CITY OF UMATILLA, OREGON

CTUIR/COU Joint Pump and Pipeline Project
Intake and Pump Station

VOLUME I OF III
CONTRACT DOCUMENTS AND SPECIAL PROVISIONS

May 2026

Volume I Contract Documents and Special Provisions
Volume II Technical Specifications
Volume III Plans

This project was funded in part with a financial award from the Special Public Works Fund, funded by the Oregon State Lottery and administered by the Oregon Infrastructure Finance Authority

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Contracting Agency:

City of Umatilla
700 6th Street
Umatilla, OR 97882
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Nakul Joshi, Project Manager

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TABLE OF CONTENTS

SECTION 1 – BID AND CONTRACT FORMS

CERTIFICATIONS

Certification by Civil Engineer

BID FORMS

Invitation to Bid
Information for Bidders
Bidder's Checklist
Proposal
Bid Schedule
Proposal Guaranty - Bid Bond
Bidder's Warranty
Contractor's Registration
First-Tier Sub-Contractor Disclosure Form Instructions
First Tier Sub-Contractor Disclosure Form

CONTRACT FORMS

Agreement for Construction
Performance and Payment Bond
Notice of Award
Notice to Proceed
Oregon Nonresident Bidder Form

WAGE REQUIREMENTS

Oregon State Wage Rates (BOLI)

SECTION 2 – SPECIAL PROVISIONS

SPECIAL PROVISIONS

Special Provisions
2024 Oregon Standards Specifications for Constructions (Incorporated by Reference)
City of Umatilla Design & Construction Standards & Specifications (Incorporated by Reference)

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SECTION 1 – BID
AND CONTRACT FORMS

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CERTIFICATIONS

CERTIFICATION BY CIVIL ENGINEER

CERTIFICATION

I hereby attest that the Volume I – Contract Documents and Special Provisions were prepared by me or under my direct supervision and that I am a duly registered Engineer under the laws of the State of Oregon.

Professional
Engineer's
License No. OR 99403PE



SIGNED 06/02/2026

EXPIRES: 12/31/2026

Signed: _____

Alejandro Romero, P.E.

Date: 6/2/2026

J-U-B Engineers, Inc.
3611 S Zintel Way
Kennewick, WA 99337

BID FORMS

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INVITATION TO BID

Owner: **City of Umatilla,** Umatilla City Hall, 700 6th Street | PO Box 130, Umatilla, OR 97882

Project: **CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station**

Sealed bids for the **CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station** will be received by **The City of Umatilla at 700 6th Street, Umatilla, OR 97882** until **11:00 a.m., Wednesday, July 1, 2026** at which time bids will be publicly read aloud. Within 2 working hours after the date and time designated for bid opening, the Bidder's shall submit to the City the First Tier Sub-Contractor's Disclosure form. If a First Tier Sub-Contractor Disclosure form is not received by **1:00 p.m.** the bid will be considered Non-Responsive. Proposals shall be clearly marked "**CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station**" showing the date and time of the bid opening, and shall be delivered to the City of Umatilla, City Hall on or before the above bid time. **No faxed or electronically submitted bids will be considered.**

A **non-mandatory** Pre-Bid Meeting will be held on **Wednesday, June 17, 2026 at 11:00 a.m.** at the project site. **Meeting will start at the Lewis and Clark Commemorative Trail access near the McNary Beach Recreation Area at the north end of Beach Access Road,** see link here for approximate location: https://maps.app.goo.gl/UPyhJep2eyZdv8HYA . Statements made by the Contracting Agency's representatives at the Pre-Bid Meeting are not binding upon the Contracting Agency unless confirmed by written addendum.

Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis, as indicated in the Bid Form. All bid proposals shall be in accordance with the Instructions to Bidders. Bid approval by City Council is scheduled for the subsequent City Council meeting that occurs on the first Tuesday of the month, beginning **Tuesday, July 21, 2026 at 7:00 p.m.** A pre-construction conference will be scheduled following council approval.

Description of work:

The project proposes the construction of a new raw river water intake pump station/POD, and the portion of the new raw water transmission main on USACE property conveying raw water to the new WTF. Also included is the installation of fiber optic cables from the POD to the WTF within conduit installed as part of this project, as part of the pipeline construction project, and as part of the WTF construction contract. The major components of the project include:

1. Construction of a pump station (POD) including pumps, fish screens, a hydropneumatic surge tank,
2. Construction of approximately 340 feet of 30-inch and 36-inch diameter pipeline from the pump station to the property line, and
3. Demolition of the existing CTUIR pump station and pipeline.

Adjacent projects designed by others will be constructed in tandem with this project, coordination of construction schedules and scope connections will be required.

Electronic copies of the bidding documents are available for purchase at http://www.questcdn.net upon payment of $22. The QuestCDN project number is **10217531**. **Should you need assistance with this process, please contact QuestCDN at 952-233-1632.** All addenda will be issued electronically and available for no extra cost at QuestCDN. Contract Documents must be purchased and submitted in completion in order to be considered a Responsive Offer as Defined by OAR 137-046-0110(33). **Partial sets of Bidding Documents**

will not be available from the Issuing Office. Bids will only be accepted from those registered QuestCDN plan holders.

This project was funded in part with a financial award from the Special Public Works Fund, funded by the Oregon State Lottery and administered by the Oregon Infrastructure Finance Authority. As such, the Contractor is required to post a sign, provided by the Authority, at the project site or, if more than one site is included in the project, at a site visible to the general public stating that the project is being funded by lottery proceeds. Oregon Bureau of Labor and Industries (BOLI) Wage Rates must be paid on this project. Contractor agrees to be bound by and will comply with the provisions of 279C.840 or 40 U.S.C. 3141 to 3148.

Each bid must contain a statement as to whether the Bidder is a resident Bidder, as defined in ORS 279.120. In determining the lowest responsible Bidder, City of Umatilla will, for the purpose of awarding the Contract, add a percentage increase on the bid of a nonresident Bidder equal to the percentage, if any, of the preference given to that Bidder in the state in which the Bidder resides.

Each proposal must be submitted on the prescribed form and accompanied by a bid bond payable to City of Umatilla in an amount not less than ten percent (10%) of the amount bid.

The successful Bidder will be required to furnish separate Performance and Payment Bonds of one hundred percent (100%) submitted on the prescribed forms for faithful performance of the Contract in the full amount of the Contract price. The Surety issuing the bond must have an attorney-in-fact or a principal doing business in the State of Oregon. This information must be included on the bond statement.

In addition to required Performance and Payment Bonds which may be used for unpaid wages, all contractors, subcontractors and non-construction companies working on public works projects, with a contract price that exceeds $100,000, subject to the Prevailing Wage Rate Law, must file a $30,000 Public Works Bond with the Construction Contractor's Board before starting work on the project, unless exempt, to be used exclusively for unpaid wages determined to be due by BOLI. (ORS 279C.830 and ORS 279C.836).

The Contracting Agency will not receive or consider an Offer for a Public Improvement Contract unless the Offeror is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board, as specified in OAR 137-049-0230.

Contractor shall not discriminate in obtaining required Sub-Contractor's in accordance with ORS 279A.110(4). (See OAR 137-049-0440(3)).

The City of Umatilla reserves the right to reject any or all proposals not in compliance with all prescribed Public Contracting procures and requirements, including the requirement to demonstrate the Bidder's responsibility under ORS 279C.375(3)(b). The City of Umatilla may also reject any or all proposals for good cause, or any or all bids upon a finding of the Owner that it is in the public interest to do so, to postpone the award of the Contract for a period not to exceed thirty (30) days, and to accept that proposal which is to the best interests of City of Umatilla.

For information regarding this project, contact the contract administrators, J-U-B ENGINEERS, Inc.:

Cliff Woods, P.M.P.
(509) 783-2144
cwoods@jub.com

Dated this **3rd** day of **June 2026**

City of Umatilla
David Stockdale, City Manager

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INFORMATION FOR BIDDERS

1. PROJECT DATA AND REQUIREMENTS

a. **Project Name**: CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station

b. **Project Location**: Umatilla, Oregon

c. **Project Owner**: City of Umatilla

d. **Project Financing:** City of Umatilla, Oregon Special Public Works Fund

e. **Owner's Engineer**:

Kleinschmidt Associates, Inc., 15301 NE 90th Street, Redmond, WA 98052, (425) 241-0256, Kleinschmidt Project Manager: Charles Cutting, P.E.

f. **Owner's Contract Administrator:**

J-U-B ENGINEERS, Inc., 3611 S Zintel Way, Kennewick, WA 99337, (509) 783-2144, J-U-B Project Manager: Cliff Woods, P.M.P.

g. **Project Starting and Contract Times:**

Work is to commence within five (5) Calendar Days of the date of Notice to Proceed and shall be completed in accordance with the Contract Times stated in these Contract Documents and Technical Specifications.

h. **Bid Proposal:**

Each Bid must be submitted in a sealed envelope, addressed to **David Stockdale, City Manager, City of Umatilla, 700 Sixth Street, PO Box 130, Umatilla, OR 97882**. Each sealed envelope must be plainly marked on the outside "**CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station**" and shall state the **date and time of the bid opening** and the **name and address of the Bidder.**

All Bids must be made on the Proposal and Bid Schedule Forms included in this Bid Package. All blank spaces for prices must be filled out in ink or typewritten, and the forms must be fully completed and executed when submitted. In case of discrepancies between unit prices and totals, unit prices will prevail. Only one copy of the Bid is required. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope, addressed as stated above.

The City reserves the right to revise or amend the Bid Package prior to the date set for opening of the bids. Such revisions and amendments will be covered by addendum or addenda, copies of which will be transmitted by email to each Bidder who has received bid documents via the QuestCDN Plan Holders List. Each Bidder shall be required to

acknowledge receipt of the addendum or addenda by his/her/their signature and shall include the signed addendum or addenda with his/her/their Bid.

i. Bid Schedule:

The work is offered in one Bid Schedule on a lump sum price basis. Each item is to be bid. If a bid item is not filled in, the bid may be considered non-responsive as defined in Section 00120.65. No substitutions, alternate bids or partial bids are allowed, except as provided by written addenda from the Engineer.

The Bidder is referred to Special Provision 00120.40 – Preparation of Bids.

j. Bid Opening:

Public bid opening will be at **City of Umatilla City Hall, 700 6th Street, Umatilla at 11:00 a.m. local time, Wednesday, July 1, 2026**.

k. Copies of Bidding Documents:

Digital copies of the Bid Documents, including any Addenda, may be obtained beginning **Wednesday, June 3, 2026**, from QuestCDN at www.questcdn.com upon payment of twenty-two dollars ($22.00). Log in to the website and enter Quest Project Number (**10217531**). Should you need assistance with this process, please contact QuestCDN at 952-233-1632. Partial sets of Bidding Documents will not be available from the Issuing Office.

Bids will only be accepted from registered plan holders who have purchased a set of Plans and Contract Documents through QuestCDN. Complete sets of Bidding Documents shall be used in preparing the Proposals. Neither the Owner nor Engineer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

For information regarding the project contact:

Cliff Woods, P.M.P.
J-U-B ENGINEERS, Inc.
3611 South Zintel Way
Kennewick, WA 99337
(509) 783-2144
cwoods@jub.com

l. Basis of Award:

This contract will be awarded to the lowest responsible Bidder. The Owner reserves the right to reject any and all Proposals, to waive any and all informalities and the right to disregard all nonconforming, nonresponsive or conditional Proposals. Discrepancies between words and figures will be resolved in favor of the correct total sum. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

The Bidder is referred to Special Provision 00120.40 – Preparation of Bids. The Bidder is also referred to Section 00130 – Consideration of Bids in the Standard Specifications and its corresponding Special Provisions included herein.

m. **Retainage**:

To ensure proper performance of this Contract, the Owner shall retain five percent (5%) of the amount of each progress payment from start of construction through start of operations and from removal of temporary system until completion and acceptance of all work covered by this Contract. Retainage will be deducted in accordance with Section 00195.50(c). Retainage will not be withheld on the operational period when Contractor is not onsite.

n. **Prevailing Wages**:

The Contractor shall comply with the prevailing wage provisions of ORS 279C.800 through ORS 279C.870 and the requirements of Section 00170.65. The project is funded through City of Umatilla funds and as such the Oregon Bureau of Labor and Industries (BOLI) Wage Rates must be paid on this project in accordance with Section 00170.65(e).

o. **Bid Bond:**

Accompanying this proposal is a certified check, cashier's check or Bidder's bond in the sum of (10%) of Bid Total. Failure of the successful Bidder to execute the contract and provide the required documentation as stated in Section 00130.60 may cause forfeiture of the Bid bond under ORS 279C.385. ***A bid submitted with other than the bid bond provided will be determined to be non-responsive and not considered for award action***.

p. **Performance and Payment Bonds:**

Prior to execution of the Contract, the Bidder shall in accordance with Section 00130.40(a) 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 surety issuing such bonds shall be licensed to issue bonds in the State of Oregon. The City of Umatilla, Kleinschmidt Associates, and J-U-B ENGINEERS, Inc. shall be named as an additional insured.

q. **Public Works Bond:**

In addition to the required Performance and Payment Bonds, which may be used to satisfy unpaid wage claims, all contractors and subcontractors required to be licensed by the Oregon Construction Contractors Board (CCB) and working on public works projects with a contract price that exceeds $100,000 that are subject to the Prevailing Wage Rate Law must, unless exempt, file a $30,000 Public Works Bond with the CCB before starting work on the project. This bond is separate from the Performance and Payment Bonds and is used exclusively for the payment of wages determined to be due by the Oregon Bureau of Labor and Industries (BOLI). See ORS 279C.830, ORS 279C.836, and Section 00170.20 of the Standard Specifications for additional information.

r. Change Orders:

Any change in cost, schedule, and/or scope of work would require review of the Owner and/or Owner's Representative prior to approval. Change orders shall follow the procedures outlined in Section 00140.30. Adjustments to contract time will be made according to Section 00180.80.

s. Pre-Bid Meeting:

A **non-mandatory** Pre-Bid Meeting will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner, Contract Administrator, and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Contract Administrator will transmit to all prospective Bidders of record such Addenda as Contract Administrator considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

t. Interpretations and Addenda:

All questions about the meaning or intent of the Bidding Documents are to be submitted to the Contract Administrator in writing. Interpretations or clarifications considered necessary by the Engineer and/or Contract Administrator in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions and/or clarifications shall be received no less than five (5) business days prior to the date for opening of Bids to allow for a written reply to reach all prospective Bidders before submission of their bids. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents.

u. Oregon's Reciprocal Preference Law:

ORS 279A.120 requires public contracting agencies, in determining the lowest responsible bidder, to add a percent increase to each out-of-state bidder's bid price which is equal to the percent of preference given to local bidders in the bidder's home state. That is, if the low bidder is from a state that grants a 10 percent preference to its own in-state bidders, the Oregon agency must add 10 percent to that bidder's price when evaluating the bid.

ORS 279A.120(2) states: For the purposes of awarding a public contract, a contracting agency shall:

> (a) Give preference to goods or services that have been manufactured or produced in this state if price, fitness, availability and quality are otherwise equal; and
>
> (b) Add a percent increase to the bid of a nonresident bidder equal to the percent, if any, of the preference given to the bidder in the state in which the bidder resides.

The Department of Administrative Services (DAS), State Procurement Office has gathered information on preference laws of all states. For more information please visit:

https://www.oregon.gov/DAS/Procurement/Pages/Index.aspx

Each bid must identify whether the bidder is a resident bidder, and each bidder must be qualified in accordance with ORS 279 and other applicable sections of the Oregon Revised Statutes in order to enter into a Contract with the Owner for public work in Oregon.

v. In-State Tie-Bid Awards:

All state and local contracting agencies shall give preference to in-state offerors if their offers are the same as nonresident offerors.

w. Nonresident Bidders:

ORS 279A.120(3) states: "When a public contract is awarded to a nonresident bidder and the contract price exceeds $10,000, the bidder shall promptly report to the Department of Revenue (DOR) on forms to be provided by the department the total contract price, terms of payment, length of contract and such other information as the department may require before the bidder may receive final payment on the public contract. The contracting agency shall satisfy itself that the requirement of this subsection has been complied with before the contracting agency issues a final payment on a public contract." **(See form included in the Contract Documents).**

To view ORS 279A.120, visit: www.oregonlegislature.gov

For information about DOR requirements, contact: www.oregon.gov/DOR

x. Notice of Award:

The City will issue a Notice of Award, which shall be accompanied by the necessary Agreement, within seven (7) calendar days of award of the contract. The Agreement shall be completed by the Contractor and returned to the City, together with the Performance Bond within seven (7) calendar days. In case of failure by the Bidder to execute the Agreement, the City may at their option consider the Bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the City.

y. Notice to Proceed:

The City will issue a Notice to Proceed no more than 14 calendar days following receipt of an acceptable Performance Bond and Agreement signed by the party to whom the Agreement was awarded.

Should there be reasons why the Notice to Proceed cannot be issued, the time may be extended by mutual agreement between the City and the Contractor. If the Notice to Proceed has not been issued within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

z. Liquidated Damages:

Liquidated damages will be assessed based on provisions in the Oregon Standard Specifications and the related Special Provisions for each and every Calendar Day that the project remains uncompleted beyond the Contract Times set in these Contract Documents and Technical Specifications. See Sections 00185.50 and 00180.85 of the Oregon Standard Specifications and the related Special Provisions for additional information.

aa. Contractor's Relations with Subcontractors:

Contractor's relations with subcontractors shall be in accordance with ORS 279C.580.

bb. Contractor's Relations with Other Contractors:

Contractor is aware that other contractors may be working within close proximity of the construction site and must coordinate accordingly to not interfere with one another.

cc. Stormwater Pollution Prevention Plan (SWPPP):

The Contractor shall be responsible for stormwater, site disturbance, erosion and sediment control and dewater discharge management. On-site construction practices shall conform to the Oregon State mandated requirement.

The Bidder is referred to Technical Specification 01 57 10 – Stormwater Pollution Prevention Plan.

dd. Cultural Monitoring:

The Owner will provide a cultural monitor to observe all ground disturbing work including blasting and grading. The Contractor will be responsible for coordination work location with the Owner or Owner's Representative within the agreed upon extents. Any costs for the cultural monitor will be paid for by the Owner. If cultural resources are discovered during construction, work will cease in that area and the appropriate agencies will be notified of the discovery. If human remains are found, the Oregon State Police (State Historic Preservation Office) will also be contacted. See Sections 00290.50 and 00290.51 of the Oregon Standard Specifications and Technical Specification 01 10 00 for more information.

ee. Coordination with Irrigation Operations:

The existing CTUIR pump station, pipeline and canal will be in operation periodically during construction of the project to deliver water to the CTUIR-operated wetlands. The Contractor shall coordinate installation of new utilities with City of Umatilla and CTUIR operations to minimize the duration of construction impacts on water delivery to the wetlands. Continuous interruptions shall be no more than 2 weeks in duration.

ff. In-Water Work Window

Construction of the cofferdam to isolate the pump station work from the Columbia River must be completed by March 31, 2027. See Technical Specifications 01 32 16 and 01 57 24 for additional information.

BIDDER'S CHECKLIST

The Bidder's attention is especially called to the following forms or information, which must be submitted in full as part of the bid.

[ ] **PROPOSAL** signed and completely filled out.

[ ] **BID SCHEDULE** filled out showing bid amounts and properly signed.

[ ] **PROPOSAL GUARANTY** completed, signed, and dated.

[ ] **BIDDER'S WARRANTY**.

[ ] **CONTRACTOR'S REGISTRATION**.

Above forms MUST BE inserted in sealed envelope properly identified and delivered to the OWNER.

[ ] **Complete and submit, in a separate envelope, the FIRST-TIER SUB-CONTRACTOR'S DISCLOSURE form. This form shall be submitted no later than two work hours after the time that bids are due (bid closing).**

(This Bidder's Checklist is provided as a convenience to the Bidder.
It is recommended, but not required, that this page be attached to the front of the bid.)

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PROPOSAL

TO: CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station
City of Umatilla
700 6th Street | PO Box 130
Umatilla, OR 97882

Bidder's Declaration and Understanding

The undersigned Bidder declares that: (a) the Construction Drawings, Standard Specifications, Invitation to Bid, Information to Bidder's, Proposal, Bid Schedule and all other Bidding Requirements, collectively referred to hereinafter as the Contract Documents for the construction of the proposed improvement have been carefully examined; (b) that the site has been personally inspected and that he 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 the existing streets and roadways giving access to the site of the work, and the topography of the site of the work; (c) that the Bidder is satisfied as to the quantities of materials, items of equipment and conditions or work involved including the fact that the description of the quantities of work and materials as included herein is brief and is intended only to indicate the general nature of such items and to identify the said quantities with the detailed requirements of the Contract Documents; and (d) that the Bidder's proposal is made according to the provisions and under the terms therein, which documents are hereby made a part of this proposal.

The Bidder further declares that the only persons or parties interested in this proposal are those named herein; that this proposal is in all respects fair and without fraud; that it is made without collusion with any official of City of Umatilla (Owner), and that the proposal is made without any connection or collusion with any person making another proposal on this Contract.

The Bidder further declares by the signing of this proposal that all the provisions required by ORS Chapter 279C relating to the payment of prevailing wage rates for work performed under the Contract with the Owner shall be complied with. Including, but not limited to:

a) Bidder is a registered with the Oregon Construction Contractors Registration Board in Oregon in accordance with ORS 701. A Contracting Agency may not receive or consider a bid for a public improvement Contract unless the Bidder is registered with the Construction Contractors Board or a State Landscape Contractors Board as specified in OAR 197-049-0230. The Bidder further certifies that, if awarded the Contract, all Sub-Contractor's performing the work will be registered with the Construction Contractors Board in accordance with ORS 701.035 and ORS 701.055 before the Sub-Contractor's commence work under the Contract. The Contracting Agency will not receive or consider an offer for a Public Improvement Contract from an unregistered Bidder.

b) Bidder shall identify whether the Bidder is a "resident Bidder" as defined in ORS 279A.120.

c) Bidder agrees to be bound by and will comply with the provisions of the Oregon Prevailing Wage Law (ORS 279C.800 through ORS 279C.870). In addition, the Bidder will comply with ORS 297C.520, 279C.540, and 279C.545 in the hours of employment and the payment of overtime.

d) Bidder, in accordance with ORS 279A.110, does not discriminate against minorities, women, or emerging small business enterprises in obtaining any Sub-Contract's.

e) Bidder and Bidder's Sub-Contractors are not on the Oregon Construction Contractors Board list of corporations, partnerships, or other business entities of which the Contractor or Sub-Contractor is an Owner, shareholder, or officer of the business or was an Owner or officer of the business and who have been determined not be qualified to hold or participate in a public Contract for a public improvement.

f) Bidder must provide prompt payment to all persons supplying labor or material, contributions to Industrial Accident Fund; liens and withholding taxes per ORS 279C.505.

g) Bidder has an employee drug testing program that meets State and Federal standards per ORS 279C.505(2).

h) Bidder must salvage or recycle construction and demolition debris and must compost or mulch yard waste material at an approved site, if feasible and cost-effective, per ORS 279C.510(1).

i) Bidder acknowledges conditions concerning notice and payment of claims per ORS 279C.515, ORS 279C.580 and ORS 279C.605.

j) Bidder shall comply with environmental and natural resource regulations as defined in ORS 279C.525.

k) 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 Oregon Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Sub-Contractors comply with these requirements. Contractor must comply with payment for medical care and attention to employees as defined in ORS 279C.530.

l) Bidder acknowledges retainage will be per ORS 279C.550 to ORS 279C.570.

m) Bidder's certification of compliance with State of Oregon tax laws in accordance with ORS 305.385.

n) Bidder acknowledges that 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.

The Bidder further agrees that its own judgment has been exercised regarding the interpretation of subsurface information and all data which it believes pertinent from the Engineer, Owner, and other sources in arriving at these conclusions have been utilized.

Contract Execution and Bonds

The Bidder agrees that if this proposal is accepted, a Contract with the Owner will be executed within seven (7) Calendar Days after the date of the written Notice of Award, and will at that time, deliver to Owner the required Performance and Payment Bonds.

Certificates of Insurance

The Bidder agrees to furnish the Owner, in accordance with Section 00130.50(a), the certificates of insurance as specified in these Contract Documents (refer to *00130.40 (b) of the 2024 Oregon Standards*).

Start of Construction and Contract Completion Date

Work is to commence within five (5) Calendar Days of the date of Notice to Proceed and shall be completed in accordance with the Contract Times stated in these Contract Documents and Technical Specifications.

Liquidated Damages

Liquidated damages will be assessed based on provisions in the Oregon Standard Specifications and the related Special Provisions for each and every Calendar Day that the project remains uncompleted beyond the Contract Times set in these Contract Documents and Technical Specifications. See Sections 00185.50 and 00180.85 of the Oregon Standard Specifications and the related Special Provisions for additional information.

Surety

If the Bidder is awarded a construction Contract on this proposal, the Surety who provides the Performance and Payment bond will be _____ whose address is _____ .

Lump Sum or Unit Price Work

The Bidder further proposes to accept as full payment for the work proposed herein the amounts computed under the provisions of the Contract Documents and based on the following lump sum or unit price amounts stated in the Bid Schedule, it being expressly understood that the unit prices are independent of the exact quantities involved. The Bidder agrees that the lump sum prices and the unit prices represent a true measure of the labor and materials required to perform the work, including all allowances for overhead and profit for each type and unit of work called for in these Contract Documents.

Addendum

The Bidder hereby acknowledges receipt of Addendum Nos. ____, ____, _____, _____, _____ to these Contract documents.

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.

Bidder

The name of the Bidder submitting this proposal is: _____ doing business at _____ which is the address to which all communications concerned with this proposal and with the Contract shall be sent.

In accordance with ORS 279A.120, Bidder hereby declares that it **IS / IS NOT** a resident Bidder**.** *(Required - Circle appropriate option).*

By submitting a bid/proposal under this solicitation, the bidder or offeror certifies that neither it nor its principals are presently debarred or suspended by any Federal department or agency from participation in this transaction.

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.

The names of the principal officers of the corporation submitting this proposal, or of the partnership, or of all persons interested in this proposal as principals are as follows:

_____

_____

If Sole Proprietor or Partnership: IN WITNESS hereto the undersigned has set his/her/their hand this day of _____, 20__.

_____ _____

Signature of Bidder Title

If Corporation: IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this _____ day of _____, 20__.

Name of Corporation_____

(SEAL)

By_____

Attest_____ Title_____

Telephone No._____ Fax No._____

BID SCHEDULE
(Estimated Quantities)

Base Bid					
Item No.	**Description**	**QTY**	**UNIT**	**UNIT PRICE**	**TOTAL COST**
1	MOBILIZATION	1	LS		
2	CARE AND DIVERSION OF WATER	1	LS		
3	DEMOLITION AND SITE RESTORATION	1	LS		
4	CONCRETE	1	LS		
5	METALWORK	1	LS		
6	PUMP HOUSE STRUCTURE	1	LS		
7	PAINTING	1	LS		
8	HEATING, VENTILATING AND AIR CONDITIONING	1	LS		
9	ELECTRICAL	1	LS		
10	INSTRUMENTATION AND CONTROL SYSTEM	1	LS		
11	EARTHWORK	1	LS		
12	SITE IMPROVEMENTS	1	LS		
13	VALVES, GATES, AND PIPING	1	LS		
14	VERTICAL TURBINE PUMPS	1	LS		
15	HYDROPNEUMATIC SURGE TANK	1	LS		

Base Bid					
Item No.	**Description**	**QTY**	**UNIT**	**UNIT PRICE**	**TOTAL COST**
16	RETREIVABLE DRUM SCREENS	1	LS		
17	START-UP, TESTING AND COMMISSIONING	1	LS		
18	AS-BUILTS AND DEMOBILIZATION	1	LS		

Base Bid Total: $_____

Total Bid: $_____

Total Bid in Words: _____

The above processes shall include all labor, materials, overhead, profit, insurance, etc., to cover the items specified, and shall also include applicable taxes and fees.

Award will be made to the lowest responsible bidder. The City reserves the right to award or not award this Contract.

The undersigned Bidder acknowledges receipt of the following addendum(s):

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

Addendum No. _____ Date: _____

_____

Signature - Bidder

_____

Name (Print/Type) - Bidder

PROPOSAL GUARANTY - BID BOND

BOND NO _____

AMOUNT $_____

KNOW ALL MEN BY THESE PRESENTS, that we _____(Contractor) hereinafter called the PRINCIPAL, and _____ (Surety) a corporation duly organized under the laws of the State of _____, hereinafter called the Surety, having its principal place of business at , in the State of _____, and authorized to do business in the State of Oregon, as SURETY, are held firmly bound unto City of Umatilla, hereinafter called the OBLIGEE, in the sum of _____ DOLLARS ($_____), for the payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the PRINCIPAL is herewith submitting his or its Bid Proposal for City of Umatilla, **CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station**, said Bid Proposal, by reference thereto, being hereby made a part hereof.

NOW, THEREFORE, if the Bid Proposal submitted by the PRINCIPAL is accepted, and the Contract awarded to the PRINCIPAL, and if the PRINCIPAL shall execute the proposed Agreement for Construction and shall furnish such Performance and Payment Bonds as required by the Contract Documents within the time fixed by the documents, then this obligation shall be void; if the PRINCIPAL shall fail to execute the proposed Contract and furnish the bond, the SURETY hereby agrees to pay to the OBLIGEE the said sum as liquidated damages, within ten (10) days of such failure.

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

Principal: _____ Surety: _____

By: _____ By: _____

Title: _____ Title: _____

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BIDDER'S WARRANTY

By the act of submitting a bid for the proposed Contract, the Bidder warrants that:

1. The Bidder and all Sub-Contractors they intend to use have carefully and thoroughly reviewed the Drawings, Specifications and other Bid Documents have found them complete and free from ambiguities and sufficient for the purpose intended; further that,

2. The Bidder and all workmen, employees and Sub-Contractor's they intend to use are skilled and experienced in the type of construction represented by the Documents bid upon; further that,

3. Neither the Bidder nor any of his/her employees, agents, intended suppliers or Sub-Contractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, his/her employees or agents including architects, Engineers or consultants, in assembling the bid figure; and further that,

4. The bid figure is based solely upon the Bid Documents and properly issued written Addenda and not upon any other written representation.

Dated _____, day of _____, 20__

Name of Bidder: _____

By: _____

Title: _____

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CONTRACTOR'S REGISTRATION

NAME OF FIRM: _____

ADDRESS: _____

Oregon Construction Contractors Registration Board Number: _____

SIGNATURE: _____

By:_____ Date: _____

Title: _____

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FIRST-TIER SUB-CONTRACTOR DISCLOSURE FORM INSTRUCTIONS

Instructions for Submitting Form

Submit the First-Tier Sub-Contractor Disclosure form in any of the following manners:

- May be submitted with the bid, but
- Must be received no later than ***two working hours*** after the time set for opening bids. (For example, by 4:00 p.m. after a 2:00 p.m. bid closing). Submit as follows:
    - Remove the form from the bid booklet and deliver it to the City of Umatilla, Umatilla City Hall, 700 6th Street | PO Box 130, Umatilla, OR 97882.

Instruction for First-Tier Sub-Contractor Disclosure

When the Contract value for a public improvement is greater than $100,000 Bidders are required to disclose information about first-tier Sub-Contractor's that will furnish labor or labor and materials (See ORS 279C.370). Specifically, when the Contract amount of the first-tier Sub-Contractor is greater than or equal to: (1) 5% of the total project bid, but at least $15,000, or (2) $350,000 regardless of the percentage of the total project bid, you must disclose the following information about the Sub-Contractor not later than two working hours after the time set for opening bids:

- The name of the Sub-Contractor.
- The Category of work that the Sub-Contractor will be performing.
- The dollar value of the Sub-Contract

If your bid is greater than $100,000 and you will not be using any first-tier Sub-Contractor's, you are still required to submit the form, with the appropriate box checked or enter "NONE" on the first line.
If your bid is greater than $100,000 and you are not subject to the above disclosure requirements, you are still required to submit the form, with the appropriate box checked or enter "NONE" on the first line.

THE OWNER MUST REJECT BIDS if the Bidder fails to submit the disclosure form with this information by the stated deadline.

To determine disclosure requirements, the Owner recommends that you disclose Sub-Contractor information for any Sub-Contractor as follows:

1. Determine the lowest possible prime Contract price. That will be the base bid amount less all alternate deductive bid amounts (exclusive of any options that can only be exercised after bid award).
2. Provide the required disclosure information for any first-tier Sub-Contractor whose potential Contract services are greater than or equal to: (1) 5% of the lowest Contract price, but at least $15,000, or (2) $350,000 regardless of the percentage. Total all possible work for each Sub-Contract in making this determination, (for example, if a Sub-Contract will provide $15,000 worth of services on the base bid and $40,000 on an additive alternate, then the potential amount of the Sub-Contractor's services 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 services).

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FIRST-TIER SUB-CONTRACTOR DISCLOSURE FORM

Project Name: _____

Owner: _____

Bid Opening Date: _____ **Bid Opening Time:** _____

Name of Bidding Contractor: _____

Contact Name: _____ **Phone No:** _____

☐ ***Check this box if you will not be using any first-tier sub-contractor's (see instructions).***

LIST SUBCONTRACTORS FURNISHING LABOR OR LABOR AND MATERIALS THAT ARE REQUIRED TO BE DISCLOSED.

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

Firm Name	
Category of Work	$

(Attach additional sheets as necessary)

It is the responsibility of Bidder's to submit this Disclosure Form and any additional sheets, with the Project Name clearly marked, at the location indicated by the specified disclosure deadline. See Instructions to Bidder's.

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CONTRACT FORMS

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AGREEMENT FOR CONSTRUCTION

THIS CONTRACT, made and entered into, in triplicate, this _____ by and between the
(date)

City of Umatilla, hereinafter called "Owner", and _____,
(Contractor Name)
is authorized to do business in the State of Oregon, hereinafter called "Contractor",

WITNESSETH:

That the said Contractor, in consideration of the sums to be paid by the **City of Umatilla**, in the manner and at the time herein provided, and in consideration of the other covenants and agreements herein contained, hereby agrees to perform and complete the work herein described and provided for and to furnish all necessary machinery, tools, apparatus, equipment, supplies, materials and labor and do all things in accordance with the applicable Plans, the applicable Standard Specifications, the Special Provisions and other required provisions bound herewith or incorporated therein, and in accordance with such alterations or modifications of the same as may be made by the Engineer or the Owner, and according to such directions as may from time to time be made or given by the Engineer under the authority and within the meaning and purpose of this Contract. This agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the Contractor.

That the applicable Plans, the applicable Standard Specifications, the Special Provisions and other required provisions bound herewith or incorporated therein and the Schedule of Items bound herewith are hereby specifically referred to and by this reference made a part hereof, and shall by such reference have the same force and effect as though all of the same were fully written or inserted herein.

That the Contractor agrees the time allowed is a reasonable period to perform the work and all work on this project shall be completed within the defined Contract time. Project time extension will be evaluated and duly processed by the Engineer or Owner as defined in the specifications.

That the Contractor shall faithfully complete and perform all of the obligations of this Contract, and in particular shall promptly, as due, make payment of all just debts, dues, demands and obligations incurred in the performance of said Contract; and shall not permit any lien or claim to be filed or prosecuted against the **City of Umatilla**. It is expressly understood that the laws of the State of Oregon shall govern this Contract in all things.

In consideration of the faithful performance of all of the obligations, both general and special, herein set out, and in consideration of the faithful performance of the work as set forth in this Contract, the applicable Plans, Standard Specifications, Special Provisions, other required provisions, Schedule of Items, and all general and detailed Specifications and Plans which are a part hereof, and in accordance with the directions of the Engineer and to the Engineer's satisfaction, and if applicable, to the satisfaction of the governing Federal Agencies and/or Funding Agencies, or its authorized representative, the **City of Umatilla**, agrees to pay to the said Contractor the amount earned, as determined from the actual quantities of work performed and the prices and other bases of payment specified and taking into consideration any amounts that may be deductible under the terms of the Contract, and to make such

payments in the manner and at the times provided in the applicable Standard Specifications or Special Provisions and Schedule of Unit Prices hereto attached. The Contract Sum is:

_____($)_____

If said work is not completed within the time specified, the Contractor agrees to pay the Owner the liquidated damages amount sum as set forth in the Specifications. These amounts shall be totaled and deducted from the amounts due to the Contractor.

The Contractor, for himself, and for his heirs, executors, administrators, successors and assigns, does hereby agree to the full performance of all covenants herein contained upon the part of the Contractor.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be executed the day and year below:

Dated this _____ day of _____, 20__.

CITY OF UMATILLA

By _____ By _____
Authorized Official Signature Authorized Official Signature

_____ _____
Printed Name Printed Name

Contractor Name: _____

Address: _____

Phone: _____

Email: _____

By _____ By _____
Authorized Official Signature Authorized Official Signature

_____ _____
Printed Name Printed Name

PERFORMANCE AND PAYMENT BOND

Know all persons by these presents, that _____, hereinafter called the PRINCIPAL,

and _____ a CORPORATION or partnership duly authorized to do a general

surety business in Oregon, as SURETY, are jointly and severally held and bound unto the City of Umatilla,

Oregon, hereinafter called the OBLIGEE in the sum of

DOLLARS _____ **($ _____)**

for the payment of which we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, firmly by these presents.

The condition of this bond is such that, whereas, _____
(Contractor)
the PRINCIPAL herein, on the _____ Day of _____, entered into a Contract with the OBLIGEE, for the **"CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station"** Project in accordance with the Contract Documents.

Said the PRINCIPAL undertakes to furnish all labor and equipment, and materials in accordance with all the terms and conditions set forth in said Contract documents; to promptly make payment for all labor, services, material, and sums due the Workmen's Compensation Board or equivalent. The Collector of Internal Revenue, and the Treasurer of the State of Oregon; to save harmless the OBLIGEE from any claim for damages or injury to property or persons arising by reason of said work, as set out more fully in said Contract documents; to do and perform all things in said Contractor documents required, in the time and manner under the terms and conditions therein set forth; and in conformity with all laws, state and national, applicable thereto.

Now, therefore, if said PRINCIPAL herein; shall promptly pay all persons furnishing labor, services and material, and Workmen's Compensation Insurance or equivalent, and Social Security and unemployment compensation, to him/her and to his/her Sub-Contractor's, or to their assigns, on or about said work; shall, commencing with the date hereof and continuing for one (1) year after the complete performance of the contact and the final acceptance of the work in the Contract, save harmless the OBLIGEES, its officers and agents, from all claims therefore, or from any claim for damages or injury to property or persons arising by reason of said work; shall, in the time and manner, and under the terms and conditions prescribed, will and faithfully do, perform and furnish all matters and things as by them in said Contract undertaken, and as by law state and national, prescribed, then this obligation shall be void; but otherwise it shall remain in full force and effect.

Provided, however, that this bond is subject to the following further conditions:

(a) All material, men, and all persons who shall supply such laborers, mechanics or Sub-Contractor's with material, supplies, or provisions for carrying on such work, shall have a direct right of action against the PRINCIPAL and SURETY on the bond, second only to the right of the OBLIGEE under

this bond, which right of action shall be asserted in proceedings instituted in the appropriate court of the State of Oregon, and insofar as permitted by the laws of Oregon, such right of action shall be asserted in a proceedings instituted in the name of the OBLIGEE to the use and benefit of the person, firm, or corporation instituting such action and of all other persons, firms, or corporations having claims hereunder, and any other person, firm, or corporation having a claim hereunder shall have the right to be made a party to such proceeding (but not later than one year after the complete performance of said Contract and final acceptance of the work in the Contract) and to have such claim adjudicated in such action and judgement rendered thereon.

(b) In no event shall the SURETY be liable for a greater sum than the penalty of this bond.

(c) The said SURETY for the value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract of to the work to be performed thereunder or the specification accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the specifications.

(d) The principal herein shall faithfully and truly observe and comply with the terms of the Contract, and shall well and truly perform all matters and things by him/her undertaken to be performed under said Contract upon the terms proposed therein and shall promptly make payments to all persons supplying labor or material for any prosecution of the work provided for in such contact and shall not permit any Lien or claim to be filed or material furnished, and shall promptly pay all contributions or amount due the Workmen's Compensation Board or equivalent and all contributions or amounts due the State Employment compensation Trust Fund incurred in the performance of said Contract, and shall also pay all sums of money withheld from the employees and payable to State Tax Commission pursuant to ORS 316.711 and shall promptly as due, make payment to any person, co-partnership, association, or corporation, furnishing medical, surgical, and hospital care or other needed care and attention incidental to sickness or injury to the employees for such PRINCIPAL, pursuant to the laws of this state and any Contract entered into pursuant thereto or collected or deducted from the wages of said employees pursuant to any law, Contract, or agreement for the purpose of providing or paying for such services, and shall do all things required of said PRINCIPAL, by the laws of this state.

This bond is given and received under the authority of ORS Chapter 279, the provisions of which hereby are incorporated into this bond and made a part hereof.

In witness whereof, the parties hereto have caused this bond to be executed in _____this ___ _____ day of _____, 20__.

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

Principal

WITNESSES:

_____(SEAL)

_____(SEAL)

_____(SEAL)
Surety

The attorney-in-fact who executes this bond in behalf of the surety company, must attach a copy of their power-of-attorney as evidence of their authority.

To each executed original of this bond, there must be attached a complete set of the Contract documents, as the term is defined in the Oregon Standard Specifications “General Conditions”, with all corrections, interlineations, signatures, etc., completely reproduced therein.

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NOTICE OF AWARD

TO: _____

FROM: CITY OF UMATILLA
700 Sixth Street, PO Box 130
Umatilla, OR 97882
(541) 922-3226

RE: **CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station**

DATE: _____

This **Notice of Award** is to advise you that the City of Umatilla has accepted your bid for the above-described goods and materials.

In accordance with the Bid Package, you have seven (7) calendar days from the date of this Notice of Award to furnish the completed Purchase Agreement and Performance Bond called out in the Bid Package.

This is **not** a Notice to Proceed for the performance of the work under the Purchase Agreement. When you have complied with the requirements set forth in the Bid Package a Notice to Proceed will be issued to you.

You are required to return an acknowledged copy of this Notice of Award to the City of Umatilla.

City of Umatilla

By: _____ (David Stockdale)

Title: City Manager, Umatilla OR

Receipt of Notice of Award is hereby acknowledged.

Contractor

Date: _____ By: _____

Title: _____

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NOTICE TO PROCEED

TO: _____

FROM: CITY OF UMATILLA
700 Sixth Street, PO Box 130
Umatilla, OR 97882
(541) 922-3226

RE: CTUIR/COU Joint Pump and Pipeline Project – Transmission Main

DATE: _____

In accordance with the Purchase Agreement entered into with the City of Umatilla for the above-described Bid Package, this is your **Notice to Proceed** with the work in accordance with the Bid Package.

City of Umatilla

By: _____ (David Stockdale)

Title: City Manager, Umatilla OR

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Form OR-NRB

 Oregon Department of Revenue

Office use only
Date received

Oregon Nonresident Bidder Form

Submit original form—do not submit photocopy.

Oregon Revised Statute (ORS) 279A.120 states that when a public contract is awarded to a nonresident bidder and the contract price is more than $10,000, the bidder must report certain information to the Oregon Department of Revenue before the bidder can receive final payment on the contract. To view ORS 279A.120, visit www.oregonlegislature.gov.

Using one of the options below, you must submit this completed form before we can make your final payment.

A. Bidder information

Company name	Federal ID number –
Company contact name	Oregon business ID number
Street/mailing address	Telephone ( ) –
City, state, ZIP	Email

B. Contract information

Contracting agency name		
Terms of payment		Total contract price $
Brief description of services provided		
Will the work or services provided, at any time, require a physical presence in Oregon? ☐ Yes ☐ No		
Contract number	Start date of contract / /	Contract expiration date / /
Agency contact		

C. Submitting this form

Please submit this form one of these ways:

Mail	Fax	Email
Oregon Department of Revenue Financial Services Unit 955 Center Street NE, Room 461 Salem OR 97301	503-945-8382	dor.procurement@state.or.us *(You must have Acrobat Standard or Professional to use this option)*

Name of person signing for business — Title

/ /

Signature of person signing for business — Date

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WAGE REQUIREMENTS

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OREGON STATE WAGE RATES (BOLI)

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Oregon Bureau of Labor and Industries

Prevailing Wage Rates for Public Works Contracts



Christina E. Stephenson
Labor Commissioner
Rates Effective January 5, 2026

CHRISTINA E. STEPHENSON
Labor Commissioner

In this rate book are the new prevailing wage rates for Oregon non-residential public works projects, effective January 5, 2026.

Prevailing wage rates are the minimum hourly wages that must be paid to all workers employed on all public works projects. Thank you for your engagement in the process and commitment to Oregon law.

Our team is ready to help support you with any questions you have. We also offer regular, free, informational seminars and webinars for contractors and public agencies. Contact us at PWR.Email@boli.oregon.gov or (971) 245-3844.



Christina E. Stephenson
Labor Commissioner

More information about prevailing wage rates:

The Oregon Bureau of Labor & Industries publishes the prevailing wage rates (PWR) that are required to be paid to workers on non-residential public works projects in Oregon.

Separate documents, *Definitions of Covered Occupations for Public Works Contracts in Oregon,* provide occupational definitions used to classify the duties performed on public works projects. These definitions are used to find the correct prevailing wage rate.

The rate book and definition publications are available online at https://www.oregon.gov/boli, as well as additional information, supporting documents, and forms.

Please contact us at PWR.Email@boli.oregon.gov or (971) 245-3844, for additional information such as:

- Applicable prevailing wage rates for projects (Generally, the rates in effect at the time the bid specifications are first advertised are those that apply for the duration of the project.)
- Federal Davis-Bacon rates (In cases where projects are subject to both state PWR and federal Davis-Bacon rates, the higher wage must be paid.)
- Required PWR provisions for specifications and contracts
- Apprentice rates

TABLE OF CONTENTS

JANUARY 5, 2026

Required Postings for Contractors and Subcontractors **1**

Public Works Bonds **2**

Finding the Correct Prevailing Wage Rate **3**

Prevailing Wage Rates by Occupations **4**

List of Ineligible Contractors **27**

Forms necessary to comply with ORS 279C.800 through ORS 279C.870 can be found on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx. Contractors are encouraged to use and keep on file the forms provided as master copies for use on future prevailing wage rate projects.

All of the information in this booklet can be accessed and printed from the Internet at: www.oregon.gov/BOLI

Pursuant to ORS 279C.800 to ORS 279C.870, the prevailing wage rates contained in this booklet have been adopted for use on public works contracts in Oregon.

Required Postings for Prevailing Wage Contractors and Subcontractors

PREVAILING WAGE RATES

Every contractor and subcontractor engaged in work on a public works must post the applicable prevailing wage rates for that project in an obvious place on the worksite, so workers have ready access to the information.

DETAILS OF FRINGE BENEFIT PROGRAMS

When a contractor or subcontractor provides or contributes to a health and welfare plan or a pension plan, or both, for employees who are working on a public works project, the details of all fringe benefit plans or programs must be posted on the worksite.

The posting must include a description of the plan or plans, information about how and where claims can be made and where to obtain more information. The notice must be posted in an obvious place on the work site in the same location as the prevailing wage rates.

WORK SCHEDULE

Contractors and subcontractors must give workers their regular work schedule (days of the week and number of hours per day) in writing before beginning work on the project.

Contractors and subcontractors may provide the schedule at the time of hire, prior to starting work on the contract, or by posting the schedule in a location frequented by employees, along with the prevailing wage rate information and any fringe benefit information.

If an employer fails to give written notice of the worker's schedule, the work schedule will be presumed to be a five-day schedule. The schedule may only be changed if the change is intended to be permanent and is not designed to evade the PWR overtime requirements.

ORS 279C.840(4); OAR 839-025-0033(1). ORS 279C.840(5); OAR 839-025-0033(2). ORS 279C.540(2); OAR 839-025-0034.

PUBLIC WORKS BONDS

Every contractor and subcontractor who works on public works projects subject to the prevailing wage rate (PWR) law is required to file a $30,000 **"PUBLIC WORKS BOND"** with the Construction Contractors' Board (CCB). This includes flagging and landscaping companies, temporary employment agencies, and sometimes sole proprietors.

The key elements of ORS 279C.830(2) and ORS 279C.836 specify that:

- Specifications for every contract for public works must contain language stating that the contractor and every subcontractor must have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt.
- Every contract awarded by a contracting agency must contain language requiring the contractor:
  - To have a public works bond filed with the CCB before starting work on the project, unless otherwise exempt; and
  - To include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the CCB before starting work on the project unless otherwise exempt
- Every subcontract that a contractor or subcontractor awards in connection with a public works contract between a contractor and a public agency must require any subcontractor to have a public works bond filed with the CCB before starting work on the public works project, unless otherwise exempt.
- Before permitting a subcontractor to start work on a public works project, contractors must first verify their subcontractors either have filed the bond or have elected not to file a public works bond due to a bona fide exemption.
- The PWR bond is to be used exclusively for unpaid wages determined to be due by the Bureau of Labor & Industries.
- The bond is in effect continuously (you do not have to have one per project).
- A public works bond is in addition to any other required bond the contractor or subcontractor is required to obtain.

Exemptions:

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

PREVAILING WAGE RATES

FINDING THE CORRECT PREVAILING WAGE RATE

To find the correct rate(s) required on your public works project, you will need:

- the date the project was first advertised for bid
- the county your project is in
- the duties of workers on the job

Generally, the rate you should look for is based on the date the project was first advertised for bid. (See OAR 839-025-0020(8) for information about projects that contract through a CM/GC, or contract manager/general contractor.)

The Labor Commissioner must establish the prevailing rate of wage for each region as defined in law. (See ORS 279C.800.) A map of these regions can be found on BOLI's website.

To find the correct rate in this rate book:

1. *Determine the duties that are being performed by each worker.* Use the booklet *Definitions of Covered Occupations* to find the definition that most closely matches the actual work performed by the worker. You can find this publication online at https://www.oregon.gov/boli/employers/Pages/occupational-definitions.aspx.

2. *Find the correct occupation in the "Prevailing Wage Rate for Public Works Contracts" below.* The prevailing wage rate is made up of an hourly base rate and an hourly fringe rate. The combination of these two amounts must be paid to each worker. Watch for possible zone differential, shift differential, and/or hazard pay. If the occupation lists different rates for different Areas of the state, locate the Area that includes the county where the project is located.

Apprentices must be paid consistent with their registered apprenticeship program standard. You can find apprenticeship rates on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx. You may also contact the agency to confirm the correct apprenticeship rate.

The "Prevailing Wage Rate Laws" handbook provides specific information and answers questions regarding prevailing wage laws and is available on our website at https://www.oregon.gov/boli/employers/Documents/2024%20PWR%20Law%20book%20-%20FINAL.pdf.

If you have any questions about any of this information, please contact the Bureau of Labor & Industries at PWR.Email@boli.oregon.gov or (971) 245-3844.

Prevailing Wage Rates by Occupations—Table of Contents

Using the booklet, Definitions of Covered Occupations, find the definition and group number, if applicable, that most closely matches the actual work being performed by the worker.

Asbestos Worker/Insulator 5
Boilermaker 5
Bricklayer/Stonemason 5
Bridge and Highway Carpenter (See Carpenter Group 5) 5
Carpenter 5
Cement Mason 6
Diver 7
Diver Tender 7
Dredger 7
Drywall, Lather, Acoustical Carpenter & Ceiling Installer 8
Drywall Taper (See Painter & Drywall Taper) 17
Electrician 9
Elevator Constructor, Installer and Mechanic 13
Fence Constructor (Non-Metal) 13
Fence Erector (Metal) 13
Flagger (Laborer Group 1) 14
Glazier 13
Hazardous Materials Handler 13
Highway/Parking Striper 13
Ironworker 14
Laborer 14
Landscape Laborer/Technician 15
Limited Energy Electrician 15
Line Constructor 17
Marble Setter 17
Millwright Group 1 (See Carpenter Group 3) 5
Painter & Drywall Taper 18
Piledriver (See Carpenter Group 6) 5
Plasterer and Stucco Mason 18
Plumber/Pipefitter/Steamfitter 18
Power Equipment Operator 19
Roofer 21
Sheet Metal Worker 22
Soft Floor Layer 24
Sprinkler Fitter 24
Tender to Mason Trades (Brick and Stonemason, Mortar Mixer, Hod Carrier) 24
Tender to Plasterer and Stucco Mason 25
Testing and Balancing (TAB) Technician 25
Tile Setter/Terrazzo Worker: Hard Tile Setter 25
Tile, Terrazzo, and Marble Finisher 25
Truck Driver 26

ASBESTOS WORKER/INSULATOR	**62.02**	**25.42**
Firestop Containment	**48.74**	**18.89**
BOILERMAKER	**45.33**	**32.22**
BRICKLAYER/STONEMASON	**49.60**	**25.92**

This trade is tended by "Tenders to Mason Trades."

Add $1.00 per hour to base rate for refractory repair work.

CARPENTER

Zone A (Base Rate)

Group 1	**54.69**	**16.81**
Group 2	**54.86**	**16.81**
Group 3 (Millwrights)	**61.57**	**22.38**
Group 4	**Eliminated**	
Group 5 (Bridge & Highway)	**56.06**	**16.81**
Group 6 (Piledrivers)	**56.06**	**16.81**

Zone Differential for Carpenters - Add to Zone A Base Rate

Zone B **1.25** per hour
Zone C **1.70** per hour
Zone D **2.00** per hour
Zone E **3.00** per hour
Zone F **5.00** per hour
Zone G **10.00** per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities for Group 1 and 2 Carpenters

Albany	Coos Bay	Klamath Falls	Newport	Roseburg
Astoria	Eugene	La Grande	Ontario	Salem
Baker City	Goldendale	Lakeview	Pendleton	The Dalles
Bend	Grants Pass	Longview	Portland	Tillamook
Brookings	Hermiston	Madras	Port Orford	Vancouver
Burns	Hood River	Medford	Reedsport	

See more information on Reference Cities for Zone Differential and Premium Pays on page 6.

CARPENTER (continued)

Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Group 1, 2, 5, and 6:
Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1, 2, and 3:
When working with toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:
When working with creosote and other toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 6:
When working in sheet pile coffer dams or cells up to the external water level, workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

CEMENT MASON
This trade is tended by "Concrete Laborer."

Group 1	**46.13**	**22.31**
Group 2	**47.09**	**22.31**
Group 3	**47.09**	**22.31**
Group 4	**48.05**	**22.31**

Zone Differential for Cement Mason - Add to Basic Hourly Rate

Zone A: **3.00** per hour
Zone B: **5.00** per hour
Zone C: **10.00** per hour

Zone A: Projects located 60-79 miles of the respective city hall of the Reference Cities listed below .
Zone B: Projects located 80-99 miles of the respective city hall of the Reference Cities listed below.
Zone C: Projects located 100 or more miles of the respective city hall of the Reference Cities listed below.

See more information on Reference Cities for Zone Differential on page 7.

CEMENT MASON (continued)

Reference Cities for Cement Mason

Bend	Eugene	Pendleton	Salem	Vancouver
Corvallis	Medford	Portland	The Dalles	

When a contractor takes employees to a project that is located more than 59 miles from the city hall of the Reference City that is closest to the contractor's place of business, Zone Pay is to be paid for the distance between the city hall of the identified Reference City and the project site.

Note: All miles are to be determined on the basis of road miles using the normal route (shortest time – best road), from the city hall of the Reference City closest to the contractor's place of business and the project.

DIVER & DIVER TENDER

Zone 1 (Base Rate)

DIVER	**108.33**	**20.40**
DIVER TENDER	**64.32**	**20.40**

Any Diver or Diver's Tender working on a project more than 50 miles from Portland, OR city hall shall receive forty dollars ($40.00) per day in addition to their regular pay. Miles are calculated via the "shortest route" filter using Google Maps from Portland, OR city hall or the employee's primary residence; whichever one is closer

Diver Depth Pay:

Depth Below Water Surface (FSW)	Daily Depth Pay
50-100 ft.	**2.00** per foot over 50 feet
101-150 ft.	**3.00** per foot over 100 feet
151-220 ft.	**4.00** per foot over 150 feet
Over 220 ft.	**5.00** per foot over 220 feet

The actual depth in FSW shall be used in determining depth premium.

Diver Enclosure Pay (working without vertical escape):

Distance Traveled in the Enclosure	Daily Enclosure Pay
0 – 25ft.	**N/C**
25 – 300 ft.	**1.00** per foot from the entrance
300 – 600 ft.	**1.50** per foot beginning at 300 ft.
Over 600 ft.	**2.00** per foot beginning at 600 ft.

DREDGER

Zone A (Base Rate)

Leverman (Hydraulic & Clamshell)	**58.75**	**16.95**
Assistant Engineer (Watch Engineer, Mechanic Machinist)	**55.59**	**16.95**
Tenderman (Boatman Attending Dredge Plant), Fireman	**54.10**	**16.95**
Fill Equipment Operator	**52.93**	**16.95**
Assistant Mate	**50.23**	**16.95**

See more information on Zone Differential on page 8.

DREDGER (continued)

Zone Differential for Dredgers – Add to Zone A Base Rate

Zone B: **3.00** per hour
Zone C: **6.00** per hour

Zone mileage based on road miles:

Zone A: Center of jobsite to no more than 30 miles from the **City Hall of Portland.**
Zone B: More than 30 miles but not more than 60 miles.
Zone C: Over 60 miles.

DRYWALL, LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER

1. DRYWALL INSTALLER	**54.49**	**17.01**
2. LATHER, ACOUSTICAL CARPENTER & CEILING INSTALLER	**54.49**	**17.01**

Zone Differential for Lather, Acoustical Carpenter & Ceiling Installer

Zone mileage based on road miles:

Zone B	61-80 miles	**6.00** per hour
Zone C	81-100 miles	**9.00** per hour
Zone D	101 or more	**12.00** per hour

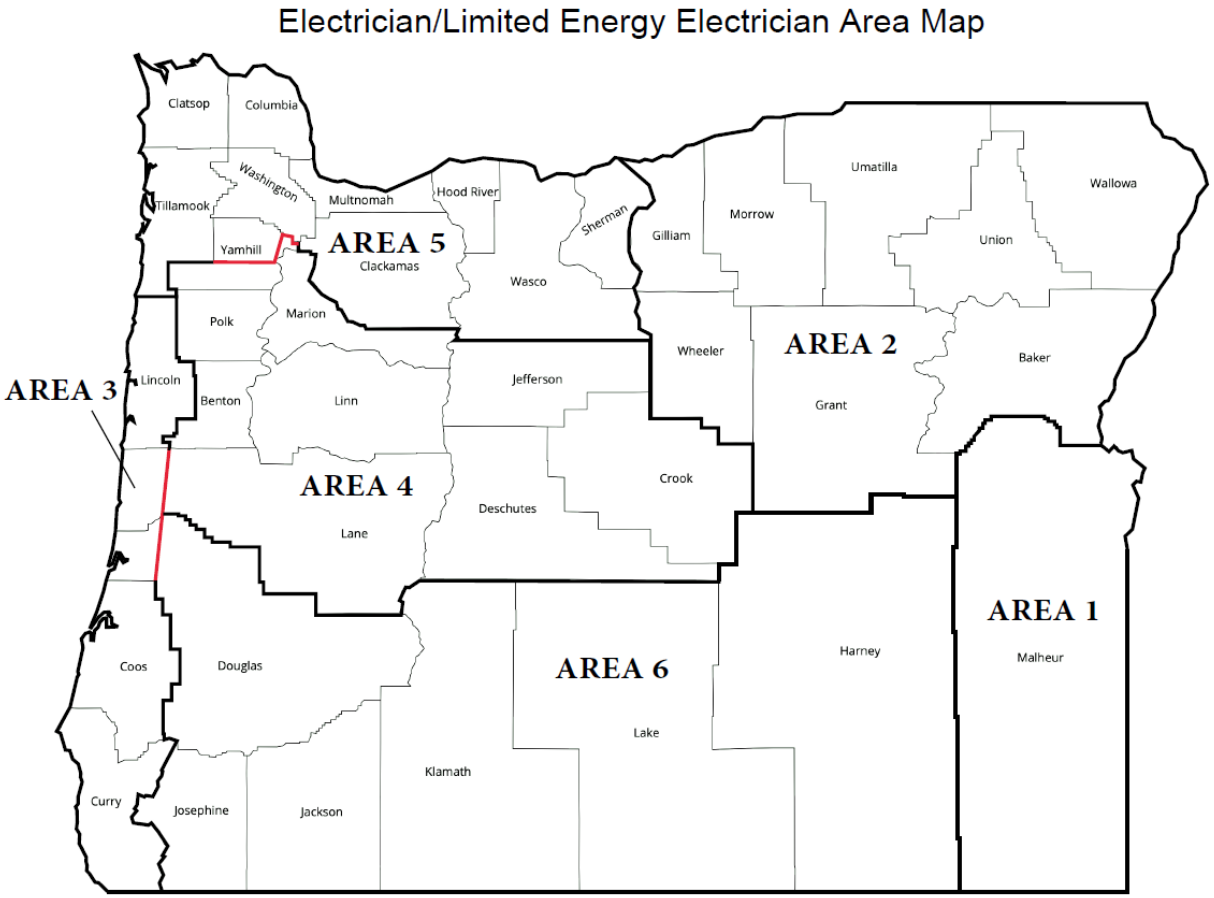
The correct transportation allowance shall be based on AAA road mileage from the City Hall of the transportation reference cities listed herein.

Reference Cities for Drywall, Lather, Acoustical Carpenter & Ceiling Installer

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Certified welders shall receive 5% over the base wage rate, with an eight (8) hour minimum.

ELECTRICIAN



Note: If you are unable to determine the area of a project located on or near the cross-county boundaries marked in red on the map, call or email the BOLI Prevailing Wage Rate Coordinator at (971) 245-3844 or PWR.email@boli.oregon.gov.

Area 1

Electrician	**45.33**	**20.41**
Wireman Welder/Cable Splicer	**49.86**	**20.66**

Reference County

Malheur

Shift Differential*

1st Shift "day":	Between the hours of 8:00am and 4:30pm –	8 hours pay for 8 hours work
2nd Shift "swing":	Between the hours of 4:30pm and 1:00am –	8 hours pay for 8 hours work plus 10% for all hours worked
3rd Shift "graveyard":	Between the hours of 12:30am and 9:00am –	8 hours pay for 8 hours work plus 15% for all hours worked.

* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Work will be paid at time and one half the regular rate: (1) When workmen are under compressed air or where gas masks are required; (2) When working tunnels or shafts where danger of falling rocks or other debris exists; and (3) When working from suspended or swinging scaffolds or boson's chairs.

ELECTRICIAN (continued)

Area 2

Electrician	**60.00**	**27.78**
Cable Splicer	**63.00**	**27.87**
Certified Welder	**75.00**	**28.23**
Material Handler	**36.00**	**20.76**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Add 50% of the base rate when workers are required to work under the following conditions:

1) Under compressed air with atmospheric pressure exceeding normal pressure by at least 10%.

2) From trusses, swing scaffolds, bosun's chairs, open platforms, unguarded scaffolds, open ladders, frames, tanks, stacks, silos and towers where the workman is subject to a direct fall of (a) more than 60 feet or (b) into turbulent water under bridges, powerhouses or spillway faces of dams.

Area 3

Electrician	**53.20**	**29.01**

Reference Counties

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas counties lying **west** of the red line on the Electrician Area Map posted above.

Shift Differential*

1st Shift "day":	Between the hours of 8:00am and 4:30pm	– 8 hours pay for 8 hours work
2nd Shift "swing":	Between the hours of 4:30pm and 1:00am	– 8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard":	Between the hours of 12:30am and 9:00am	– 8 hours pay for 8 hours work plus 31% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or where gas masks are required, or to work from trusses, all scaffolds including mobile elevated platforms, any temporary structure, bosun's chair or on frames, stacks, towers, tanks, within 15' of the leading edges of any building at a distance of:

50 – 75 feet to the ground	Add 1 ½ x the base rate
75+ feet to the ground	Add 2 x the base rate

High Time is not required to be paid on any permanent structure with permanent adequate safeguards (handrails, mid-rails, and toe guards). Any vehicle equipped with outriggers are exempted from this section.

ELECTRICIAN (continued)

Area 4

Electrician	**59.34**	**26.17**
Cable Splicer	**65.27**	**26.35**
Lighting Maintenance/Material Handler	**31.60**	**11.45**

Reference Counties for Area 4

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) Those portions of Lane and Douglas counties lying **east** of the red line on the Electrician Area Map posted above.

(c) The portion of Yamhill county lying **south** of the red line on the Electrician Area Map posted above.

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm –	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am –	8 hours pay for 8 hours work plus 17% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am –	8 hours pay for 8 hours work plus 31.4% for all hours worked.

* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

Area 5

Electrician	**65.50**	**34.04**
Electrical Welder	**72.05**	**34.23**
Material Handler/Lighting Maintenance	**37.34**	**24.08**

Reference Counties

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) The portion of Yamhill County lying **north** of the red line on the Electrician Area Map posted above.

Shift Differential*

1st Shift "day"	Between the hours of 7:00am and 5:30pm –	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 3:00am –	8 hours pay for 8 hours work plus 17.3% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 11:00am –	8 hours pay for 8 hours work plus 31.4% for all hours worked.

* The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

See more information about Zone Pay on page 12.

ELECTRICIAN (continued)

Zone Pay for Area 5 – **Electrician and Electrical Welder** – Add to Basic Hourly Rate

Zone mileage based on air miles:

Zone 1: 31-50 miles – **1.50** per hour
Zone 2: 51-70 miles – **3.50** per hour
Zone 3: 71-90 miles – **5.50** per hour
Zone 4: Beyond 90 – **9.00** per hour

There shall be a 30-mile free zone from downtown Portland City Hall and a similar 15-mile free zone around the following cities:

Astoria	Seaside	Tillamook
Hood River	The Dalles	

Further, the free zone at the Oregon coast shall extend along Hwy 101 west to the ocean Hwy 101 east 10 miles if not already covered by the above 15-mile free zone.

When workers are performing electrical work on a structure at or above the 90 ft. level directly above the ground, floor, roadway, roof or water where scaffolding or special safety devices which have not been approved by the Occupational Safety and Health Administration are used, the wage rate for such work shall be double the straight time hourly rate.

Area 6

Electrician	**47.04**	**21.84**
Lighting Maintenance and Material Handler	**23.53**	**11.21**

Reference Counties

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) The portion of Douglas county lying **east** of the red line on the Electrician Area Map posted above.

Shift Differential*

1st Shift "day"	Between the hours of 8:00am and 4:30pm	–	8 hours pay for 8 hours work
2nd Shift "swing"	Between the hours of 4:30pm and 1:00am	–	8 hours pay for 8 hours work plus 7.5% for all hours worked
3rd Shift "graveyard"	Between the hours of 12:30am and 9:00am	–	8 hours pay for 8 hours work plus 15% for all hours worked.

***** The Employer shall be permitted to adjust the starting hours of the shift by up to two (2) hours.

When workers are required to work under compressed air or to work from trusses, scaffolds, swinging scaffolds, bosun's chair or on building frames, stacks or towers at a distance, the following should be added to base rate.

50 – 90 feet to the ground: Add 1 ½ x the base rate
90+ feet to the ground: Add 2 x the base rate

When such work is performed outside of the regularly scheduled working hours, workmen shall be paid three (3) times the regular rate of pay. An assignment of work referred to in this Section shall entitle the workman to the premium rate for a period of at least two (2) hours.

ELEVATOR CONSTRUCTOR, INSTALLER AND MECHANIC

Area 1

Mechanic	**70.47**	**44.62**

Reference Counties

Baker	Union	Wallowa

Umatilla – **See Area 2 rate**

Area 2

Mechanic	**70.76**	**44.65**

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Gilliam	Klamath	Morrow	Washington
Columbia	Grant	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

FENCE CONSTRUCTOR (NON-METAL)	**41.10**	**18.30**
FENCE ERECTOR (METAL)	**41.10**	**18.30**
GLAZIER	**53.15**	**23.31**

Add $1.00 to base rate when employee works from a swing stage, scaffold, suspended contrivance or mechanical apparatus from the third floor up or thirty feet of free fall (whichever is less), and employee is required to wear a safety belt.

Add twenty percent (20%) to base rate when employee works from a bosun chair (non-motorized single-man apparatus), regardless of height.

Certified welders shall receive twenty percent (20%) above the base rate for actual time spent performing welding duties.

HAZARDOUS MATERIALS HANDLER	**31.03**	**18.18**
HIGHWAY/PARKING STRIPER	**71.89**	**19.50**

IRONWORKER

Zone 1 (Base Rate):	**49.80**	**34.98**

Zone Differential for Ironworker – Add to Basic Hourly Rate

Zone 2: **8.13**/hr. or $65.00 maximum per day
Zone 3: **11.25**/hr. or $90.00 maximum per day
Zone 4: **16.25**/hr. or $130.00 maximum per day

Zone 1: Projects located within 45 miles of city hall in the reference cities listed below.
Zone 2: More than 46 miles, but less than 60 miles.
Zone 3: More than 61 miles, but less than 100 miles.
Zone 4: More than 100 miles.

Note: Zone pay for Ironworkers shall be determined using the quickest route per Google Maps and computed from the city hall or dispatch center of the reference cities listed below **or** the residence of the employee, whichever is nearer to the project.

Reference Cities and Dispatch Center

Portland

LABORER

Zone A (Base Rate):

Group 1 (Includes Flagger)	**41.10**	**18.30**
Group 2	**42.47**	**18.30**
Group 3	**43.00**	**18.30**
Group 4	**36.13**	**18.30**
Group 5 (Landscape Laborer)	**29.42**	**18.30**

Zone Differential for Laborers Add to Zone A Base Rate

Zone B: **.85** per hour
Zone C: **1.25** per hour
Zone D: **2.00** per hour
Zone E: **4.00** per hour
Zone F: **5.00** per hour

Zone A: Projects located within 30 miles of city hall in the reference cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles but less than 100 miles.
Zone F: More than 100 miles.

Reference Cities for Laborer

Albany	Burns	Hermiston	Roseburg
Astoria	Coos Bay	Klamath Falls	Salem
Baker City	Eugene	Medford	The Dalles
Bend	Grants Pass	Portland	

See more information on Zone Differential and Live Sewer Pay on page 15.

LABORER (Continued)

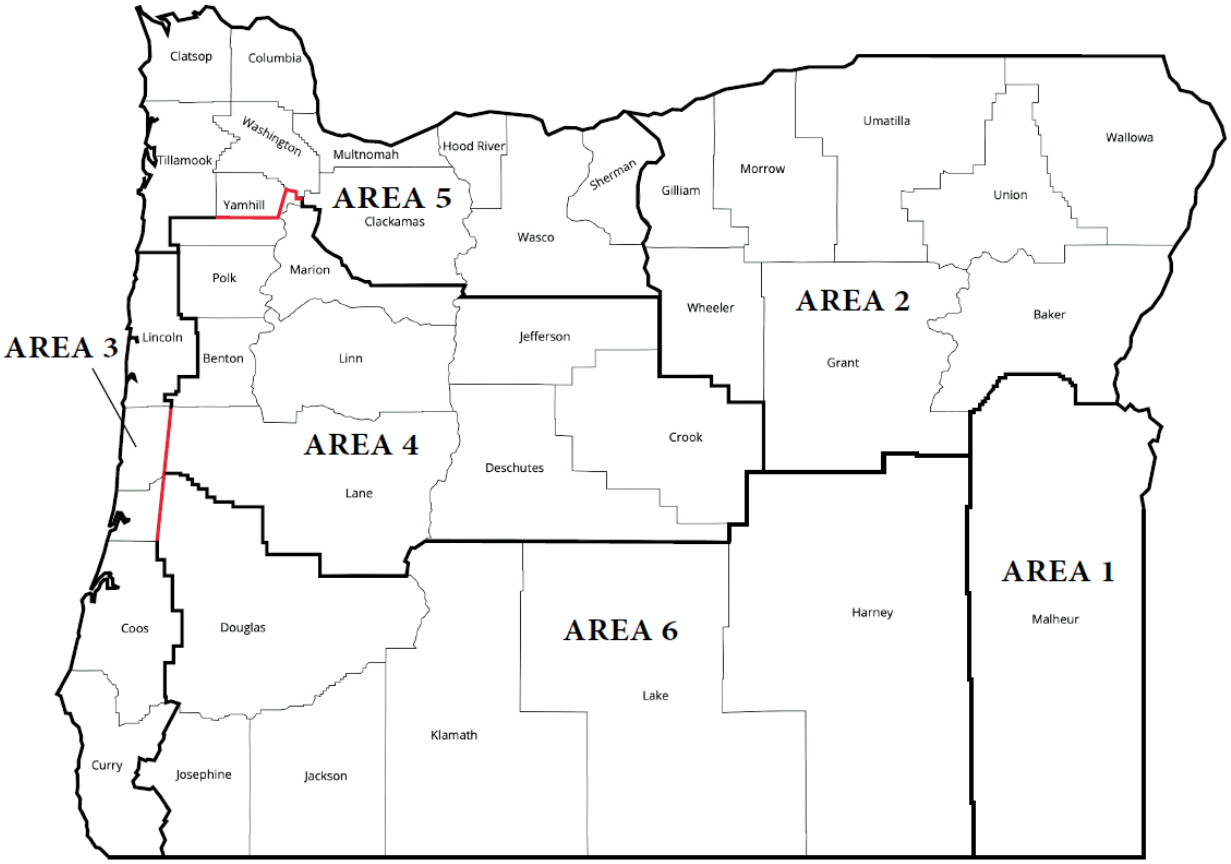
Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time, best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Any Laborer working in Live Sewers shall receive forty dollars ($40) per day in addition to their regular pay.

LANDSCAPE LABORER/TECHNICIAN (Laborer Group 5) **See Laborer Group 5 Rate**

LIMITED ENERGY ELECTRICIAN

Electrician/Limited Energy Electrician Area Map



Note: If you are unable to determine the area of a project located on or near the cross-county boundaries marked in red on the map, call or email the BOLI Prevailing Wage Rate Coordinator at (971) 245-3844 or PWR.email@boli.oregon.gov.

Area 1 **37.90** **18.10**

Reference County

Malheur

LIMITED ENERGY ELECTRICIAN (continued)

Area 2 **40.47** **18.76**

Reference Counties

Baker	Grant	Umatilla	Wallowa
Gilliam	Morrow	Union	Wheeler

Area 3 **43.11** **26.08**

Reference Counties

Coos	Douglas (a)	Lincoln
Curry	Lane (a)	

(a) Those portions of Lane and Douglas counties lying **west** of the red line on the Electrician Area Map posted above

Area 4 **44.79** **20.39**

Reference Counties

Benton	Jefferson	Marion
Crook	Lane (b)	Polk
Deschutes	Linn	Yamhill (c)

(b) Those portions of Lane and Douglas counties lying **east** of the red line on the Electrician Area Map posted above.

(c) The portion of Yamhill county lying **south** of the red line on the Electrician Area Map posted above.

Area 5 **54.50** **28.76**

Reference Counties

Clackamas	Hood River	Tillamook	Yamhill (d)
Clatsop	Multnomah	Wasco	
Columbia	Sherman	Washington	

(d) The portion of Yamhill county lying **north** of the red line on the Electrician Area Map posted above.

Area 6 **36.58** **19.00**

Reference Counties

Douglas (e)	Jackson	Klamath
Harney	Josephine	Lake

(e) The portion of Douglas county lying **east** of the red line on the Electrician Area Map posted above.

LINE CONSTRUCTOR

Area 1 (All Regions)

Group 1	**75.47**	**27.15**
Group 2	**67.38**	**26.78**
Group 3	**41.12**	**17.94**
Group 4	**57.95**	**23.16**
Group 5	**50.54**	**19.42**
Group 6	**40.43**	**18.97**
Group 7	**22.84**	**14.16**

Reference Counties

All counties

Pursuant to ORS 279C.815(2)(b), the Line Constructor Area 1 rate is the highest rate of wage among the collective bargaining agreements for Line Constructor Area 1 and Area 2.

MARBLE SETTER — 50.60 — 25.92

This trade is tendered by "Tile, Terrazzo, & Marble Finishers." Add $1.00 per hour to base rate for refractory repair work.

PAINTER & DRYWALL TAPER

COMMERCIAL PAINTING	**37.74**	**16.82**
INDUSTRIAL PAINTING	**39.94**	**16.82**
BRIDGE PAINTING	**46.83**	**16.82**

Shift Differential for Painter
Add $2.00/hour to base rate for entire shift if any hours are worked outside of 5:00 a.m. to 5:00 p.m.

DRYWALL TAPER		
Zone A (Base Rate)	**48.02**	**21.53**

Zone Differential for Drywall Taper – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the dispatch cities listed.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

See more information on Dispatch Cities for Zone Differential on page 18.

PAINTER & DRYWALL TAPER (continued)

Dispatch Cities for Drywall Taper

Albany	Bend	Grants Pass	Medford	Portland	Seaside
Astoria	Brookings	Hermiston	Newport	Reedsport	The Dalles
Baker	Coquille	Klamath Falls	North Bend	Roseburg	Tillamook
Bandon	Eugene	Kelso-Longview	Pendleton	Salem	Vancouver

Note: Zone pay is based on AAA Road Mileage.

PLASTERER AND STUCCO MASON

This trade is tended by "Tenders to Plasterers."

Zone A (Base Rate)	**46.56**	**19.83**

Zone Differential for Plasterer and Stucco Mason – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located less than 61 miles from the respective city hall of the reference cities listed below.
Zone B: Projects located 61 miles to 80 miles.
Zone C: Projects located 81 miles to 100 miles.
Zone D: Projects located 101 miles or more.

Reference Cities for Plasterer & Stucco Mason

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $1.00 to base rate for swinging scaffold work.

Add $2.00 to base rate for nozzle technicians on plastering machines.

PLUMBER/PIPEFITTER/STEAMFITTER

Area 1	**-------**	**-------**

Reference Counties

Harney – **See Area 3 rates** Malheur – **See Area 3 rates**

Baker – **See Area 2 rates**

Area 2	**65.20**	**34.91**

Reference Counties

Baker	Morrow	Wallowa
Gilliam	Union	Wheeler
Grant	Umatilla	

See more information about Zone Pay on page 19

PLUMBER/PIPEFITTER/STEAMFITTER (continued)

Zone Differential for Area 2 – Add to Base Rate
Zone 2: **10.62/**hr. not to exceed $80.00 day.

Zone mileage based on road miles:
Zone 2: Eighty (80) miles or more from City Hall in Pasco, Washington.

Add $1.00 to base rate in one-hour minimum increments if it is possible for worker to fall 35 ft. or more.

Add $1.00 to base rate in one-hour minimum increments if worker is required to wear a mask in hazardous areas.

Area 3 **60.77** **37.10**

Reference Counties

Benton	Deschutes	Klamath	Multnomah
Clackamas	Douglas	Lake	Polk
Clatsop	Harney	Lane	Sherman
Columbia	Hood River	Lincoln	Tillamook
Coos	Jackson	Linn	Wasco
Crook	Jefferson	Malheur	Washington
Curry	Josephine	Marion	Yamhill

Gilliam – **See Area 2 rates** Grant – **See Area 2 rates** Morrow – **See Area 2 rates**
Umatilla – **See Area 2 rates** Wheeler – **See Area 2 rates**

POWER EQUIPMENT OPERATOR

POWER EQUIPMENT OPERATOR MAP



POWER EQUIPMENT OPERATOR (continued)

Zone 1 (Base Rate)

Group 1	**58.94**	**17.15**
Group 1A	**61.10**	**17.15**
Group 1B	**63.26**	**17.15**
Group 2	**57.03**	**17.15**
Group 3	**55.88**	**17.15**
Group 4	**52.55**	**17.15**
Group 5	**51.31**	**17.15**
Group 6	**48.09**	**17.15**

Zone Pay Differential for Power Equipment Operator – Add to Zone 1 Base Rate
Zone 2: **3.00** per hour
Zone 3: **6.00** per hour

For projects in the following metropolitan counties:

Clackamas	Marion	Washington
Columbia	Multnomah	Yamhill

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

See more information on Hazard Pay and Shift Differential calculation on page 21.

POWER EQUIPMENT OPERATOR (continued)

Add $10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add $0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment.

Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add $0.50 to the base rate for employees who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 245-3844.

Shift Differential

Two-Shift Operations:

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked.

When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

Three-Shift Operations:

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

ROOFER

Area 1 **44.51** **22.70**

Reference Counties

Baker	Deschutes	Morrow	Union
Clackamas	Gilliam	Multnomah	Wasco
Clatsop	Grant	Sherman	Wallowa
Columbia	Hood River	Tillamook	Washington
Crook	Jefferson	Umatilla	Wheeler

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

ROOFER (continued)

Area 2 **40.15** **18.97**

Reference Counties

Benton	Harney	Lake	Malheur
Coos	Jackson	Lane	Marion
Curry	Josephine	Lincoln	Polk
Douglas	Klamath	Linn	Yamhill

Crook – **See Area 1 rates** Deschutes – **See Area 1 rates**

Application, spudding and cutting or removal of coal tar products 10%over basic wage scale.

Application, spudding and cutting fiberglass insulation add a 10% over the basic wage scale.

Area 4 **44.51** **22.70**

Reference County

Umatilla Union Wallowa

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials.

Add 10% to the base rate for handling fiberglass insulation.

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

Area 5 **44.51** **22.70**

Reference County

Morrow

Add 10% to the base rate for handling coal tar pitch or coal tar-based materials. Add 10% to the base rate for handling fiberglass insulation.

Pursuant to ORS 279C.815(2)(b), the Roofer Area 1 rate is the highest rate of wage among the collective bargaining agreements for Roofer Areas 1, 4 and 5.

SHEET METAL WORKER

Area 1 **56.24** **32.77**

Reference Counties

Benton	Deschutes	Lincoln	Polk	Washington
Clackamas	Gilliam	Linn	Sherman	Wheeler
Clatsop	Grant	Marion	Tillamook	Yamhill
Columbia	Hood River	Morrow	Umatilla	
Crook	Jefferson	Multnomah	Wasco	

See more information on Shift Differential calculation and Hazard Pay on page 23.

SHEET METAL WORKER (Continued)

Swing Shift Operations:

When a second (or "swing") shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus $8.25 for all hours worked.

Graveyard Shift Operations:

When the second (or "graveyard") shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus $12.65 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

Area 2	-------	-------

Reference Counties

Baker – **See Area 3 rate** Malheur – **See Area 4 rate**

Area 3	**50.00**	**28.37**

Reference Counties

Baker Union Wallowa

Morrow – **See Area 1 rate** Umatilla – **See Area 1 rate**

Add $.45 to base rate for work performed on any swinging stage, swinging scaffold or boson chair in excess of thirty (30) feet above the ground.

Add $1.00 to base rate for work where it is necessary to wear a chemically activated type face mask.

Area 4	**45.14**	**30.45**

Reference Counties

Douglas Jackson Klamath Lane
Harney Josephine Lake Malheur

Coos – **See Area 5 rate** Curry – **See Area 5 rate**

Swing Shift Operations:

When a second (or "swing") shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus $6.76 for all hours worked.

Graveyard Shift Operations:

When the second (or "graveyard") shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus $10.37 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder.

Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

SHEET METAL WORKER (Continued)

Area 5	**45.45**	**31.54**

Reference Counties

Coos Curry

Swing Shift Operations:

When a second (or "swing") shift starts between 2:00pm -7:00pm, second-shift workers shall be paid the base hourly wage rate plus $6.81 for all hours worked.

Graveyard Shift Operations:

When the second (or "graveyard") shift starts between 7:00pm – 1:00am, second-shift workers shall be paid the base hourly wage rate plus $10.44 for all hours worked.

Add 10% to base rate for work performed on any swinging platform, swinging chair or swinging ladder. Add 10% to base rate for work where a worker is exposed to resins, chemicals, or acid.

SOFT FLOOR LAYER	**44.28**	**19.17**

SPRINKLER FITTER

Area 1	**51.65**	**28.87**

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Gilliam	Klamath	Morrow	Washington
Columbia	Grant	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

Area 2	**44.40**	**28.86**

Reference Counties

Baker Union Wallowa

Gilliam – **See Area 1 rate** Malheur – **See Area 1 rate** Umatilla – **See Area 1 rate**
Grant – **See Area 1 rate** Morrow – **See Area 1 rate**

TENDER TO MASON TRADES (Brick and Stonemason, Mortar Mixer, Hod Carrier)	**45.79**	**17.80**

Add $0.50 to base rate for refractory repair work.

TENDER TO PLASTERER AND STUCCO MASON

Zone A (Base Rate)	**44.79**	**18.30**

Zone Differential for Tender to Plasterer and Stucco Mason – Add to Zone A Base Rate

Zone B: **6.00** per hour
Zone C: **9.00** per hour
Zone D: **12.00** per hour

Zone A: Projects located within 60 miles of city hall in the reference cities listed.
Zone B: More than 61 miles but less than 80 miles.
Zone C: More than 81 miles but less than 100 miles.
Zone D: More than 101 miles

Reference Cities

Bend	Eugene	Medford	Portland	Seaside
Coos Bay	La Grande	Newport	Salem	The Dalles

Add $0.50 to base rate for refractory repair work.

TESTING AND BALANCING (TAB) TECHNICIAN

For work performed under the Sheet Metal classification, including Air-Handling Equipment, Ductwork

See SHEET METAL WORKER RATE

For work performed under the Plumber/Pipefitter/Steamfitter classification, including Water Distribution Systems

See PLUMBER/PIPEFITTER/STEAMFITTER RATE

TILE SETTER/TERRAZZO WORKER: Hard Tile Setter	**43.93**	**22.51**

This trade is tended by “Tile, Terrazzo, & Marble Finisher.” Add $2.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

TILE, TERRAZZO, AND MARBLE FINISHER

1. TILE, TERRAZZO FINISHER	**32.68**	**16.93**

Add $2.00 when performing terrazzo work.

Add $1.00 when working with epoxy, furnane, or alkor acetylene.

2. BRICK & MARBLE FINISHER	**32.68**	**17.06**

Add $1.00 per hour to base rate for refractory repair work.

TRUCK DRIVER

Zone A (Base Rate)

Group 1	**35.41**	**18.30**
Group 2	**35.57**	**18.30**
Group 3	**35.74**	**18.30**
Group 4	**36.08**	**18.30**
Group 5	**36.35**	**18.30**
Group 6	**36.57**	**18.30**
Group 7	**36.82**	**18.30**

Zone Differential for Truck Drivers – Add to Zone A Base Rate

Zone B: **.65** per hour
Zone C: **1.15** per hour
Zone D: **1.70** per hour
Zone E: **2.75** per hour

Zone A: Projects within 30 miles of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 80 miles.
Zone E: More than 80 miles.

Reference Cities

Albany	Burns	Hermiston	Madras	Pendleton	The Dalles
Astoria	Coos Bay	Hood River	Medford	Portland	Tillamook
Baker	Corvallis	Klamath Falls	McMinnville	Port Orford	Vancouver
Bend	Eugene	La Grande	Newport	Reedsport	
Bingen	Goldendale	Lakeview	Ontario	Roseburg	
Brookings	Grants Pass	Longview	Oregon City	Salem	

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 5, 2026

To: All Oregon Contracting Agencies

Pursuant to ORS 279C.860, contractors on this list are ineligible to receive public works contracts subject to the Prevailing Wage Rate Law. These contractors and subcontractors, as well as any firm, corporation, partnership or association in which the contractor or subcontractor has a financial interest are ineligible to receive public works contracts until removed from this list. You can find the most current and up to date list of contractors ineligible to receive public works contracts on our website at https://www.oregon.gov/boli/employers/Pages/pwr-ineligible-contractors.aspx.

If you have questions regarding the list or for the most current information regarding persons ineligible to receive prevailing wage contracts, please contact the Prevailing Wage Rate Coordinator in Portland at (971) 245-3844.

Contractor	Address	Date placed	Removal date
A1 Dumptruck Services LLC	703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	2/24/2020	2/23/2027
Cameron Creations, Steven Cameron, Nancy Cameron *	PO Box 2 Lowell, OR 97452	5/25/2000	
David Miller *	731 NW Naito Parkway, #215 Portland, OR 97209	6/17/2020	
Eugene Graeme	169 SE Cody Lane Madras, OR 97741	7/3/2017	7/2/2027
Lisa Hoang aka Kim Lien Hoang aka Lien Kim Hoang aka Kim Hope aka Lisa K Ryan aka Ryan Lien Hoang aka Kim L Hoang aka Lien Hoang Ryan aka Lien K Hoang-Ryan aka Hoang K Lien aka Lisa Hall aka Lisa Kim Ryan aka Lien Ryan aka Lien Hoang Ryan aka Kim Hoang Lien aka K Lisa Hoang	703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	2/24/2020	2/23/2027
NW Flagging LLC	703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	2/24/2020	2/23/2027

LIST OF CONTRACTORS INELIGIBLE
TO RECEIVE PUBLIC WORKS CONTRACTS
PUBLICATION DATE: JANUARY 5, 2026

Contractor	Address	Date placed	Removal date
Oregon Building & Landscaping Services LLC	703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	2/24/2020	2/23/2027
Pacific NW Drywall & Acoustics LLC aka Pacific NW Drywall& Acoustics LLC*	731 NW Natio Parkway #215 Portland, OR 97209	6/17/2020	
Regional Traffic Management LLC	703 N Hayden Meadows Dr., #206 Portland, OR 97213 731 N Hayden Meadows Dr., #206 Portland, OR 97217 2408 NE 164th Avenue Vancouver, WA 98684	2/24/2020	2/23/2027
Sang In Nam dba Cornerstone Janitorial Services*	130 NE Danbury Ave Hillsboro, OR 97124	9/20/2016	
WCI Construction LLC	169 SE Cody Lane Madras, OR 97741	7/3/2017	7/2/2027

*** Not to be removed from debarment.**

Prevailing Wage Rate Laws Handbook

The 2024 edition of the ***Prevailing Wage Rate Laws Handbook*** is now available on our website at https://www.oregon.gov/boli/employers/Pages/prevailing-wage.aspx.

In addition to providing this and other PWR publications, Oregon BOLI Labor & Industries' PWR Unit regularly offers free, informational seminars for both public agencies and contractors. The current schedule is available online at https://www.oregon.gov/boli/employers/Pages/prevailing-wage-seminars.aspx.

If you are interested in being included on our mailing lists for future seminar notifications, please contact us at PWR.Email@boli.oregon.gov or (971) 245-3844.

DREDGER

Zone A (Base Rates)

Leverman (Hydraulic & Clamshell)	61.80	17.55
Assistant Engineer (Watch Engineer, Mechanic Machinist)	58.64	17.55
Tenderman (Boatman Attending Dredge Plant), Fireman	57.15	17.55
Fill Equipment Operator	55.98	17.55
Assistant Mate	53.28	17.55

Zone Differential for Dredgers – Add to Zone A Base Rate

Zone B: **3.50** per hour
Zone C: **6.50** per hour

Zone milage based on road miles.

Zone A: Center of jobsite to no more than 30 miles from the **City Hall of Portland.**
Zone B: More than 30 miles but not more than 60 miles.
Zone C: Over 60 miles.

LINE CONSTRUCTOR

Area 1 (All Regions)

Group 1	79.24	28.27
Group 2	70.75	27.88
Group 3	41.12	17.94
Group 4	60.85	24.24
Group 5	53.06	19.89
Group 6	42.45	19.41
Group 7	22.84	14.16

Reference Counties

All counties in Oregon

Pursuant to ORS 279C.815(2)(b), the Line Constructor Area 1 rate is the highest rate of wage among the collective bargaining agreements for Line Constructor Area 1 and Area 2.

Shift Differential

1st Shift (Groups 1,2, 4, 5, & 6)..... Between the hours of 8:00am and 4:30pm..... Base rate.

2nd Shift (Groups 1,2, 4, 5, & 6)..... Between the hours of 4:30pm and 12:00am..... Add 10% per hour to base rate.

3rd Shift (Groups 1,2, 4, 5, & 6)..... Between the hours of 12:00am and 8:00am..... Add 15% per hour to base rate.

POWER EQUIPMENT OPERATOR



Zone 1 (Base Rate)

Group 1	61.99	17.55
Group 1A	64.15	17.55
Group 1B	66.31	17.55
Group 2	60.08	17.55
Group 3	58.93	17.55
Group 4	55.60	17.55
Group 5	54.36	17.55
Group 6	51.14	17.55

See more information about Power Equipment Operator Zone Differential, Premium Pay, and Shift Differential on page 3.

POWER EQUIPMENT OPERATOR (continued)

Zone Pay Differential for Power Equipment Operator – Add to Zone 1 Base Rate
Zone 2: **3.50** per hour
Zone 3: **6.50** per hour

For projects in the following metropolitan counties:

Clackamas Columbia Multnomah Marion Washington Yamhill

(A) All jobs or projects located in Multnomah, Clackamas and Marion counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Hwy 26 and West of Mile Post 30 on Hwy 22 and all jobs located in Yamhill County, Washington County and Columbia County shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located in the area outside the *identified boundary* above, but less than 50 miles from Portland City Hall shall receive Zone 2 pay for all classifications.

(C) All jobs or projects located more than 50 miles from Portland City Hall, but outside the identified border above, shall receive Zone 3 pay for all classifications.

Reference cities for projects in all remaining counties:

Albany	Coos Bay	Grants Pass	Medford
Bend	Eugene	Klamath Falls	Roseburg

(A) All jobs or projects located within 30 miles of the respective city hall of the above-mentioned cities shall receive Zone 1 pay for all classifications.

(B) All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above-mentioned cities shall receive Zone 2 for all classifications.

(C) All jobs or projects located more than 50 miles from the respective city hall of the above-mentioned cities shall receive Zone 3 pay for all classifications.

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time-best road) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all other project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Add $10.00/hour hyperbaric pay for Group 4 Tunnel Boring Machine Mechanic.

Add $0.40 to the base rate for any and all work performed underground, including operating, servicing and repairing of equipment.

Add $0.50 to the base rate per hour for any employee who works suspended by a rope or cable.

Add $0.50 to the base rate for employees who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation.

Note: A Hazardous Waste Removal Differential must be added to the base rate if work is performed inside the boundary of a Federally Designated Waste Site. For information on this differential, call the Prevailing Wage Rate Coordinator at (971) 245-3844.

See more information about Power Equipment Operator Shift Differential on page 4.

POWER EQUIPMENT OPERATOR (continued)

Shift Differential

Two-Shift Operations

On a two-shift operation, when the second shift starts after 4:30 p.m., second-shift workers shall be paid the base hourly wage rate plus 5% for all hours worked. When the second shift starts at 8:00 p.m. or later, the second-shift workers shall be paid at the base hourly wage rate plus 10% for all hours worked.

Three-Shift Operations

On a three-shift operation, the base hourly wage rate plus five percent (5%) shall be paid to all second-shift workers for all hours worked, and the base hourly wage rate plus ten percent (10%) shall be paid to all third shift workers for all hours worked.

ASBESTOS WORKER/INSULATOR

Base Rate:	62.02	25.42

FIRESTOP CONTAIMENT

Base Rate:	50.29	21.14

CARPENTER

Zone A (Base Rates)

Group 1	54.69	17.01
Group 2	54.86	17.01
Group 3 (Millwrights)	61.57	22.38
Group 4	Eliminated	
Group 5 (Bridge & Highway)	55.29	17.01
Group 6 (Piledrivers)	55.63	17.01

Zone Differential for Carpenters - Add to Zone A Base Rate

Zone B: **1.25** per hour
Zone C: **1.70** per hour
Zone D: **2.00** per hour
Zone E: **3.00** per hour
Zone F: **5.00** per hour
Zone G: **10.00** per hour

Zone A: Projects located within 30 miles of the respective city hall of the cities listed.
Zone B: More than 30 miles but less than 40 miles.
Zone C: More than 40 miles but less than 50 miles.
Zone D: More than 50 miles but less than 60 miles.
Zone E: More than 60 miles but less than 70 miles.
Zone F: More than 70 miles but less than 100 miles.
Zone G: More than 100 miles.

Reference Cities for Group 1 and 2 Carpenters

Albany	Coos Bay	Klamath Falls	Newport	Rosburg
Astoria	Eugene	La Grande	Ontario	Salem
Baker City	Goldendale	Lakeview	Pendleton	The Dalles
Bend	Grants Pass	Longview	Portland	Tillamook
Brookings	Hermiston	Madras	Port Orford	Vancouver
Burns	Hood River	Medford	Reedsport	

Reference Cities for Group 3 Carpenters

Eugene	Medford	Portland	Vancouver
Longview	North Bend	The Dalles	

See more information about Carpenter Zone Differential and Premium Pay on page 2.

CARPENTER (continued)

Reference Cities for Group 5 and 6 Carpenters

Bend	Longview	North Bend
Eugene	Medford	Portland

Note: All job or project locations shall be computed (determined) on the basis of road miles and in the following manner. A mileage measurement will start at the entrance to the respective city hall, facing the project (if possible), and shall proceed by the normal route (shortest time--best road via Google Maps) to the geographical center on the highway, railroad, and street construction projects (end of measurement). On all project contracts, the geographical center where the major portion of the construction is located, shall be considered the center of the project (end measurement).

Groups 1, 2, 5, and 6:
Welders shall receive a 5% premium per hour based on their Group's journeyman wage rate, with an 8-hour minimum.

Group 1, 2, and 3:
When working with toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 5 and 6:
When working with creosote and other toxic treated wood, workers shall receive $.25/hour premium pay for minimum of eight (8) hours.

Group 6:
When working in sheet pile coffer dams or cells up to the external water level, workers shall receive $.15/hour premium pay for minimum of eight (8) hours.

HAZARDOUS MATERIALS HANDLER

Base Rate:	33.03	18.18

SPRINKLER FITTER

Area 1

Base Rate:	54.74	28.87

Reference Counties

Benton	Deschutes	Jefferson	Malheur	Umatilla
Clackamas	Douglas	Josephine	Marion	Wasco
Clatsop	Gilliam	Klamath	Morrow	Washington
Columbia	Grant	Lake	Multnomah	Wheeler
Coos	Harney	Lane	Polk	Yamhill
Crook	Hood River	Lincoln	Sherman	
Curry	Jackson	Linn	Tillamook	

SPRINKLER FITTER (continued)

Area 2

Base Rate:	47.11	28.86

Reference Counties

Baker Unions Wallowa

Gilliam – **See Area 1 rate** Malheur – **See Area 1 rate** Umatilla – **See Area 1 rate**
Grant – **See Area 1 rate** Morrow – **See Area 1 rate**

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SECTION 2 – SPECIAL PROVISIONS

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SPECIAL PROVISIONS

REVISIONS TO THE STANDARD SPECIFICATIONS

The Contractor's attention is directed to the current edition of the ***Oregon Standard Specification for Construction*** which are the Standard Specifications for this Project, containing other directions pertinent to the project.

The bidder shall incorporate all applicable provisions of the current edition of the ***Oregon Standard Specifications for Construction,*** into this bid proposal. All work performed, materials used in the project, and the legal relations between the parties and the Contractor's requirements shall be as set forth in said Standard Specifications, except as specially and specifically modified or deleted by these Special Provisions.

Also incorporated into the Contract Documents by reference are the ***City of Umatilla Design Guidelines and Standard Specifications for Public Works Improvements***, adopted January 20, 2026 by Resolution No. 26-2026. Relevant Agency standard specifications have been incorporated into these Special Provisions.

If conflicting information is noted by the Contractor, it shall be brought to the immediate attention of the Owner for interpretation. In cases of conflicting specifications, the most restrictive requirement will govern. All work performed, materials used in the project, and the legal relationships between the parties and the Contractor's requirements shall be as set forth in said Standard Specifications, except as specifically modified or deleted by these Revisions to the Standard Specifications.

PROFESSIONAL OF RECORD CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER 99403PE OREGON MAR 8, 2022 ALEJANDRO ROMERO SIGNED 06/02/2026 EXPIRES: 12/31/2026	I certify the Special Provision Section(s) listed below are applicable to the design for the subject project for the Work, as Described in the Contract Documents. Modified Special Provisions were prepared by me or under my supervision. Section(s) 00110, 00120, 00130, 00140, 00150, 00160, 00165, 00170, 00180, 00195, 00197.

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

WORK TO BE DONE

The Work to be done under this Contract consists of the following major elements:

1. Construction of a pump station (POD) including pumps, fish screens, a hydropneumatic surge tank,
2. Construction of approximately 340 feet of 30-inch and 36-inch diameter pipeline from the pump station to the property line, and
3. Demolition of the existing CTUIR pump station and pipeline.

APPLICABLE SPECIFICATIONS

The Specifications that are applicable to the Work on this Project is the 2024 edition of the "Oregon Standard Specifications for Construction", as modified by these Special Provisions. All Sections in Part 00100 apply, whether or not modified or referenced in the Special Provisions.

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

CLASS OF PROJECT

This is a State Project.

SECTION 00110 - ORGANIZATION, CONVENTIONS, ABBREVIATIONS AND DEFINITIONS

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

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

- AASHTOWare Project TM
  www.oregon.gov/odot/Construction/Pages/AW-Construction.aspx
- American Traffic Safety Services Association (ATSSA)
  www.atssa.com
- BidExpress
  www.bidx.com
- EquipmentWatch
  www.equipmentwatch.com
- ODOT Construction Section
  www.oregon.gov/odot/construction/pages/index.aspx
- ODOT Construction Section - Qualified Products List (QPL)
  www.oregon.gov/ODOT/Construction/Pages/Qualified-Products.aspx
- ODOT Construction Surveying Manual for Contractors
  www.oregon.gov/ODOT/ETA/Documents_Geometronics/Construction-Survey-Manual-Contractors.pdf
- ODOT Estimating

www.oregon.gov/ODOT/Business/Pages/Steel.aspx

- ODOT Oregon Trucking Online - "Highway Restriction Notice - Size and/or Weight" (Form No. 734-2357)
  www.oregontruckingonline.com/cf/MCAD/pubMetaEntry/restriction/
- ODOT Traffic Control Plans Unit
  www.oregon.gov/ODOT/Engineering/Pages/Work-Zone.aspx
- ODOT Traffic Standards
  www.oregon.gov/ODOT/Engineering/Pages/Signals.aspx
- Oregon Legislative Counsel
  www.oregonlegislature.gov/lc
- Oregon Secretary of State: State Archives
  sos.oregon.gov/archives/Pages/default.aspx

00110.10 Abbreviations – Add the following paragraph to the end of this subsection:

EPD – Environmental Product Declaration

PCD - Pedestrian Channelizing Device

Delete the following paragraph:

DBE – Disadvantaged Business Enterprise

00110.20 Definitions – Add the following paragraph to the end of this subsection:

Environmental Product Declaration – An environmental declaration providing environmental data using predetermined parameters and, where relevant, additional environmental information. ISO 14025 refers to these as Type III Environmental Declarations.

Materially Unbalanced Bid - A Bid which generates a reasonable doubt that Award to the Bidder submitting a Mathematically Unbalanced Bid will result in the lowest ultimate cost to the Agency.

Mathematically Unbalanced Bid - A Bid containing lump sum or unit Pay Items (bid items) which do not reflect reasonable actual costs plus a reasonable proportionate share of the Bidder's anticipated profit, overhead costs and other indirect costs.

Pedestrian Accessible Route - An area for the use of pedestrians to navigate along sidewalks, driveways, curb ramps, crossings, and pedestrian facilities.

Pedestrian Channelizing Device - Devices used for channelizing pedestrians along a Temporary Pedestrian Accessible Route.

00110.20 Definitions – The terms defined in Section 00110.20 of the Oregon Standard Specifications for Construction shall be further described by the following:

Consultant:	Means an engineer licensed in the State of Oregon, employed by the Owner to design the improvement and prepare plans and specifications, perform construction staking, or similar services.
Construction Documents:	Means the project plans, specifications, and special provisions prepared by the Owner's Consultant for the public works improvements contemplated and approved by the City.
City:	Means the City of Umatilla, a municipal corporation, as represented by its authorized officials, employees or agents. The term “Contracting Agency” and “City” are synonymous.
Contract Administrator:	Means the person or firm employed by the City of Umatilla to prepare the contract and oversee its execution.
Contractor:	Means the person or firm employed by the Owner or under Contract with the City to do the construction of the public works improvements.
Drawings:	Means the construction plans prepared by the Owner's Consultant for the public works improvements contemplated. The terms “Construction Documents,” “Contract Documents,” “Plans,” “Engineer’s Plans,” “Engineer’s Drawings,” “Working Drawings,” and “Project Manual” are synonymous.
City Engineer:	Means the appointed City Engineer for the City of Umatilla or his/her duly authorized agent or representative.
Owner:	Means the City of Umatilla acting through its legally established officials, boards, commissions, etc., as represented by its authorized officers, employees, or agents.
Public Works Director:	Means the appointed official for the City, responsible for managing the Department of Public Works.
Standard Plans and Details:	Means specific drawings adopted by the City of Umatilla and revised from time to time which show frequently recurring components of work which have been standardized for use.
Standard Specifications:	The latest edition of the Oregon Standard Specifications for Construction. Except as may be amended, modified, or supplemented hereinafter, each section of the Standard Specifications shall be considered as much a part of these Construction Documents as if they were actually set forth herein.

Special Provisions: The Special Provisions supplement or modify the Standard Specifications and supersede any conflicting provisions of the Oregon Standard Specifications for Construction and the appended amendments to the Standard Specifications and are made a part of a Construction Document.

Should any conflicts be encountered, the following inter-relationships shall govern: The Special Provisions shall supersede the Standard Specifications.

Supplement this section with the following:

All references in the Standard Specifications, Amendments, or Oregon Standard Specifications for Construction, to the terms "Department of Transportation", "Oregon State Transportation Commission", "Commission", "Secretary of Transportation", "Secretary", "Headquarters", and "State Treasurer" shall be revised to read "Contracting Agency".

All references to the terms "State" or "state" shall be revised to read "Contracting Agency" unless the reference is to an administrative agency of the State of Oregon, a State statute or regulation, or the context reasonably indicates otherwise.

All references to "State Materials Laboratory" shall be revised to read "Contracting Agency designated location".

All references to "certification of completed public improvements" shall be interpreted to mean the Contracting Agency form(s) by which final completion is granted. Public improvements shall be deemed accepted by the City one year from the date of certification.

SECTION 00120 - BIDDING REQUIREMENTS AND PROCEDURES

Comply with Section 00120 of the Standard Specifications modified as follows:

00120.01 General Bidding Requirements – Replace this subsection, except subsection number and title, with the following:

Bidders shall submit Bids by paper. Electronic bids will not be accepted. Sealed bids for the **CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station** will be received by The City of Umatilla until **11:00 a.m., Wednesday, July 1, 2026**. Bids can be physically delivered or mailed to **Umatilla City Hall, 700 6th St | PO Box 130, Umatilla, OR 97882**.

As and when applicable, the Contractor shall maintain the certifications required by ORS 279A.107.

00120.05 Request for Plans, Special Provisions, and Bid Booklets - Delete this section, excluding title, and replace with the following:

Comply with the bid instructions in the Contract Documents. Bid procedures will be completed per OAR 137-049. Bids are to be submitted as outlined in the Invitation to Bid. Electronic Bids are not accepted and considered non-responsive. ODOT is not part of this project.

The Plans, which are applicable to the Work to be performed under the Contract, bear title and date as follows:

"CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station
City of Umatilla, Oregon
Umatilla County
May 2026"

00120.05(b) Bidding Plans, Special Provisions, and Bid Booklets – Section is modified as follows:

Replace 00120.05(b) with the following:

(1) Paper Bids - Bids must obtain Solicitation Documents at QuestCDN.net
(2) Electronic Bids - Electronic and/or faced Bids are not accepted and considered non-responsive.

00120.10 Bid Booklet – Replace the bullet that begins "Appendix, which includes…" with the following bullet:

- Appendix, which includes required time-sensitive forms, sample forms, and other informational pages

00120.15 Examination of Work Site and Solicitation Documents; Consideration of Conditions to be Encountered – The 3rd paragraph of this Section is replaced with the following:

Any prospective Bidder desiring an explanation or interpretation of the Bid Documents, must request the explanation or interpretation in writing no less than five (5) business days prior to the date for opening of Bids to allow for a written reply to reach all prospective Bidders before the submission of their bids. Oral explanations or interpretations given before receiving Bids for a Project will not be binding. To be binding, interpretation of the Plans and Specifications by the Agency must be made by written Addendum furnished to all Holders of Bidding Plans according to 00120.30. Notification of erroneous or incomplete Plans or Specifications shall also be submitted to the Engineer. Such notification shall also be made no less than five (5) business days prior to the date for opening of Bids to allow the Agency to make any necessary modifications and issue Addenda to Bidders prior to Bid Closing.

Add the following to the end of this subsection:

A **non-mandatory** Pre-Bid Meeting will be held on **Wednesday, June 17, 2026 at 11:00 a.m. at the project site.** Meeting will start at the Lewis and Clark Commemorative Trail access near the McNary Beach Recreation Area at the north end of Beach Access Road, **see link here for approximate location: *https://maps.app.goo.gl/UPyhJep2eyZdv8HYA* .**

00120.30 Changes to Plans, Specifications, or Quantities before Opening of Bids – Delete this Section in its entirety and replace with the following:

The Agency reserves the right to issue Addenda making changes or corrections to the Plans, Specifications, or quantities. The Agency will provide Addenda to the plan centers responsible for distribution of these contract booklets.

Bidders shall be responsible for the checking with the plan centers to verify issuance of Addenda. Bidders should check for Addenda until the Bid Closing.

Bidders, not the Agency, shall be responsible for failure of Bidders to acquire Addenda. Bids shall incorporate all Addenda. Bids may be rejected if opened and found by the Agency to not be based on all Addenda issued by the Agency before Bid Closing.

00120.40 Preparation of Bids – Revise this section as follows:

Replace references to "ODOT eBIDS" with "plan center".
Replace references to "BidExpress" with "electronic sources".

Replace references to "ODOT Procurement Office" with "City of Umatilla".

Delete part (a) General (2) Electronic Bids in its entirety.

Delete part (c) Bid Schedule Entries (2) Electronic Bid Schedule Entries in its entirety.

Delete part (e) Bid Guaranty (2) Bid Guaranty with Electronic Bids in its entirety.

00120.40(f) Disclosure of First-Tier Subcontractors – Replace the paragraph beginning "If no subcontracts subject to the above…" with the following paragraph:

If no subcontracts subject to the above disclosure requirements are anticipated, a Bidder shall so indicate by entering "NONE" or by filling in the appropriate check box. For each Subcontractor listed, Bidders shall provide all requested information. Failure to submit a form or submission of a form that does not include the information required by ORS 279C.370 for each Subcontractor listed, specifically the name of each Subcontractor, the dollar amount of each subcontract and the category of Work that each Subcontractor will perform, will result in the rejection of the Bid. The Agency is not required to determine the accuracy or the completeness of the Subcontractor disclosure. See ORS 279C.370 and OAR 731-005-0420.

Replace both of the bullets that begin "Using the form provided on the Agency's website…" with the following bullet:

- Using the fillable form provided on the Agency's website, identified in the Bid Booklet on the ODOT eBIDS website, filling the form out and submitting the completed form via email to the email address given in the paper Bid Booklet.

00120.45 Submittal of Bids – Delete part (b) Electronic Bids in its entirety.

00120.45(a) Paper Bids – Replace the paragraph that begins "Paper Bids submitted after the time …" with the following paragraph:

Paper Bids submitted or received after the time set for receiving paper Bids will not be opened or considered. The Agency assumes no responsibility for the receipt and return of late paper Bids.

00120.60 Revision or Withdrawal of Bids – Revise this section as follows:

Replace references to "ODOT Procurement Office" with "City of Umatilla".

Delete part (b) Electronic Bids in its entirety.

00120.65 Opening and Comparing Bids – Section is supplemented with the following:

The City of Umatilla will receive sealed bids for the **CTUIR/COU Joint Pump and Pipeline Project – Intake and Pump Station project**, at **Umatilla City Hall, 700 6th St |PO Box 130, Umatilla, OR 97882 until 11:00 a.m., Wednesday, July 1, 2026.**

Bidders are notified that all bids are likely to be rejected if the lowest responsive bid received exceeds the Engineer's estimate by an unreasonable amount and exceed available funding limits. In the event all bids are rejected for this reason, this project may be deferred for re-advertising for bids until a more competitive situation exists.

00120.70 Rejection of Non-responsive Bids – Delete the bullet that begins "The Bidder has not complied with the DBE…".

Add the following bullet to the end of the bullet list:

- The Bid is found to be Mathematically Unbalanced and Materially Unbalanced.

00120.70 Rejection of Non-responsive Bids – Revise this section as follows:

Replace references to "ODOT eBIDS" with "plan center".

Replace references to "BidExpress" with "electronic sources".

SECTION 00130 - AWARD AND EXECUTION OF CONTRACT

Comply with Section 00130 of the Standard Specifications modified as follows:

00130.00 Consideration of Bids – Replace the paragraph that begins "The Agency reserves…" with the following paragraph:

The Agency reserves the right to waive minor informalities and irregularities, seek clarification of any Bid or response that, in its sole discretion, it deems necessary or advisable, and to reject any Bids for irregularities under 00120.70 or all bids for good cause after finding that it is in the public interest to do so (ORS 279C.395). The Agency may correct obvious clerical errors, when the correct information can be determined from the face of the documents, if it finds that the best interest of the Agency and the public will be served thereby.

00130.10 Award of Contract – Replace the paragraph that begins with "The Agency will provide Notice …" with:

The Agency will provide the Notice of Intent to Award electronically.

00130.15 Right to Protest Award – Delete all references to ODOT Procurement Office – Construction Contracts Unit and replace with Agency.

00130.40 Contract Submittals - Add the following paragraph to the end of this subsection:

The Agency, in its sole discretion, may require execution of documents identified in subsections (a), (b) and (c) with a form of electronic signature (including but not limited to sealing and signing) acceptable to the Agency.

00130.40(c) Workers' Compensation – Replace this subsection, except for the subsection number and title, with the following:

To certify compliance with the workers' compensation insurance coverage required by 00170.61(a) and 00170.70(e), the successful Bidder shall complete and sign the "Certification of Workers' Compensation Coverage" form bound in the Contract booklet.

00130.50 Execution of Contract and Bonds - Replace the first sentence of (a) with the following:

(a) **By the Bidder** – The successful Bidder shall deliver the required number of Contract booklets with the properly executed Contract, Performance Bond, Payment Bond, certification of workers' compensation coverage, and the required certificated of insurance, to City of Umatilla, Umatilla City Hall, 700 6th St., P.O. Box 130, Umatilla, OR 97882, within seven (7) Calendar Days after the date on which the Notice of Award and Contract Booklets are sent or otherwise conveyed to the Bidder under 00130.10.

Add the following paragraph to the end of this subsection:

The Agency, in its sole discretion, may require execution of documents identified in subsection (a) with a form of electronic signature (including but not limited to sealing and signing) acceptable to the Agency.

00130.90 Notice to Proceed – Delete this subsection, excluding title, and replace with the following:

Notice to Proceed will be issued within fourteen (14) Calendar Days after the Agreement has been executed and the Performance Bond and evidence of insurance have been approved and filed by the Agency. The Contractor shall not commence with the work until the Notice to Proceed has been given by the Contracting Agency. The Contractor shall commence construction activities on the project site within five (5) Calendar Days of the Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the Contract Times specified in these Contract Documents and Technical Specifications. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the Contract Times specified in these Contract Documents and Technical Specifications.

Should there be reasons why the Notice to Proceed cannot be issued, the time may be extended by mutual agreement between the Agency and the Contractor. If the Notice to Proceed has not been issued within the period mutually agreed upon, the Contractor may terminate the Agreement without further liability on the part of either party.

The Engineer will issue a First Notification recording the date the performance of the Contract has begun. Construction shall begin within five (5) Calendar Days of the Notice to Proceed.

SECTION 00140 - SCOPE OF WORK

Comply with Section 00140 of the Standard Specifications modified as follows:

00140.00 Purpose of Contract – Add the following new sections including titles:

00140.01 Bid Items Not Included in the Proposal

All labor, equipment, and materials required for the manufacturing and installation of this project shall be incorporated into the bid items as provided in the bid proposal. Payment for general construction items that are not listed in the Bid Proposal, but are shown or required by the Contract Documents, are indicative of the fact that the items of work not listed are considered as incidental to the bid items listed in the Bid Proposal. Unless the work to be performed is specifically called out in the Bid Proposal, measurement and payment for such work shall be included in other applicable items of the Bid Proposal.

00140.02 Contractor Use of Site and Premises

(a) **Working Hours -** Construction activities shall take place between 7:00 a.m. and 7:00 p.m. from Monday through Friday. Construction activities shall not be allowed during any other time periods without approval from the Engineer and Agency except for inspection and maintenance of traffic control and/or erosion and sediment control BMPs.

(b) **Protection of Adjacent Properties -** Any damage to areas outside the work area shall be repaired to the satisfaction of the Owner to a condition equal to or better than pre-project conditions at no additional cost to the Agency, including areas disturbed during temporary stockpiling of materials and equipment, and construction staging activities.

(c) **Protection of Existing Facilities** - Any underground pipe or other facility that is damaged by the Contractor shall be repaired to pre-project conditions and to the satisfaction of the Owner at no additional cost to the Agency.

(d) **Spill Prevention** – Spillage of wastewater to the ground shall not be allowed. Liner and other measures must be utilized by the Contractor as necessary to prevent spillage.

00140.03 Work Sequence

(a) Contractor shall be solely responsible for sequencing all construction activities to meet the requirements of the Contract Documents.

(b) Construct work to allow for review of all trenching, excavation, and material installation prior to backfilling or other work that would prevent a complete visual inspection of the work by the Agencies representative.

(c) Construct work in an orderly and timely manner and minimize disruption to vehicular and pedestrian traffic and the surrounding environment. During construction period, coordinate construction schedule and operations with the Engineer.

(d) Any historical or archeological site discovered in the course of work shall be immediately reported to the Engineer, and work shall cease in the area of the site.

(e) Construct work in a manner which maintains alternation one-way traffic at all times during working hours, two-way traffic at all times during non-working hours, and access to properties within the work zone at all times unless otherwise approved by the Agency in writing.

00140.30 Agency-Required Changes in the Work – Supplement this subsection with the following:

No changes in the work covered by the approved Construction Documents shall be made without having prior written approval by the Agency.

00140.35 Variation in Estimated Quantities - Add the following section:

Payment to the Contractor will be made only for the actual quantities of Work performed and accepted in conformance with the Contract. When the accepted quantity of Work performed under a unit item varies from the original Proposal quantity, payment will be at the unit Contract price for all Work unless the total accepted quantity of any Contract item, adjusted to exclude added or deleted amounts included in change orders accepted by both parties, increases or decreases by more than 25 percent from the original Proposal quantity. In that case, payment for Contract Work may be adjusted as described herein.

The adjusted final quantity shall be determined by starting with the final accepted quantity measured after all Work under an item has been completed. From this amount, subtract any quantities included in additive change orders accepted by both parties. Then, to the resulting amount, add any quantities included in deductive change orders accepted by both parties. The final result of this calculation shall become the adjusted final quantity and the basis for comparison to the original Proposal quantity.

(a) Increased Quantities – Either party to the Contract will be entitled to renegotiate the price for that portion of the adjusted final quantity in excess of 1.25 times the original Proposal quantity. The price for excessive increased quantities will be determined by agreement of the parties, or, where the parties cannot agree, the price will be determined by the Engineer based upon the actual costs to perform the Work, including reasonable markup for overhead and profit.

(b) Decreased Quantities – Either party to the Contract will be entitled to an equitable adjustment if the adjusted final quantity of Work performed is less than 75 percent of the original Bid quantity. The equitable adjustment shall be based upon and limited to three factors:
    (1) Any increase or decrease in unit costs of labor, materials or equipment, utilized for Work actually performed, resulting solely from the reduction in quantity;
    (2) Changes in production rates or methods of performing Work actually done to the extent that the nature of the Work actually performed differs from the nature of the Work included in the original plan; and
    (3) An adjustment for the anticipated contribution to unavoidable fixed cost and overhead from the units representing the difference between the adjusted final quantity and 75 percent of the original Plan quantity.

The following limitations shall apply to renegotiated prices for increases and/or equitable adjustments for decreases:

- The equipment rates shall be actual cost but shall not exceed the rates set forth in the Rental Rates Blue Book that is in effect at the time the Work is performed.

- No payment will be made for extended or unabsorbed home office overhead and field overhead expenses to the extent that there is an unbalanced allocation of such expenses among the Contract Bid items.
- No payment for consequential damages or loss of anticipated profits will be allowed because of any variance in quantities from those originally shown in the Proposal form, Contract Provisions, and Contract Plans.
- The total payment (including the adjustment amount and unit prices for Work performed) for any item that experiences an equitable adjustment for decreased quantity shall not exceed 75 percent of the amount originally Bid for the item.

If the adjusted final quantity of any item does not vary from the quantity shown in the Proposal by more than 25 percent, then the Contractor and the Contracting Agency agree that all Work under that item will be performed at the original Contract unit price.

When ordered by the Engineer or Owner, the Contractor shall proceed with the Work pending determination of the cost or time adjustment for the variation in quantities.

The Contractor and the Contracting Agency agree that there will be no cost adjustment for decreases if the Contracting Agency has entered the amount for the item in the Proposal form only to provide a common Proposal for Bidders.

00140.40 Differing Site Conditions - Replace the first sentence of the third paragraph with the following:

The party discovering such a condition shall, within 24-hours of discovery, notify the other party, in writing, of the specific differing conditions before they are disturbed and before the affected Work is performed.

At the end of the section, add the following:

Because of varying soil composition, surface drainage, and groundwater levels encountered in various areas at different seasons of the year, the Agency makes no representation of such conditions as they may pertain to this project. The Contractor shall be responsible for any and all cribbing, sheet piling, dewatering, and/or construction methods or procedures which may be necessary to complete the project, and additional compensation, therefore, will not be allowed.

00140.90 Final Trimming and Cleanup – Supplement this section with the following:

The Contractor shall perform final cleanup as provided in this section to the City's satisfaction. The date of acceptance will not be established until this is done. The material sites and all ground the Contractor occupied to do the work shall be left neat and presentable. The Contractor shall:

- Remove all rubbish, surplus materials, discarded materials, falsework, temporary structures, equipment, and debris, and
- Deposit in embankments, or remove from the project, all unneeded, oversized rock left from grading, surfacing, or paving.

Partial cleanup shall be done by the Contractor when he feels it is necessary or when, in the opinion of the City, partial clean-up should be done prior to either major cleanup or final inspection.

00140.91 Waste Site – Add the following new section including title:

Where there is additional waste excavation in excess of that needed for the project and in excess of that needed for compliance with requests of the City, the Contractor shall secure and operate his own waste site at his own expense. The Contractor shall also be required to secure and operate his own waste site at his own expense for the disposal of all unsuitable material, asphalt, concrete, debris, waste material, and any other objectionable material which is directed to waste.

The Contractor shall comply with the State of Oregon's regulations regarding disposal of waste material.

SECTION 00150 - CONTROL OF WORK

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

00150.00 Authority of the Engineer – Supplement this section with the following:

Unless otherwise expressly provided in the approved Construction Drawings, Specifications and Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Consultant and the Agency's right to reject the means and methods proposed by the Contractor which (1) will constitute or create a hazard to the work, or to persons or property; or (2) will not produce finished work in accordance with the terms of the approved Construction Documents. Approval of the Contractor's means and methods of construction or his failure to exercise his right to reject such means or methods shall not relieve the Contractor of the obligation to accomplish the result intended by the Construction Documents; nor shall the exercise of such right to reject create a cause for action for damages.

00150.05 Cooperative Arrangements – Delete the third sentence of the first paragraph and replace with the following:

The Contractor may exercise the election to enter into a partnering agreement by signing and returning the form if included with the Notice of Award.

00150.10 Coordination of Contract Documents – Delete the first paragraph and Part (a) in 00150.10 and replace it with the following:

The complete contract includes these parts: The contract form, bidder's completed form, contract plans, contract provisions, standard specifications, special provisions, standard plans, addenda, supplemental agreements, change orders and other various documents attached hereto. These parts complement each other in describing a complete work. Any requirement in one-part binds as if stated in all parts.

(a) Order of Precedence – In the case of discrepancy or conflict in the plans, standard specifications, and/or special provisions, they shall be resolved in the following order in decreasing precedence:

- Contract Change Orders;
- Addenda;
- Agreement for Construction;
- Supplemental Technical Specifications;
- Special Provisions;
- Bid Proposal;

- Stamped Engineer prepared drawings specifically applicable to the project and bearing the project title;
- Reviewed and accepted, stamped Working Drawings;
- 3D Engineered Models and supplemental Engineer prepared line, grade, and cross section data applicable to the project;
- 2026 City of Umatilla Design & Construction Standards & Specifications for Public Works Improvements, unless such resolution would violate governing Law or Regulation;
- Oregon Standard Drawings;
- Oregon Standard Specifications for Construction;
- **Information to Bidders;** and
- All other Contract Documents not listed above.

On the plans, working drawings, and standard plans, written dimensions shall take precedence over scaled dimensions.

This order of precedence shall not apply when work is required by one part of the Contract but omitted from another part or parts of the Contract. The required in one part must be furnished even if it is not mentioned in other parts of the Contract.

00150.15 Construction Stakes, Lines, and Grades – Add the following to Part (a) in 00150.15. Replace Part (b) and Part (c) with the following in:

(a) General – Contractor shall protect permanent and temporary benchmarks within the project boundary.

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

The Owner will:

- Provide copies of Plans and Specifications; and,
- Provide horizontal and vertical alignment control data used to create drawings

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

The Contractor shall:

- Provide that all survey work shall be completed under the direction and review of a Professional Land Surveyor registered in the State of Oregon.
- Lay out and set construction stakes and marks to establish the lines, grades, slopes, cross sections, and curves, required to complete the Work.
- Set benchmarks and stakes as necessary.
- Calculate and provide finish grades.
- Accurately measure detailed dimensions, elevations, and slopes from the construction stakes and marks.
- Perform the Work in such a manner as to preserve the stakes and marks.

- Set any reference lines for automatic control form the control stakes. Construction Staking is the sole responsibility of the Contractor.
- Maintain, relocate, or replace existing survey monuments, control points, and stakes within the project area. Perform the work to produce the same level of accuracy as the original monuments in a timely manner, at no additional cost to the Agency.
- Preserve survey monuments according to section 00170.82(c), ORS 209.140, and ORS 209.150. If such monuments are to be disturbed or destroyed, comply with requirements of these ORS at no additional cost to the Agency.
- Perform the Contractor responsibilities described in the Construction Surveying Manual for Contractors, Chapter 1.6 (see Section 00305).
- The Contractor shall perform slope staking including intersections and set stakes defining limits for clearing which approximate right-of-way and easements.
- The contractor is responsible for staking construction limits, rights-of-way, clearing limits, and grading boundaries.
- Staking must conform to the plans, special provisions, and authorized changes.
- The contractor must preserve all survey monuments and reference points unless removal is authorized.

00150.20 Inspection – Supplement this section with the following:

The City Engineer or his representative may not be on the job site full-time. The Contractor shall follow the approved construction plans and specifications, schedule, and request inspections and testing at the appropriate times as required herein. The Engineer will try to provide inspections on short notice, but if unable to, the requirements for proper notice shall apply. The project schedule prepared by the Contractor and approved by the Engineer shall also be used as a guide for the Contractor to schedule inspections. The Contractor shall provide a minimum 48 hours notice to request inspections and testing, but in no case shall there be more than 72 hours notice. The request shall state the date and approximate time the inspection or test is requested. If the Contractor has requested two (2) inspections or tests and is not prepared for said inspection or test, the Contractor shall pay the costs for any additional improperly scheduled requests.

At the beginning of the project, or each applicable construction activity, the Contractor shall meet with the City Engineer or his representative and establish a minimum 100 feet of product, in the field, which meets the specifications. This work includes: Survey staking and control, pavement cuts, utility trenches, trench bedding, pipe installation, backfill, patches, curb and gutter alignment, grade and finish, sidewalk finish, paving finish, and any other activities determined by the Engineer to be important to the project. No major amount of work shall proceed until this is established. This does not waive the Contractor's requirements in the specifications for quality control or materials used.

Inspections and testing are mandatory for acceptance of backfilling any utility trenches; placing base course and top course for streets; paving; placing sidewalks, curbs and gutters; storm, sewer and water line installation.

When the Engineer requests, the Contractor shall without charge provide samples of materials used or to be used in the Work. If the Contractor uses materials tested and approved for one project in an unrelated project, the Agency may deduct its testing and inspection costs from payments due the Contractor. The Engineer may order the Contractor to remove and replace, and bear the cost of doing so, any materials used without inspection.

Any inspections, tests, measurements, or other actions by Agency employees serve only one purpose: to assure the Engineer that Work, materials, progress rate, and quantities comply with Contract terms. Such work by Agency employees shall not relieve the Contractor from doing any Contract-assigned Work or from determining whether Contract requirements are being met. The Contractor shall correct any substandard Work or materials. The Engineer will reject unsuitable Work or materials even though inspected or paid for in a progress estimate.

00150.30 Delivery of Notices – Delete the items referencing Doc Express and replace with the following:

- Emails received before 5:00 P.M. PST on a business day shall be considered as received on the business day it was issued.
- Emails received after 5:00 P.M. PST, or on a non-business day, shall be considered to be received on the next business day.

00150.35 Plans, 3D Engineered Models, Working Drawings, and 3D Construction Models – Delete this section in its entirety and replace with the following:

All Work performed shall be in conformity with the lines, grades, slopes, cross-sections, superelevation data, and dimensions shown in the Plans, or as staked. If the Plans, Specifications, or these Special Provisions state specific tolerances, then the Work shall be performed within those limits.

Electronic data or 3D models may be available for the Contractor's convenience upon request, this data is informational only, and is not considered a part of the Contract, or these provisions. No guarantee is made by the Agency that the electronic data if provided to the Contractor is:

1. Compatible with any systems utilized by the Contractor;
2. Complete;
3. Representative of actual conditions at the project site;
4. Accurately reflects the quantities and character of the actual Work required.

Furnished electronic design data or documentation shall not relieve the Contractor from any risks or of any duty to make examinations and investigations or any other responsibility under the Contract or as required by law. No corrections, additions, or updates of any kind will be made to the electronic data that is available to the Contractor.

After execution of the Contract, the Project Engineer will provide, if available, upon written request the following electronic data used to design the project:

Geometric line work; alignments; profiles; sections, surfaces in AutoCAD 2025 format.

Data may be obtained by furnishing a written request to the Contracting Agency.

The Contractor shall provide any information or data that is requested by the Agency for the purpose of performing the verification of quantities, and quality.

The Contractor shall be responsible for any edits or conversions of the Agencies electronic data whether done by the Contractor or a vendor that is hired by the Contractor to perform such edits or conversions.

The Contractor shall be responsible for the accuracy and usability of any data or model that is developed from the Contracting Agencies data.

The Contractor shall be responsible for establishing any control points needed to achieve results that meet the requirements of the Contract.

00150.37 Equipment Lists and Other Submittals - Add the following to the end of this section:

Requirements for equipment lists and submittals shall be as specified in Technical Specification 01 33 00 of Volume II of these Contract Documents.

00150.50 Cooperation with Utilities – Supplement this section with the following:

It shall be the Contractor responsibility to notify all non-City of Umatilla utility companies of project including coordination of any impacts.

It shall be the Contractor's responsibility to investigate and verify the presence and location of all utilities prior to construction.

The Contractor shall call for field location, not less than two nor more than ten business days before the scheduled date for commencement of excavation which may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, state, or federal holiday. The phone number for the Oregon utility notification center 1-800-424-5555 (or 811). If no one-number locator service is available, notice shall be provided individually by the Contractor to those owners known to or suspected of having underground facilities within the area of proposed excavation.

No excavation shall begin until all known facilities, in the vicinity of the excavation area, have been located and marked.

The Contractor shall use surface features and other evidence in determining the approximate utility location prior to excavation. The Contractor shall hand dig to expose known utilities.

Where the location of the work is in proximity to overhead wires and power lines, the Contractor shall coordinate all work with the utility and shall provide for such measures as may be necessary for the protection of workmen.

Only City personnel shall operate water system valves.

00150.50(c) Contractor Responsibilities – Replace the bullet that begins “In addition to the notification required in OAR 952-001-0090(5), notify the Engineer…” with the following bullet:

- In addition to the notification required in OAR 952-001-0090(7), notify the Engineer and the Utility as soon as the Contractor discovers any previously unknown Utility conflicts or issues. Contrary to the OAR, stop excavating until directed by the Engineer and allow the Utility a minimum of two weeks to relocate or resolve the previously unknown Utility issues; and

00150.50(f) Utility Information – Add the following new subsection including title:

The Contractor is responsible to verify the location of all existing utilities prior to construction. All excavators performing work on this project must comply with all the provisions of ORS 757.541 to 757.571, including notification of all owners of underground facilities at least 48 business day hours, but not more than 10 business days before commencing an excavation.

In the event of damage to water, gas, telephone or any other underground utility system, the Contractor shall immediately notify the affected utility of the damage and coordinate the repair work. The Contractor shall make available to the utility company any manpower or equipment that will facilitate the repair and the continuation of the scheduled work. All cost of repairs shall be the responsibility of the Contractor.

The Contractor shall immediately repair any damages or breaks to unmarked existing sewer service pipes, sewer mains, or storm drainage pipes by connecting a section of pipe across the break. Permanent repair of the damaged lines shall be with approved materials and inspected by the Owner's representative.

Owner's Representative:	Client: City of Umatilla	(541) 371-1960
	Contact Name: Nakul Joshi	
	Title: Project Manager	
Confederated Tribes of the Umatilla Indian Reservation (CTUIR)		
	Carey Miller	(541) 429-7234
	Teara Farrow Ferman	(541) 429-7230
United States Army Corp of Engineers (USACE)		
	Natasha Susin	(509) 527-7002
Engineer:	Kleinschmidt Associates, Inc.	(425) 241-0256
	Charles Cutting, P.E.	(425) 241-0256
	Carl Mannheim, P.E.	(971) 236-5812
Contract Administrator:	J-U-B Engineers, Inc.	(509) 783-2144
	Cliff Woods, P.M.P.	
Utility Location:	OneCall	811
Power:	Umatilla Electric Co-Op	
	Justin Samp	(541) 561-4594
	Brian Kraegenbrink	(541) 564-4378
Water/Sewer/Storm:	City of Umatilla	(541) 922-3226
	Leon Scheel	(541) 561-9038
Irrigation:	CTUIR	(541) 429-7241
Fiber Optics:	Windwave Communications	(541) 676-9663
	Jack Halbert	(541) 561-3862
	Gerald Oden	(541) 561-3377

The Contractor shall coordinate all work with the utility companies for marking, removal, and/or relocation of utilities. Unless prior approval is obtained from the Owner, the Contractor is expected to maintain access to all adjoining properties at all times. When access must be temporarily interrupted, the Contractor will be responsible for providing a minimum of 72 hours' notice to affected landowners.

The Contractor shall notify all utilities in writing, with a copy to the Engineer, at least 14 Calendar Days before beginning Work within 10 feet of the respective utility's facilities.

See Technical Specification 01 30 00 for more information regarding utility coordination.

00150.55 Cooperation with Other Contractors – Add the following to the end of this subsection:

The following contract work will be ongoing adjacent to the Project site during the following times:

Contract Name (Contractor's Name)	**Estimated Times (From - To)**
CTUIR/COU Joint Pump and Pipeline Project – Transmission Main	September 2026 to December 2028
Transmission Main Contractor Name (Transmission Main Contractor) TBD	
CTUIR/COU Joint Pump and Pipeline Project – Temporary Water System	September 2026 to December 2028
Silver Creek Contracting, LLC (TWS Contractor) Derek Smith (541) 626-2060 dsmith@silvercreeekcontracting.com	
Water Treatment Facility	September 2026 to December 2028
PCL Construction Inc. (WTF Contractor) Keenan Byrne (820) 600-3110 kbyrne@pcl.com	

No additional compensation will be given to the Contractor for any coordination or delays caused by other nearby construction projects.

See Technical Specifications for additional information.

No additional compensation will be given to the Contractor for any coordination or delays caused by other nearby construction projects.

00150.80 Removal of Unacceptable and Unauthorized Work – Supplement this subsection with the following:

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the City Engineer, or fails to perform any part of the work required by the Contract Documents, the City Engineer may correct and remedy such work as may be identified in the written notice, with Agency forces or by such other means as the Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the City Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Agency attributable to correcting and remedying defective or unauthorized work, or work the Contractor failed or refused to perform, shall be paid by the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor's unauthorized work.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency's right to pursue any other avenue for additional remedy or damages with respect to the Contractor's failure to perform the work as required.

00150.91 Post-Construction Review – Delete this Section and replace it with the following:

The Contractor or the Engineer may request a Post-Construction Review meeting, to be held at a time prior to issuance of Third Notification but not earlier than five (5) Days following the date of Second Notification. The meeting may be held if agreed to by both parties. The party making the request will conduct the meeting and will announce the time and place of the meeting at least five (5) Days prior to the meeting date. The purpose of this meeting is to examine the Project for possible process improvements that may benefit future projects. The Contractor's attendance at the Post-Construction Review meeting is mandatory.

00150.96 Maintenance Warranties and Guarantees – Delete this subsection, excluding title, and replace it with the following:

If defective and unauthorized materials or work is discovered within the guarantee timeframe defined in 00170.85(b)(2), the Contractor shall promptly, upon written request, return and in accordance with the instructions either correct such work, or if such work has been rejected, remove it from the Project Site and replace it with non-defective and authorized work, all without cost to the Agency. If the Contractor does not promptly comply with the written request to correct defective and unauthorized work, or if an emergency exists, the Agency reserves the right to have defective and unauthorized work corrected or rejected, removed, and replaced pursuant to the provisions of Section 00150.80 of the Standard Specifications.

00150.98 Means and Methods – Add the following new subsection including title:

Unless otherwise expressly provided in the Contract Drawings, Specifications and Addenda, the means and methods of construction shall be such as the Contractor may choose; subject, however, to the Engineers right to reject means and methods proposed by the Contractor which (1) will constitute or create a hazard to the work, or to persons or property; or (2) will not produce finished work in accordance with the terms of the Contract.

The Engineer's approval of the Contractor's means and methods of construction or his failure to exercise his right to reject such means or methods shall not relieve the Contractor of the obligation to accomplish the result intended by the Contract; nor shall the exercise of such right to reject create a cause for action for damages.

00150.99 Water and Power – Add the following new subsection including title:

Water Supply – The Contractor shall make necessary arrangements and shall bear the costs for water necessary for the performance of the work. Water for use on the projects may be purchased from the Agency, and the Contractor shall arrange for and convey the water from the nearest convenient hydrant or other source at his own expense. The hydrants shall be used in accordance with the City of Umatilla Water Department regulations.

If Agency water is used for any work related to a project, a fire hydrant meter and gate valve will need to be obtained from the Agency to be used specifically for this project. The Agency will charge the Contractor for any water used during construction. The Contractor shall not operate the hydrant as a gate valve, nor shall the Contractor be allowed to operate any other Agency owned valve. The Contractor shall provide the necessary back flow prevention device when connecting to the water service. The Fire Hydrant Meter requirements and the Fire Hydrant Meter Application are available at the Customer Service Window and the Engineering Department.

The Agency reserves the right to deny the use of fire hydrants where deemed inappropriate by the City.

Power Supply – The Contractor shall make necessary arrangements and shall bear the costs for power necessary for the performance of the work.

00150.100 Oral Agreements – Add the following new subsection including title:

No oral agreement or conversation with any officer, agent, or employee of the Agency, either before or after construction, shall affect or modify any of the terms or obligations contained in any of the Agency-approved documents. Such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Agency, unless subsequently put in writing and signed by the Agency.

SECTION 00160 - SOURCE OF MATERIALS

Comply with Section 00160 of the Standard Specifications:

00160.01(a) All Materials - Replace the paragraph that begins "The Contractor shall identify…" with the following paragraph:

When the estimated value is over $10,000, the Contractor shall submit a copy of the materials purchase order or supply agreement.

Delete the paragraph that begins "For this purpose…".

00160.01(e) Substitute Material and Equipment – Add the following new subsection including title:

Where reference to proprietary products appear in the Specifications, Standard Plans, or Drawings, it is for the purpose of establishing an acceptable standard of quality or design. Unless a substitute is expressly prohibited, the Contractor may request approval of a substitute for any such proprietary product. Such request must be in writing and must identify the following as appropriate to enable the Engineer to determine the acceptability of the product proposed for substitution.

- Descriptive literature.
- Specifications.
- Test reports or samples.
- Identify variations from the Contract Documents and specified product.
- Identify system limitations that may be detrimental to the successful performance of the completed work.
- Provide revised drawings and/or details if required.

The Contract, if awarded, will be on the basis of material and equipment described in the Drawings or specified in the Specifications without consideration of possible substitute or equivalent items. When it is indicated in the Drawings, Standard Plans, or specified in the Specifications that a substitute or equivalent 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 the Engineer until after the "effective date of the Contract". The Engineer shall have the final authority for approving or rejecting the proposed substitute. No substitute product shall be used on the work until written approval has been received from the Engineer.

00160.20 Preferences for Materials – Supplement this Section with the following:

Build America Buy America Provisions do not apply to this Work.

00160.30 Agency-Furnished Material - Add the following to the end of this subsection:

The Agency will furnish the listed items at the following locations:

- Standby Generator at the City's Wastewater Treatment Plant
- Automatic Transfer Switch at the City's Wastewater Treatment Plant

See Section 01 64 00 – Owner Furnished Equipment for additional information.

SECTION 00165 - QUALITY OF MATERIALS

Comply with Section 00165 of the Standard Specifications modified as follows:

00165.03 Testing by Agency – Delete this subsection, excluding title, and replace with the following:

The Contractor shall be responsible for scheduling and paying for all material and compaction testing required by these Specifications. All testing services shall be performed by an independent, certified testing firm and/or laboratory hired by the Contractor and approved by the City Engineer. The Contractor shall submit information relating to the qualifications of the proposed testing firm to the

Agency for review and approval prior to the preconstruction conference. The testing firm shall provide copies of all test results to the Agency within 24 hours after completion of any test. Test reports shall become the property of the Agency. Testing shall comply with the Technical Specifications.

If any test fails, additional testing will be undertaken to identify the limits of the failure. Failed material or material that does not meet the required compaction level shall be removed and replaced with materials that meet the specifications and compaction requirements. Additional testing of quality assurance required because of non-conformance to specified requirements shall be performed at no cost to the Owner. Contractor shall be responsible for payments due to retesting.

The Owner reserves the right to conduct additional testing throughout the course of the project. Should an additional test fail the Contractor will be responsible for all costs associated with the initial test and all subsequent testing required to establish the limits of the failure, testing to establish replaced and recompacted material meets the compaction requirements and testing necessary to determine if the replacement material meets the requirements of the specifications.

Should the Owner perform additional testing and the test passes, the Owner will be responsible for the testing costs. The responsibility for the cost of additional testing shall be limited to the actual cost of the independent testing company.

00165.91 Fabrication Inspection Expense – Delete this Section in its entirety.

SECTION 00170 - LEGAL RELATIONS AND RESPONSIBILITIES

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

00170.00 General – Replace the paragraph that begins “The Contractor shall comply with all laws, ordinances, …” with the following paragraph:

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

00170.02 Permits, Licenses, and Taxes – Supplement this subsection with the following:

For a summary of Owner obtained permits/easements and Contractor responsibilities see Technical Specification 01 10 00.

00170.07 Record Requirements - Replace the paragraph that begins "For purposes of this Subsection, the term …" with the following paragraph:

For purposes of this Subsection, the term "Contractor" includes the Contractor, all Subcontractors, Material Suppliers, and providers of rented operated Equipment (except truck drivers), at all tiers, for all subcontracts with first-tier Subcontractors, all subcontracts between the first-tier Subcontractors and their Subcontractors and any other lower-tier subcontracts, and "Related Entities" as that term is defined in OAR 734-010-0400. The Material Suppliers included in this definition are those for Aggregates, asphalt cement concrete, Portland cement concrete and the supply and fabrication of structural steel items, and Material Suppliers that provide quotes.

00170.07(a) Records Required - Replace the paragraph that begins "The Contractor shall include in its subcontracts …" with the following paragraph:

The Contractor shall include in its subcontracts, purchase orders, and all other written agreements, a provision requiring all Subcontractors, Material Suppliers and providers of rented operated Equipment (except truck drivers), at all tiers, to comply with 00170.07. The Contractor shall also require all Subcontractors, Material Suppliers, and providers of rented operated Equipment (except truck drivers), at all tiers, and Related Entities to include in their contracts, purchase orders, and all other written agreements, a provision requiring all lower-tier Subcontractors, Material Suppliers and providers of rented operated Equipment (except truck drivers) to comply with 00170.07. The Material Suppliers to which this applies are those for Aggregates, asphalt cement concrete, portland cement concrete and the supply and fabrication of structural steel items and Material suppliers that provide Material quotes and Related Entities as defined in OAR 734-010-0400.

00170.10 Required Payments by Contractors

(a) Prompt Payment by Contractor for Labor and Materials – Supplement this subsection with the following:

If the Contractor fails to meet requirements for the prompt payment of labor and materials the Agency can pay for these services and withhold these amounts from payments owed to the Contractor.

00170.10(g) Paid Summary Report – Replace this subsection, except for the subsection number and title, with the following:

The Contractor shall submit a Paid Summary Report to the Engineer certifying payments made to all of its Subcontractors.

The Paid Summary Report shall be completed on the form provided by the Engineer and submitted to the Engineer within 20 Calendar Days of receipt of payment from the Agency for each month in which payments were made to each Subcontractor.

At the completion of the Project, submit a final Paid Summary Report form that provides the total amounts paid to each Subcontractor.

The Contractor shall require each Subcontractor at every tier to comply with the requirement to submit a Paid Summary Report within 20 Calendar Days of receipt of payment for Work on the Project and submit a final Paid Summary Report that provides the total amounts paid to the Subcontractor for its Work under the subcontract at the completion of the Project or completion of its Work.

00170.60 Safety, Health, and Sanitation Provisions – Supplement this subsection with the following:

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

The Contractor shall maintain at the project site office, or other well-known place at the project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish, and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor's care, persons, including employees, who may have been injured on the project site. Employees should not be

permitted to work on the project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor's care.

The Contractor shall have sole responsibility for the safety, efficiency, and adequacy of the Contractor's plant, appliances, and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the project site, including safety for all persons and property in the performance of the work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the Contractor's performance does not, and shall not, be intended to include review and adequacy of the Contractor's safety measures in, on, or near the project site.

All work shall be performed in accordance with all applicable local, state, and federal health and safety codes, standards, regulations, and/or accepted industry standards. It shall be the responsibility of the Contractor to ensure that his work force and the public are adequately protected against any hazards.

The City of Umatilla shall have the authority at all times to issue a stop work order at no penalty if, in their opinion, working conditions present an undue hazard to the public, property, or the work force. Such authority shall not, however, relieve the Contractor of responsibility for the maintenance of safe working conditions or assess any responsibility to the City for the identification of any or all unsafe conditions.

All signs, barricades, traffic control devices, and labor for traffic control required by construction activities for the control of traffic shall be supplied, placed, and maintained by the Contractor. This shall apply to detours and traffic control both within and outside the limits of the project.

All work shall be done under a plan which shall have the approval of the City of Umatilla Public Works Division and create a minimum of interruption or inconvenience to pedestrian and vehicular traffic. All arrangements to care for such traffic will be the Contractor's responsibility and shall be made at his expense. All work shall be carried out with due regard for public safety. Open trenches shall be provided with proper barricades and at night they shall be distinctly indicated by adequately placed lights. At entrances to business properties and other private roads, driveways, bridges, or other such means as to provide access shall be provided by the Contractor. The Contractor shall maintain vehicular and pedestrian access to businesses at all times that businesses are open for business.

Upon failure of the Contractor to immediately provide and maintain adequate suitable barricades, lights and detour signs, when ordered to do so, the City shall be at liberty, without further notice to the Contractor or the Surety, to provide the same and request payment for providing proper barricades, lights, and signs, and the City assumes no liability connected therewith.

Any traffic restriction must have prior approval of the City of Umatilla Engineering Division. Appropriate traffic control measures and signing are required during such temporary road closures.

It shall be the responsibility of the Contractor to secure the City's approval for any desired road closure and associated traffic control plan including detours. Following approval, the Contractor shall notify the City of Umatilla and the Police and Fire Departments and Umatilla School District at least 24 hours prior to closing any street. When the street is re-opened, it shall again be the responsibility of the Contractor to notify the above named departments and persons.

00170.61(a) Workers' Compensation - Replace this subsection with the following subsection:

00170.61(a) Workers' Compensation and Employer's Liability - The Contractor shall provide workers' compensation and employer's liability coverage for on-the-job injuries as required by 00170.70(e).

00170.65(b)(1) Minimum Wage Rates – Replace the paragraph that begins "The Bureau of Labor and Industries (BOLI) …" with the following paragraph:

The Bureau of Labor and Industries (BOLI) determines and publishes the existing State prevailing wage rates in the publication *Prevailing Wage Rates for Public Works Contracts*. The Contractor shall pay workers not less than the specified minimum hourly wage rate according to ORS 279C.838 and ORS 279C.840, and shall include this requirement in all subcontracts.

00170.70 Insurance - Supplement this subsection with the following:

The Contractor shall obtain and maintain in full force and effect during the duration of the work public liability and property damage insurance in accordance with this section and as modified herein.

The City of Umatilla shall set insurance requirements for each project. Prior to start of construction, the Contractor shall furnish the City of Umatilla a Certificate of Insurance and the additional insured endorsements as evidence of compliance with these requirements. This certificate shall name the City of Umatilla, its employees, agents, elected and appointed officials, consultants, and all subcontractors as "additional insureds" and shall stipulate that the policies named thereon cannot be canceled unless at least forty-five (45) days written notice has been given to the City of Umatilla. The certificate shall not contain the following or similar wording regarding cancellation notification: "Failure to mail such notice shall impose no obligation or liability of any kind upon the company, its agents, or representatives."

00170.70(a) Insurance Coverages – Replace the paragraph that begins "Contractor – The Contractor shall…" with the following paragraph:

Contractor - The Contractor shall obtain the insurance specified below prior to the execution of the Contract. The Contractor shall maintain the insurance in full force at the Contractor's expense throughout the duration of the Contract and as required by an extended reporting period or tail coverage requirements, and all warranty periods that apply.

Replace the paragraph that begins "**Insurance Provisions** - The Contractor and Subcontractor(s), if…" with the following paragraph:

Insurance Provisions - The Contractor and Subcontractor(s), if any, shall obtain insurance from insurance companies or entities that are authorized to transact the business of insurance and issue coverage in the State and that are acceptable to the Agency. Insurance coverage shall be primary and noncontributory with any other insurance and self-insurance, with the exception of Workers' Compensation/Employer's Liability. The Contractor, or appropriate Subcontractor, but not the Agency, shall pay for all deductibles, self-insurance retentions and self-insurance, if any.

Replace the paragraph that begins "**Commercial General Liability** - The Contractor shall provide Commercial…" with the following paragraph:

Commercial General Liability - The Contractor shall provide Commercial General Liability Insurance written on an occurrence basis and covering the Contractor's liability for bodily injury, property damage, personal and advertising injury, products and completed operations, and contractual liability. Coverage may be written in combination with Commercial Automobile Liability Insurance with separate limits for Commercial General Liability and Commercial Automobile Liability. Combined single limit per occurrence shall not be less than the dollar amount specified in the Special Provisions. The annual aggregate limit shall not be less than the dollar amount specified in the Special Provisions. The policy shall be endorsed to state that the annual aggregate limit of liability shall apply separately to the Contract.

Add the following to the end of this subsection:

The following insurance coverages and dollar amounts are required pursuant to this subsection:

Insurance Coverages	Combined Single Limit per Occurrence	Annual Aggregate Limit
Commercial General Liability	$1,000,000	$2,000,000
Commercial Automobile Liability	$1,000,000	(aggregate limit not required)
Pollution Liability	$2,000,000	$2,000,000

00170.70(c) Excess/Umbrella Liability – Supplement this subsection with the following:

Insurance Coverages	Combined Single Limit per Occurrence	Annual Aggregate Limit
Excess/Umbrella	$20,000,000	$20,000,000

00170.70(d) Additional Insured - Supplement this subsection with the following:

Add the following as Additional Insureds under the Contract:

- The City of Umatilla and its officers, agents, and employees
- City of Umatilla City Council
- Kleinschmidt Associates, Inc.
- Rogers Surveying
- Convergence Architecture and Associates, LLC
- Talos Engineering, Inc.
- GeoProfessional Innovation Corporation
- J-U-B ENGINEERS, Inc

00170.70(e) Workers' Compensation - Replace the title of this subsection with **"Workers' Compensation and Employer's Liability"**

00170.70(g) Certificate(s) of Insurance - Replace the bullet that begins "Specify that all liability insurance …" with the following bullet:

- Specify that all liability insurance coverages shall be primary and noncontributory with any other insurance and self-insurance, with exception of Workers' Compensation/Employer's Liability;

Replace the bullet that begins "Include a list of all policies…" with the following bullet:

- Include a list of all policies that fall under the Excess/Umbrella Liability Insurance if Excess or Umbrella Liability Insurance is used to meet the minimum insurance requirements.

00170.70(i) Insurance Requirement Review - Replace this subsection, except for the subsection number and title, with the following:

The Contractor agrees to periodic review of insurance requirements by Agency. Agency reserves the right to periodically assess risks and the adequacy of insurance coverage and in its discretion to require additional insurance coverage or increased coverage limits on existing coverages, or both.

00170.70(j) Builder's Risk – Add the following to the end of this subsection:

Provide Builder's Risk insurance for an amount equal to at least $24,000,000.

The policy shall include as loss payee, the City of Umatilla.

Add the following new subsection:

00170.70(l) Professional Liability – The Contractor and/or its subcontractor(s) and/or its design consultant providing construction management, value engineering, or any other design-related non-construction professional services shall provide evidence of Professional Liability Insurance covering professional errors and omissions.

Such policy shall provide the following minimum limits:

$1,000,000 per claim and $2,000,000 annual aggregate

If the scope of such design-related professional services includes work related to pollution conditions, the Professional Liability Insurance shall include coverage for Environmental Professional Liability.

If insurance is on a claims-made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract.

00170.72 Indemnity/Hold Harmless - Add the following paragraph and bullets to the end of this subsection:

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

- The City of Umatilla and its officers, agents, and employees
- City of Umatilla City Council
- Kleinschmidt Associates, Inc.
- Rogers Surveying
- Convergence Architecture and Associates, LLC
- Talos Engineering, Inc.

- GeoProfessional Innovation Corporation
- J-U-B ENGINEERS, Inc.

SECTION 00180 - PROSECUTION AND PROGRESS

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

00180.20(d) Disadvantaged Business Enterprise (DBE) – Delete this subsection.

00180.20(e) Trucking - Replace the paragraph that begins "This Section does not apply to…" with the following paragraph:

This Section does not apply to delivery of Materials by or for or from a Supplier. This Subsection applies to all truck hauling of materials not performed with trucks owned (or rented) and operated by the Contractor.

00180.20(e)(1) Trucking Services Agreement - Delete the bullet that begins "Statement specifying whether the services will be provided by a DBE…".

00180.20(e)(2) Limitations - Replace the paragraph that begins "The approved trucking services agreements…" with the following paragraph:

The approved trucking services agreements shall be used for all trucking services for hauling materials not provided by trucks owned (or rented) and operated by the Contractor. The Contractor shall execute a trucking services agreement with every trucking services provider for hauling materials prior to the trucking services provider doing any Work on the Project Site.

00180.21(a) General – Replace the bullet that begins " If the Subcontractor is providing any…" with the following bullet:

- If the Subcontractor is providing any of the insurance coverages as permitted under 00170.70(a), the Agency will respond within 35 Calendar Days after the Engineer's receipt of the request. (28 Calendar Days for the Agency to review and approve the Certificates of Insurance required by 00170.70(g) plus 7 Calendar Days to review and approve the subcontract request.)

Add the following subsection:

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

Limitations	**Subsection**
Cooperation with Utilities	00150.50
Cooperation with Other Contractors	00150.55
Railways	00170.01(e)
Contract Time	00180.50(h)
Right-of-Way and Access Delays	00180.65
Closed Lanes	00220.40(e)(1)
Special Events	00220.40(e)(2)(b)
Limited Duration Road Closure	00220.40(f)
Road Closure Using Rolling Slowdown Method	00220.40(g)

Noise Control	00290.32
Regulated Work Areas	00290.34(a)
Maintenance Under Traffic	00620.43
Opening Sections to Traffic	00744.51
Opening Sections to Traffic	00745.51

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

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

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

00180.41(a)(1) Schedule - Replace the paragraph that begins “10 Calendar Days prior to the preconstruction…” with the following:

At least five (5) Calendar Days prior to the preconstruction conference, the Contractor shall provide to the Engineer four copies of a Project Work schedule, including a time-scaled bar chart and narrative, showing:

00180.42 Preconstruction Conference – Supplement this subsection with the following:

Prior to the commencement of any work, a preconstruction conference shall be held. The Contractor shall contact the City of Umatilla Public Works and set a date and time for the meeting. It shall be the responsibility of the Contractor to notify and invite all parties having an interest in the project to the meeting, including the major subcontractors, Engineering Division, Irrigation Districts, and all applicable private utilities.

At this conference, all points of the approved Plans and Specifications will be open to discussion including scope, order and coordination of work, equipment lead time required, means and methods of construction, inspection and reporting procedures, etc. The Contractor should satisfy himself that all provisions and intentions of the work are fully understood.

The Contractor shall prepare and submit to the City at the preconstruction conference a Construction Progress and Completion Schedule using a bar graph format. Items in the Schedule shall be arranged in the order and sequence in which they will be performed. The schedule shall be drawn to a time scale, shown along the base of the diagram, using an appropriate measurement per day with weekends and holidays indicated. The Construction Progress Schedule shall be continuously updated and, if necessary, redrawn upon the first working day of each month or upon issuance of any Change Order which substantially affects the scheduling. Copies (2 prints or 1 reproducible) of newly updated Schedules shall be forwarded to the City Engineer, as directed, immediately upon preparation.

Any proposed road or sidewalk closures shall be presented to City Public Works at the preconstruction conference for consideration, including duration of closure. If approved, closures shall not extend beyond permitted duration.

Progress meetings between representatives of the City (inspector and/or engineer) and contractor (foreman, supervisor, and/or project manager) shall be held at the project site or at City Hall in accordance with the Technical Specifications. The contractor shall present an update on project status, project schedule, and any problems that have arisen.

At the preconstruction conference, or at a mutually agreed upon time at least seven (7) Working Days prior to beginning ground disturbing activities, the Contractor shall meet with the Engineer to discuss sensitive cultural sites on the Project. In attendance at this conference shall be:

- The Contractor's supervisory personnel.
- Any Subcontractors (including contract archaeological monitors) and supervisory personnel who will be involved in ground disturbing activities.
- When applicable, tribal representative(s) or monitor(s).

The Contractor shall submit at the preconstruction conference the names and phone numbers of the project personnel to include:

1. Project Manager
2. Onsite Project Superintendent/Foreman
3. Safety Officer
4. Traffic Control Supervisor
5. Non-Working Hours Emergency Contacts
6. Other Personnel as requested by the Contracting Agency

Other items the Contractor shall prepare and submit at the preconstruction conference include:

- A Schedule of Values breakdown of all lump sum items over $20,000. See Technical Specification 01 22 00 – Measurement and Payment for additional information.
- A preliminary schedule of working drawing submittals.
- A list of material sources for approval if applicable.
- List of long-lead items that may impact schedule.

See Technical Specification 01 30 00 for additional information and requirements regarding the Preconstruction/Kick-off Conference and subsequent Progress Meetings.

00180.43 Commencement and Performance of Work - Replace the bulleted list with the following:

- Not proceed with work resulting in an adjustment of contract time or compensation without written authorization from the Owner. This shall include work under any pending Change Order.

Add the following subsection:

00180.50(h) Contract Time – There are two Contract Time Milestones on this Project. The Contractor shall complete all Work to be done under the Contract in accordance with Contract Time Milestones stated and defined in Technical Specification 01 32 16 – Construction Schedules, generally defined as follows:

(1) **Contract Time Milestone 1** – The Contractor shall complete all Work to be done under the Contract for the raw water pump station and pipeline to be operational by March 1, 2028. The pump station and pipeline shall be tested and commissioned to allow raw water delivery to the Wanapa Road WTF for testing and commissioning activities at the WTF. See Technical Specification 01 32 16 – Construction Schedules for more information.

(2) **Contract Time Milestone 2** – The Contractor shall complete all remaining Work to be done under the Contract no later than December 31, 2028. See Technical Specification 01 32 16 – Construction Schedules for more information.

00180.85(b) Liquidated Damages - Remove and replace (1) and (2) from (b) with the following:

The Contractor shall pay Agency $4,500 per day for each and every Calendar Day that the Work remains uncompleted beyond the completion of Contract Time Milestone 1, as specified in Special Provision 00180.50(h) and Technical Specification 01 32 16 – Construction Schedules, until the improvements are completed as determined by the OWNER's Representative.

The Contractor shall pay Agency $1,500 per day for each and every Calendar Day that the Work remains uncompleted beyond the completion of Contract Time Milestone 2, as specified in Special Provision 00180.50(h) and Technical Specification 01 32 16 – Construction Schedules, until the Work is substantially complete as determined by the OWNER's Representative.

SECTION 00195 - PAYMENT

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

00195.00 Scope and Limit – Supplement this section with the following:

Payment shall be in accordance with Technical Specification 01 22 00 – Measurement and Payment.

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

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

00195.50(a)(1) Progress Estimates – Remove and replace the first paragraph with the following:

Prior to construction, the Contractor shall submit a Schedule of Values of all lump sum items over $20,000 to be reviewed and approved by the Engineer per Technical Specification 01 22 00. At the same time each month, the Contractor shall submit quantities of work performed and a breakdown of the cost of lump sum items to enable the Engineer to determine the work performed on a monthly basis. The amount of work completed will be based on the estimated percentage completed of lump sum pay items and as outlined in the Schedule of Values. The Engineers determination of the cost of work shall be final.

00195.50(a)(2) Value of Materials on Hand – At the end of the section, add the following:

As materials are used in the work, credits equaling the partial payments for them will be taken on future estimates. The Contractor shall provide sufficient written evidence of production costs to enable the Engineer to confirm amount and value. The Contractor shall provide invoices from material suppliers.

Each invoice shall be detailed sufficiently to enable the Engineer to determine the actual costs. Each month, no later than the estimate due date, the Contractor shall submit a letter to the Project Engineer that clearly states: 1) the amount originally paid on the invoice (or other record of production cost) for the items on hand, 2) the dollar amount of the material incorporated into each of the various work items for the month, and 3) the amount that should be retained in material on hand items. If work is performed on the items and the Contractor does not submit a letter, all of the previous material on hand payment will be deducted on the estimate. Partial payment for materials on hand shall not constitute acceptance. Any material will be rejected if found to be faulty even if partial payment for it has been made.

00195.50(b) Retainage – Replace this Subsection, except for the Subsection number and title, with the following:

The Agency reserves the right in its sole discretion to not withhold retainage from progress payments or to begin withholding retainage at any time. If the Agency withholds retainage from progress payments, the amount to be retained from progress payments will be 5% of the value of Work accomplished and will be retained in one of the forms specified in Subsection (c) below. No retainage will be withheld from Work performed as Force Account Work, escalation/de-escalation, bonuses, or other items decided by the Agency.

00195.50(c)(1) Cash, Alternate A – Replace this subsection, except for the subsection number and title, with the following:

Retainage will be deducted from progress payments and held by the Agency until final payment is made according to 00195.90, unless otherwise specified in the Contract.

Except as otherwise provided, the Agency will deposit the cash retainage withheld in an interest bearing account, established through the State Treasurer for the benefit of the Agency, as required by ORS 279C.560(5). Interest earned on the account shall accrue to the Contractor. Amounts retained and interest earned will be included in the final payment made according to 00195.90, unless otherwise specified in the Contract.

Any retainage withheld on Work performed by a Subcontractor will be released to the Contractor according to 00195.50(d).

00195.50(c)(2) Cash, Alternate B (Retainage Surety Bond) - Replace this subsection, except for the subsection number and title, with the following:

The Contractor may submit a Surety bond in lieu of all or a portion of the retainage required under the Contract. The Agency will accept this Surety bond unless the Agency first finds in writing good cause for rejection based on unique project circumstances in accordance with ORS 279C.560(1)(c).

The Surety bond must be in substantially the form specified in ORS 701.435 (4) (Oregon House Bill 4006, 2024), and executed by a Surety bonding company that is authorized to transact Surety business in the State of Oregon and may not be a Surety obligation of an individual. The Surety bond and any proceeds of the Surety bond must be made subject to all claims and liens and in the same manner and priority specified for retainage under ORS 279C.550 to 279C.570 and ORS 279C.600 to 279C.625. Agency will reduce the cash retainage held by an amount equal to the value of the Surety bond and pay the amount

of the reduction to Contractor according to ORS 279C.570. Any retainage withheld on Work performed by a Subcontractor will be released to the Contractor according to 00195.50(d).

When the Agency accepts a Surety bond in lieu of retainage from the Contractor, the Contractor shall accept Surety bonds from Subcontractors or Suppliers from which the Contractor has withheld retainage. At any time before final payment a Subcontractor may submit a Surety bond to the Contractor and request that the Contractor submit a Surety bond as described above for the portion of the Contractor's retainage that pertains to the Subcontractor. The Surety bond the Subcontractor provides to the Contractor must meet the Agency requirements specified in the paragraph above. When a Contractor at a Subcontractor's request obtains and submits a Surety bond under this subsection, the Contractor may withhold from payments to the Subcontractor an amount equivalent to the portion of the Contractor's Surety bond premium for which the Subcontractor is responsible in accordance with ORS 279C.560 (Oregon House Bill 4006, 2024).

Within 30 Days after a Subcontractor's request the Contractor shall provide a Surety bond as described above, and the Agency will accept the Surety bond unless:

- the Agency finds in writing good cause for rejection based on unique project circumstances in accordance with ORS 279C.560;
- a Surety bond is not commercially available;
- the Subcontractor refuses to pay to the Contractor the Subcontractor's portion of the Surety bond premium; or
- the Subcontractor refuses to provide the Contractor with a Surety bond that meets the requirements of ORS 279C.560(1)(b).

Notwithstanding 00195.50(d), within 30 Days of receiving a Surety bond from Contractor at a Subcontractor's or Supplier's request, Agency will release to the Contractor the amount held as retainage that is equivalent to the amount the Contractor submitted as a Surety bond. Contractor shall, within 30 Days after receiving a Surety bond from a Subcontractor or Supplier, release to the Subcontractor or Supplier the amount the Contractor holds as retainage that is equivalent to the amount of the Surety bond submitted, in accordance with ORS 279C.560(8).

00195.50(c)(3) Bonds, Securities, and Other Instruments - Replace this subsection, except for the subsection number and title, with the following:

Contractor may deposit bonds, securities or other instruments with the Agency or in a bank or other financial institution, to be held by Agency instead of cash retainage for the benefit of the Agency, which the Agency will accept unless the Agency first finds in writing good cause for rejection based on unique project circumstances, in accordance with ORS 279C.560(1)(c).

If the Contractor deposits bonds, securities or other instruments, and Agency does not reject the bonds, securities or other instruments as permitted by ORS 279C.560(1)(c), the Agency will reduce the cash retainage by an amount equal to the value of the bonds, securities and other instruments. Interest or earnings on the bonds, securities and other instruments accrue to the Contractor.

Bonds, securities and other instruments deposited instead of cash retainage shall be of a character approved by the Director of the Oregon Department of Administrative Services, including, but not limited to:

- Bills, certificates, notes or bonds of the United States;
- Other obligations of the United States or agencies of the United States;
- Obligations of a corporation wholly owned by the federal government;
- Indebtedness of the Federal National Mortgage Association;
- General obligation bonds of the State of Oregon or a political subdivision of the State of Oregon;
- Irrevocable letters of credit issued by an insured institution, as defined in ORS 706.008.

00195.50(f) Prompt Payment Policy - Replace this subsection, except for the subsection number and title, with the following:

Payments shall be made promptly according to ORS 279C.560, ORS 279C.570, ORS 279C.580 and other applicable legal requirements.

00195.60(a) General – At the end of the section add the following:

As materials are used in the work, credits equaling the partial payments for them will be taken on future estimates. Each month, no later than the estimate due date, the Contractor shall submit a letter to the Project Engineer that clearly states: 1) the amount originally paid on the invoice (or other record of production cost) for the items on hand, 2) the dollar amount of the material incorporated into each of the various work items for the month, and 3) the amount that should be retained in material on hand items. If work is performed on the items and the Contractor does not submit a letter, all of the previous material on hand payment will be deducted on the estimate. Partial payment for materials on hand shall not constitute acceptance. Any material will be rejected if found to be faulty even if partial payment for it has been made.

00195.90 Final Payment - At the end of the Section add the following:

No Waiver of Rights – Neither the inspection by the Agency, through the Engineer or any of its employees, nor any order by the Agency for payment of money, nor any payment for, or acceptance of, the whole or any part of the work by the Agency or Engineer, nor any extension of time, nor any possession taken by the Agency or Engineer, nor any extension of time, nor any possession taken by the Agency or its employees, shall operate as a waiver of any provision of this Contract, or any power herein reserved to the Agency , or any right to damages herein provided; nor shall any waiver of any breach in this Contract be held to be a waiver of any other subsequent breach.

SECTION 00197 - PAYMENT FOR FORCE ACCOUNT WORK

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

00197.20(e) Standby Time - Replace this subsection, except for the subsection number and title, with the following:

If ordered by the Engineer, standby time will be paid at 50% of the hourly rental rate calculated according to this Subsection, excluding the hourly operating rate. Rates for standby time that are calculated at less than $1 per hour will not be paid. Payment will be limited to not more than 8 hours in a 24-hour period or 40 hours in a 1 week period.

00197.80 Percentage Allowances - Replace the table that shows Subsection and Percent with the following:

Subsection	Percent
00197.10 Materials	19
00197.20 Equipment	19
00197.30 Labor	29
00197.40 Special Services	19

Replace the paragraph that begins "When a Subcontractor performs ordered…" with the following paragraph:

When a Subcontractor performs ordered Force Account Work, the Contractor will be allowed a supplemental markup of 10% on each Force Account Work order.

CITY OF UMATILLA, OREGON

CTUIR/COU Joint Pump and Pipeline Project
Intake and Pump Station

VOLUME II OF III
TECHNICAL SPECIFICATIONS

May 2026

Volume I Contract Documents and Special Provisions
Volume II Technical Specifications
Volume III Plans

This project was funded in part with a financial award from the Special Public Works Fund, funded by the Oregon State Lottery and administered by the Oregon Infrastructure Finance Authority

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TABLE OF CONTENTS

SECTION 1 – TECHNICAL SPECIFICATIONS

43 42 21 – Hydropneumatic Surge Tank System, Prepared by J-U-B ENGINEERS, Inc.

ALL OTHER TECHNICAL SPECIFICATIONS, Prepared by Kleinschmidt Associates, Inc.

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SECTION 1 – TECHNICAL SPECIFICATIONS

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CITY OF UMATILLA, OREGON

CTUIR/COU Joint Pump and Pipeline Project
Intake and Pump Station

SPECIFICATION SECTION	SECTION DESCRIPTION
43 42 21	HYDROPNEUMATIC SURGE TANK SYSTEM

The Technical Specifications sections listed above have been prepared under the direction of the Professional Engineer, registered in the State of Oregon, whose seal and signature appear below:



SIGNED 10/23/2025

EXPIRES: 12/31/2026

Prepared By:

J-U-B ENGINEERS, Inc.
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SECTION 43 42 21
HYDROPNEUMATIC SURGE TANK SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This performance specification describes the requirements for a package Hydropneumatic Surge Tank System. The purpose of the system is to minimize transient pressures from shock waves due to pump shutdown and startup, or any other transient forming condition. The system shall be designed for potable water service and shall be freeze protected.

1.2 RELATED SECTIONS

A. Section 01 32 16 – Construction Schedule

B. Section 01 33 00 – Contractor Submittals

C. Section 01 60 60 – Facility Startup

D. Section 01 65 60 – Pressure Pipe Testing and Disinfection

E. Section 09 90 00 – Painting and Coatings

1.3 DEFINITIONS

A. Contractor

1. The General Contractor as defined in these Contract Documents.

B. Supplier

1. The Supplier, is the party or parties who will procure the material or equipment for the work as specified under this section.

C. Hydropneumatic Surge Tank System

1. The package Hydropneumatic Surge Tank System shall be a complete air chamber system including the surge tank, level control system, and accessories.

D. Freeze Protection System

1. The Freeze Protection System shall be a complete system to prevent freezing of the surge tank, level control system, associated piping and appurtenances. The Freeze Protection System shall include, but not be limited to, the heat trace system and thermal insulation.

1.4 UNIT RESPONSIBILITY

A. Hydropneumatic Surge Tank System

1. The Hydropneumatic Surge Tank System shall be designed and supplied by a single supplier/manufacturer (i.e. Tank Supplier).

2. Installation shall be the responsibility of the Contractor.

B. Freeze Protection System

1. The Freeze Protection System shall be supplied and installed by the Contractor in coordination with the supplier's recommendations in accordance with the Contract Documents, Plans, and Specifications.

C. The Contractor shall ultimately be responsible for all coordination, labor, materials, and equipment required to provide a complete and working Hydropneumatic Surge Tank System in accordance with the Contract Documents, Plans, and Specifications.

1.5 REFERENCES

A. Pressure vessels shall be in accordance with the latest revision of the American Society of Mechanical Engineers (ASME) Code for Unfired Pressure Vessels, Section VIII Division 1.

B. All local Plumbing Codes shall be met.

C. The system and anchorage of the surge tank shall conform to the International Building Code (IBC).

D. The National Electric Code (NEC) shall be used for all electrical, instrumentation, and control systems..

1.6 GENERAL REQUIREMENTS

A. The Tank Supplier must have a minimum of five (5) years' experience, designing, supplying and starting up Hydropneumatic Surge Tank Systems.

B. Tank manufacturer shall have a quality management system certification per ISO 9001:2008 for engineered designs, solutions and manufacturing for fluid pulsation, and hydraulic surge control.

C. Personnel representing the Tank Supplier are required to visit the site and check the installation. Tank Supplier staff shall also instruct the Contractor during installation and startup and OWNER's personnel in the operation and maintenance of the Hydropneumatic Surge Tank System. A Hydropneumatic Surge Tank System Startup is required during the Tank Supplier staff site visit to confirm the system is operational prior to commissioning of the pump station. The Hydropneumatic Surge Tank System Startup Plan must be submitted at least two weeks prior to site visit.

1. Tank Supplier staff are also required to visit the site and participate in the commissioning of the pump station (i.e. Facility Startup) in accordance with this Section.

D. Tank Supplier shall submit a signed form or letter certifying that the Hydropneumatic Surge Tank System is installed correctly, has been tested and calibrated, and that it is ready for full service.

E. All piping materials, fittings, solvents, paints, coatings, primers, welds, or other appurtenances and materials used must comply with NSF/ANSI Standard 61 and be certified lead-free.

1.7 DESIGN AND PERFORMANCE REQUIREMENTS

A. The Hydropneumatic Surge Tank System must be designed to match the dynamics of the pumping station during normal operating conditions, startup/shutdown conditions, and during power outage (hard stop) conditions at peak operation.

1. The pressure transients in the pipeline generated by the above conditions must not cause cavitation or water column separation at any point in the pipeline and must not exceed the pressure rating of the system piping at any point in the pipeline. The system shall not exceed the following performance requirements:

a. Full vacuum, approximately -34.0 feet of water (-14.7 psig) is not allowed anywhere in the system at any time during any transient event.

b. Negative pressures are acceptable but should be limited to approximately -15.0 feet of water (-6.5± psig).

B. There shall be no less than thirty (30) percent reserve water in the surge tank at the maximum outflow conditions (water seal volume).

1.8 BASIS OF DESIGN

A. Hydropneumatic Surge Tank System

1. The following Hydropneumatic Surge Tank System Supplier was referenced in development of the specification:

Sam Sadek
PULSCO, Inc.
949-208-6946
s.sadek@pulsco.com
www.pulsco.com

B. Freeze Protection System

1. The following suppliers were referenced in development of the Freeze Protection System specification:

a. Heat Trace System

Scott Stephens
Chromalox
360-846-8368
Scott.stephens@chromalox.com
www.chromalox.com

b. Thermal Insulation

Matt Nichols
Dragon Jacket
509-389-8866
mnichols@dragonjacket.com
www.dragonjacket.com

1.9 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 – Contractor Submittals.

1. Schedule

a. The Contractor shall provide an anticipated schedule for design, submittals, site work, and the major components of construction including foundation, surge tank level control and appurtenances, freeze protection system, and other significant activities.

b. See Section 01 32 16 – Construction Schedule for additional information.

2. Surge Analysis

a. Prior to procurement, the Tank Supplier shall verify surge analysis performed by OWNER's Representative by conducting an independent surge analysis of the pumping station and piping, utilizing the data supplied by the OWNER's Representative.

a.1. Hydraulic system information is included as a supplement to this Section to aid the surge analysis.

b. The surge analysis must show pipeline profile, initial flow rate, initial and maximum expanded air volume and envelope of maximum and minimum line pressure throughout the pipeline. In addition, a predicted pressure-time history at the pump station and at other critical points in the pipeline will also be required. Other critical points include:

Distance[1] (ft)	Location
0	Start of Pipeline
792	10-inch CAV
1531	2-inch CAV
1754	2-inch CAV
2195	6-inch CAV
3440	End of Pipeline

1. Distance from pump manifold, see Supplements at end of Section.

c. Results of the surge analysis shall be prepared in a surge analysis report and submitted for review in accordance with Section 01 33 00 – Contractor Submittals. The results shall clearly indicate that the design and size of the surge tank provided will adequately protect the system by not exceeding the performance requirements as defined in this Section.

3. Professional Structural Engineer Requirements

a. Tank Supplier shall directly employ a licensed Professional Structural Engineer who is responsible for reviewing the proposed foundation design and shall design the anchorage connection of the surge tank to the proposed foundation. Engineer of Record shall be licensed and registered in the State of Oregon.

b. Any design data, construction drawings and reports prepared by the Engineer of Record shall be sealed.

4. Foundation Design Data

a. The Tank Supplier shall review the proposed foundation design and tank anchorages shown on the drawings and confirm or revise the design for the anchorage and connection to the surge tank saddle supports.

b. The Tank Supplier shall provide detailed structural calculations for foundation design review. The calculations shall be sealed by a Professional Structural Engineer licensed and registered in the State of Oregon.

c. The final foundation design shall be determined by the Tank Supplier's foundation design review and approved by the OWNER's Representative.

5. Construction Drawings

a. Prior to shipping equipment, submit detailed fabrication drawings, system assembly and installation drawings for review and approval.

b. Provide elevation, plan, detail, and sectional view drawings of the surge tank, support saddles and all appurtenant equipment and accessories. Show the location, dimensions, material specifications, and finish requirements.

c. Details shall include information regarding mounting of all tank appurtenances and accessories.

6. Electrical Drawings

a. Complete electrical diagrams with power and instrumentation requirements.

7. Product Data

a. Provide a separate concrete mix design for each concrete compressive strength required or specified.

b. Provide technical data and color samples of all materials and coating products used.

c. Provide manufacturers descriptive information for appurtenant equipment and accessories that are not detailed on the construction drawings.

d. Specifications for system components, accessories and protective coatings.

e. Submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.

8. Certification

a. Provide certification from Tank Supplier that the surge tank has been designed and installed in accordance with the requirements of this Section.

a.1. The tank manufacturer shall provide a guarantee of performance and workmanship certifying that the system will meet all provisions of this Section.

b. Provide documentation of all tests, inspections and certifications required by this Section.

c. NSF Certification

c.1. Copies of the NSF-61 certified listing for all wetted materials.

c.2. All piping materials, fittings, solvents, paints, coatings, primers, welds, or other appurtenances and materials used must comply with NSF/ANSI Standard 61 and be certified lead-free.

d. Provide certification that the Freeze Protection System has been designed and installed in accordance with the requirements of this Section.

9. Operation and Maintenance Manual.

    a. Provide a manual of operating instructions and maintenance procedures for the Hydropneumatic Surge Tank System and applicable appurtenant equipment, mechanical components and miscellaneous accessories. Manual shall include installation instructions, operating instructions, maintenance instructions, as-built construction drawings, cleaning and painting instructions, a gage table and catalog cuts of equipment supplied.

        a.1. The Tank Supplier shall provide all components and assembly instructions to the Contractor for installation including surge tank air-water ratio, initial water level, and internal surge tank pressure requirements.

    b. Copy of ASME Pressure Vessel Code Form U-1A.

    c. Provide a manual of operating instructions and maintenance procedures for the Freeze Protection System.

10. Hydropneumatic Surge Tank System Startup Plan

    a. Contractor shall submit a detailed plan for sequencing testing of the Hydropneumatic Surge Tank System for general review and consideration by OWNER's Representative. The plan must contain enough detail for Contractor to perform the system startup with the support of the supplier staff in field and will include at a minimum:

        a.1. Vessel Pressure Test

        a.2. Hydropneumatic Surge Tank System Testing/Startup

            a.2.1. Including contingency if there is no static pressure head in the main pipeline when the pump(s) are off and the main pipeline is drained.

        a.3. Hydropneumatic Surge Tank System Calibration

        a.4. Demonstration of Hydropneumatic Surge Tank System/Commissioning

        a.5. Freeze Protection System Testing/Startup

1.10 WARRANTY

A. Hydropneumatic Surge Tank System

1. The supplied components shall carry a warranty of one (1) year from initial operation or eighteen (18) months from delivery whichever comes first.

B. Freeze Protection System

1. Heat Trace System

a. Heat trace cable and associated components shall be warranted against faulty manufacturing workmanship, or the use of defective materials for a period of ten (10) years from the date of installation of the Heat Trace System.

2. Thermal Insulation

a. The thermal insulation shall include a 5-year limited warranty.

PART 2 - PRODUCTS

2.1 GENERAL

A. Furnish a package Hydropneumatic Surge Tank System as shown on the plans and as specified in this Section.

2.2 HYDROPNEUMATIC SURGE TANK SYSTEM

A. Surge Tank

1. The surge tank shall be a horizontal air-over-water surge tank system, PULSCO CT Series or approved equal.

2. The surge analysis performed by the OWNER's Representative requires a minimum surge tank volume of 3,000-gallons. The final size of the surge tank is to be determined by the Tank Supplier's surge analysis and approved by the OWNER's Representative. The surge tank must have no moving parts, vanes or elastomers and shall contain a vortex breaker and differential nozzle (if deemed necessary).

3. The surge tank shall be constructed of carbon steel for a Maximum Allowable Working Pressure (MAWP) of _250_ psig in accordance with the ASME Pressure Vessel Code, Section VIII, Division 1. The minimum wall thickness shall be ¼ inch. The surge tank shall be provided with a single flanged 12-inch inlet/outlet line connection, a flanged 4-inch drain connection, adequate supports (two saddles for horizontal tanks), lifting lugs and couplings for drainage, safety relief valve(s) and a level control system. The surge tank shall be provided with a round manway, minimum 24" in diameter and shall be accessible from a standing position adjacent to the tank.

4. Hydrostatic test the surge tank in accordance with ASME Code for Unfired Pressure Vessels. Form U-1A "Manufacturers' Data Report for Unfired Pressure Vessels" shall be provided by the surge tank manufacturer to certify that the surge tank was built in accordance with ASME Code Rules for the Construction of Unfired Pressure Vessels and inspected by a certified inspector.

5. The internal surface of the surge tank shall be shop sandblasted to SSPC-SP-10 and shop lined with an NSF Standard 61/600 approved epoxy coating. Coating shall be applied in accordance with the coating manufacturer's instructions.

    a. Interior Coating

        a.1. Primer Coat – Phenalkamine Epoxy - Tnemec Series 21 Epoxoline, 6.0 to 8.0 MDFT, or approved equal.

        a.2. Finish Coat - Phenalkamine Epoxy - Tnemec Series 21 Epoxoline, 2 coats, 6.0 to 8.0 MDFT, or approved equal.

    b. See Section 09 90 00 – Painting and Coatings for additional information.

6. The external surface of the surge tank shall be shop sandblasted to SSPC-SP-6 and shop coated with a polyurethane coating system with a zinc-rich primer. Coating shall be applied in accordance with the coating manufacturer's instructions.

    a. Exterior Coating

        a.1. Primer Coat – Polyamidoamine Epoxy – Tnemec Series L69 Hi-Build Epoxoline II, 4.0 to 8.0 MDFT, or approved equal.

        a.2. Finish Coat – Aliphatic Acrylic Polyurethane – Tnemec Series 1095 Endura-Shield, 3.0 to 5.0 MDFT, or approved equal.

    b. The finish coat color shall be as selected by the OWNER in accordance with Section 09 90 00 – Painting and Coatings.

    c. Touch up coating shall be applied in the field by the Contractor upon installation in accordance with Section 09 90 00 – Painting and Coatings.

7. The surge tank and associated level control system appurtenances (i.e. safety relief valve, air-line check valve, instrument well, level gauge assembly, air muffler, pressure gauge, level transmitter, level control panel, pneumatic assembly and air piping, etc.) shall be installed outdoors and shall be freeze protected in accordance with the requirements of this Section.

B. Level Control System

1. The purpose of the level control system is to control the air volume in the surge tank. This is accomplished by maintaining the water level within a designed operating range.

2. Tank Supplier to develop recommended set points in agreement with the Surge Analysis Report.

3. When water level is above the normal operating range, air shall be added to the surge tank from the air compressor, through the add air solenoid valve. When

water is below the normal operating range, air shall be vented from the surge tank through the vent air solenoid valve. High and low alarm signals shall be generated when the water level is out of range. Time delays shall be used to prevent false alarms and avoid adding or venting air during start up and shutdown or during minor fluctuations.

4. The level control system includes the local control panel (level controller), level transmitter, solenoid valves and air compressor.

5. Local Control Panel (Level Controller)

    a. The PLC based level controller shall be a PULSCO Skypark Series, or approved equal.

        a.1. All electronics shall be housed in a 304 SS NEMA 4X enclosure.

        a.2. Controller shall be equipped with a door mounted, NEMA 4X rated, 12" HMI touch screen display with a built in proximity sensor that will put the display to sleep if no movement is detected for several minutes.

        a.3. HMI shall contain screens that have continuous indication of water level and corresponding tank water volume in real time that displays current water level in relation to solenoid and alarm level set points.

        a.4. HMI shall contain screens that display and allow changes to current solenoid and alarm level set points and timers.

        a.5. A button on the HMI shall be provided that resets all values to pre-programmed O&M values.

        a.6. Vent and add air solenoid control shall be selectable from hand, off, and auto from the controller display.

        a.7. HMI shall contain an alarm screen that lists the alarms that have occurred and the number of occurrences that each alarm has had.

        a.8. Controller shall log and save locally all alarms and input signals for a minimum 3 months.

        a.9. All field wiring to the controller shall be done through heavy duty connectors. There shall be no field wiring to components inside of the controller.

        a.10. Multiple heavy duty connectors shall be provided to separate AC and DC voltages.

a.11. Electrical surge suppression devices shall be installed on all analog input signals.

a.12. Dry contacts shall be available for all alarm and solenoid relays.

a.13. Controller shall contain an Ethernet switch to allow Ethernet communication with site PLC or SCADA system.

6. Level Transmitter

   a. Level transmitter provides a 4-20 mA signal and can be a Differential Pressure Transmitter, Magnetic Level Transmitter, or R.F Capacitance probe.

7. Solenoid Valves

   a. ASCO Redhat model or equal. One solenoid valve for adding air (lowering water level) and one solenoid valve for venting air (raising water level).

8. Pneumatic Assembly

   a. Solenoid valves, associated ball valves, and piping shall be pre-assembled by the Tank Supplier and installed in a heated NEMA 4 enclosure with the Local Control Panel (level controller).

9. Air Compressor

   a. The air compressor package shall be a Simplex (one air-cooled, two-stage, oil lubricated, with air filters, reciprocating type air compressor mounted on one air receiver) minimum 5-horsepower (hp) package. The air compressor package shall be the standard product of a manufacturer who is regularly engaged in the design and construction of fully automatic air compressor systems. The air compressor system shall include the following items.

      a.1. A Totally Enclosed Fan Cooled (TEFC) motor shall drive the compressor and shall be adequate to drive the compressor continuously at full-rated output. Power supply shall be 230/460 volts, 3 phase and 60 hertz.

      a.2. The Tank Supplier shall select the compressor volumetric capacity and discharge pressure. The capacity and discharge pressure selected shall be sufficient for the application to adjust the fluid level from the add air level to the add air reset in no more than 20 minutes.

      a.3. The air receiver shall be a minimum of 80-gallon capacity.

      a.4. The air compressor shall be oil-lubricated with food grade oil or lubricants. The air compressor shall include air filters to provide an

oil-free air supply as follows: a moisture separator, followed by a coalescing filter, followed by an activated carbon filter.

b. Compressor unit shall include a totally enclosed crankcase of cast iron, separate detachable deep finned cylinders, matched balanced pistons, separately removable valve housing, low oil switch and a direct reading pressure gauge. The low oil switch shall shut down the compressor if the oil level is too low. The switch shall not reset without adding oil.

    b.1. The air compressor controller (air compressor local control panel) shall be provided with a power on indicator, Hand-Off-Automatic (HOA) switch, run indication, motor overload alarm indicator and low oil level alarm indicator. It shall contain a magnetic motor starter and 120V power supply.

c. The air compressor shall start and stop based on pressure in the air receiver. The compressor shall be shutdown by motor overload, or low oil level. An alarm condition shall energize a local alarm indicator.

    c.1. The air compressor shall start automatically, provided its HOA switch is in the AUTO position and the air receiver pressure is below the shutoff setpoint. The compressor shall run continuously if its HOA switch is in the HAND position and shall shut down if its HOA switch is in the OFF position.

    c.2. Dry contacts shall be provided in the air compressor controller for remote indication of running conditions and alarms for the compressor. Communication from the air compressor controller shall be relayed to the Local Control Panel (level controller) for communication with the site PLC or SCADA system.

d. The air compressor package shall be coated with the standard factory coating.

    d.1. The air compressor supply/drain lines and appurtenances shall be freeze protected in accordance with the manufacturer's requirements and the requirements of this Section.

    d.2. The air compressor package shall be a Quincy-Compressor QR25 Series Model F325 (horizontal configuration), or approved equal, and installed per manufacturer's recommendations for the surge tank application.

e. The air compressor will be installed outdoors and shall be provided with an insulated weatherproof enclosure suitable for outdoor installation in a temperature controlled environment.

    e.1. The enclosure shall be certified to the most recent ASSE Standard 1060 (Class I).

e.2. Enclosure shall be a wood framed structure constructed of corrosion-resistant marine grade aluminum with a powder-coated finish. The enclosure coating shall be rated for prolonged sun exposure without degradation.

e.3. The aluminum enclosure colors shall be selected by the OWNER.

e.4. The enclosure shall be sized to accommodate the air compressor footprint with a minimum 20" clearance on all sides for air flow and maintenance access.

e.5. The enclosure shall be sized and designed to accommodate internal wall mounting of the air compressor controller (if necessary). The enclosure shall include weatherproof conduit/cable entry points (if necessary).

e.6. The enclosure shall be a fully enclosed design with overlapping panels and drip edges to prevent rain, snow, dust, and wind driven-debris intrusion. All roof and access panels shall be lockable and be removeable to allow for routine maintenance and inspection purposes.

e.7. The enclosure shall be insulated with polyisocyanurate foam. Insulation shall have a minimum R9 (1.5-inch min.) rating in the walls and R18 (3-inch min.) rating in the roof.

e.8. The enclosure shall have a fully insulated drain panel designed to remain closed, except when discharging water. The drain panel shall be sized to accommodate the maximum discharge for air compressor installations.

e.9. The enclosure shall be rated for local wind conditions in accordance with ASCE 7-16.

e.10. The enclosure shall include provisions for passive or active ventilation to prevent overheating as deemed necessary by the air compressor manufacturer. If active ventilation is deemed necessary, coordinate with the OWNER's Representative for electrical loading requirements.

e.11. Heating equipment shall be furnished and designed by the manufacturer of the enclosure to maintain an interior temperature of 40-degreees Fahrenheit (°F) with an outside temperature of -30-degrees Fahrenheit (°F). Slab mounted UL or ETL listed heater(s) shall be provided that have been independently certified to meet the UL-2021 "Rain Test" for damp or wet conditions. Heater(s) shall be provided with a thermostat adjustable from 40-degrees Fahrenheit (°F) to 100-degrees Fahrenheit (°F). The thermostat, all

conduit and wiring fittings provided shall be suitable for “water-tight” installation.

e.12. The enclosure shall be mounted securely to a concrete pad and remain locked even if outside screws are removed. All mounting hardware shall be furnished. Enclosure shall be assembled and mounted to concrete pad according to manufacturer's instructions, and as generally shown on the Plans in accordance with the project Specifications.

e.13. The insulated enclosure shall be a SAFE-T-COVER Series 800 (Model 800TD-AL), or approved equal.

C. Miscellaneous Components

1. Air Piping

   a. Air piping, fittings, and accessories shall be installed from the air compressor to the pneumatic assembly to the Surge Tank for adding and venting air in accordance with the Tank Supplier’s recommendations.

2. Safety Relief Valve

   a. The surge tank shall have a safety valve sized in accordance with the ASME code to prevent over pressurizing the surge tank above its design pressure. Safety Relief Valve setpoint shall be set to the maximum allowable working pressure of the surge tank. Safety relief pipe shall be piped to floor for drainage in event of over pressurization.

3. Air-Line Check Valve

   a. A check valve shall be installed on the top of the tank to prevent fluid from ever being able to enter the air piping.

4. Isolation Ball Valves

   a. Ball valves for isolation and bypass of solenoid valves, isolation and drain of the probe well and drain and isolation of the air piping, as well as isolation for instrumentation and other accessories.

5. Instrument Well

   a. Stainless steel chamber with couplings for connection to surge tank and installation of level transmitter, level indicator and drain valve to allow for easy troubleshooting of the system.

6. Level Gauge Assembly

a. A level indicator shall be mounted on the instrument well for visually checking surge tank water level. The indicator's connections shall have isolation valves. Indicator shall extend from approximately 6" below and 6" above the designed operating range.

7. Air Muffler

a. An air muffler shall be installed on the pneumatic assembly for reducing the noise generated from the venting of air from the Surge Tank.

8. Pressure Gauge

a. A pressure gauge shall be installed on the pneumatic assembly, on the air piping on top of the tank, and at the tank inlet/outlet connection piping for indicating pressure in Surge Tank. Gauges shall be 4 ½" diameter dial, ¼" bottom connection.

9. Drain

a. The surge tank shall be provided with a flanged drain line connection separate from the flanged inlet/outlet line connection for drainage of the tank in the event isolation from the system is necessary.

2.3 FREEZE PROTECTION SYSTEM

A. The purpose of the Freeze Protection System is to prevent freezing of the surge tank, level control system, associated piping and appurtenances. This is achieved by maintaining the water and exposed components above a minimum operating temperature through the use of electric heat tracing and thermal insulation. The system shall be designed to operate automatically in response to ambient temperature conditions and shall be compatible with the facility's control and monitoring infrastructure.

B. When ambient air temperature drops below the minimum operating temperature, the heat tracing system shall be turned on to prevent the system from freezing. When the ambient air temperature rises above the minimum operating temperature, the heat tracing system shall turn off. High and low alarm signals shall be generated when the ambient temperatures are out of range or there is a sensor failure.

C. The Freeze Protection System shall be provided and installed by the Contractor, in accordance with the Plans and Specifications. Surge tank, piping and appurtenances, pneumatic assembly, air piping, air compressor piping, and other appurtenances exposed to the elements shall be freeze protected to operate effectively under ambient temperatures as low as -20-degrees Fahrenheit (°F). All components, including heat trace cable, thermal insulation, sensors, and controllers, shall be rated for continuous operation at or below this temperature and shall maintain water temperature above the minimum operating threshold to prevent freezing.

1. The Freeze Protection System shall automatically activate when the ambient air temperature falls below 40-degreees Fahrenheit (°F) and shall automatically deactivate when the ambient air temperature rises above 45-degrees Fahrenheit (°F). The activation and deactivation temperatures shall be adjustable via the digital thermostat or control system and shall be verified during commissioning to ensure proper operation.

D. The Freeze Protection System includes the heat trace system and thermal insulation.

1. Heat Trace System

a. Contractor shall coordinate with a Heat Trace System Supplier to design, furnish, and install a complete electrical heat trace system that includes a local control system, temperature sensors, and visual light indication as specified here in. Heat Trace System components shall be furnished from a single source from a single manufacturer.

b. The Heat Trace System Supplier shall have a complete quality assurance program that includes product qualification testing and routine testing of heater cable against minimum standards of acceptance.

c. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.

d. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code, N.E.C.

e. The Heat Trace System Supplier shall provide detailed design, for review and approval, utilizing standard heat-tracing design software, such as Chromatrace™. At a minimum the design must provide the following:

e.1. Circuit identification number.

e.2. Maintain temperature.

e.3. Line size and insulation.

e.4. Heat loss for pipe, valves, and supports.

e.5. Amount and type of heating cable required.

e.6. Spiral requirements.

e.7. Heating cable service voltage.

e.8. Heating cable power output at the maintain temperature.

e.9. Uncontrolled pipe temperature at maximum ambient.

f. Heat Trace Cable

f.1. Contractor shall furnish and install, in sufficient quantities, power connection kits, end seals, splice/tee kits, and all other material required for the complete installation and wiring of heat trace cables.

f.2. All connection components used to terminate self-regulating heating cables, including power connectors, splices, tees, and connectors, shall be approved for the respective area classification and approved as a system with the particular type of heating cable in use.

f.3. Heat Trace System shall include one (1) weather-resistant end seal integrated visual signal light to indicate system energization, suitable for use with self-regulating cables. The signal light kit shall be installed in a visible location to indicate energization of the Heat Trace System. Additional signal light kits shall be installed if needed necessary by Heat Trace Supplier. Signal light kit(s) shall be Chromalox USL Signal Light Kit, or approved equal.

f.4. The heating cables shall be self regulating low temperature (SRL) with continuous exposure (maintain) capability up to 150°F (65°C) and continuous exposure capability up to 185°F (85°C) with power off. Heat trace cable shall be Chromalox Self-Regulating Low-Temperature (SRL) series, or approved equal.

g. Heat Trace Controller

g.1. For single or dual loop applications, a UL listed microprocessor based temperature control, monitoring and power distribution system shall be used. The controller shall accept (2) 100 ohm platinum RTD sensor inputs per circuit. The system shall be compatible with self-regulating and MI cables and shall have the following features:

g.1.1. NEMA 4X fiberglass enclosure.

g.1.2. Supply voltage: (select: 120, 240 or 277 Vac single phase).

g.1.3. Field power connection terminal block must accept (2) RTD sensor inputs per circuit.

g.1.4. Control must operate in 32-104°F (0-40°C) environments.

g.1.5. Solid state relay rated 40A at 104°F (40°C) output.

g.1.6. Optional RS-485 MODBUS communications capable with interfacing with personal computers and PLC's.

g.1.7. Low current alarm: 0-30A in 1A increments.

g.1.8. Optional 5-100mA ground fault alarm trip.

g.1.9. Process, deviation, band, high/low and latching/non-latching (manual/automatic reset) programmable temperature alarms.

g.1.10. On/Off and PID control modes.

g.1.11. Selectable Soft start control mode to eliminate self regulating cable in-rush current.

g.1.12. High Resolution TFT display for ease of programming and monitoring (single/dual line LCD display is not acceptable).

g.1.13. Separate LED indication for power, load & alarm for each circuit shall be provided on front panel

g.1.14. Heat Trace Controller shall be Chromalox ITC-XX1 for single loop application or ITC-XX2 for dual loop application, or approved equal.

h. Ambient Air Temperature Sensor

h.1. Ambient air temperature sensor shall continuously monitor and provide temperature readings in response to changes in ambient air conditions. The sensor shall be a 100-ohm platinum resistance temperature detector (RTD) (Pt100) or approved equal.

h.2. Ambient air temperature sensors shall be installed in locations where it will anticipate the coldest ambient temperatures and out of direct sunlight, in accordance with the manufacturer's recommendations.

i. The Heat Trace System shall be installed per Heat Trace System Supplier's engineering details, isometric drawings, line lists and other pertinent data.

j. Any discrepancy and/or conflict shall be brought to the attention of the OWNER's Representative for final resolution.

2. Thermal Insulation

a. The Contractor shall coordinate with a Thermal Insulation Supplier to design and furnish a fully functional and application rated insulation product as specified herein. Contractor shall be responsible for installation and coordinating all work in accordance with the Plans and Specifications. Thermal insulation components shall be furnished from a single source from a single manufacturer.

b. Thermal insulation shall be rigid polyisocyanurate closed-cell foam insulation encapsulated with a polyurea coating for waterproofing and chemical resistance. Thermal insulation shall be compatible with the Heat Trace System.

c. Thermal insulation shall be a UV resistant fully encapsulated modular insulation system for tanks, piping, and other appurtenances.

    c.1. Tank insulation panels shall be interlocking, snap-in-place for both vertical and horizontal applications. Panels shall be engineered to eliminate pooling and corrosion under insulation. Panels shall seamlessly integrate with each other and accommodate any penetrations.

    c.2. Pipe insulation shall accommodate straights, elbows, tees, valves, saddles and other appurtenances as needed and accommodate any pipe penetrations (i.e. instrumentation, etc.).

d. Material Properties

    d.1. Thickness:

        d.1.1. 2-inch minimum or as required (Tank Insulation)

        d.1.2. 1-inch minimum or as required (Pipe Insulation)

        d.1.3. Thermal Insulation Supplier shall determine minimum thickness requirement in coordination with Heat Trace System Supplier to meet the Freeze Protection System requirements in this section. Contractor shall be responsible for coordination between the Heat Trace System Supplier and Thermal Insulation Supplier to provide a complete Freeze Protection System.

    d.2. Encapsulation: Polyurea coating, finish color shall be selected by the OWNER.

    d.3. R-Value:

        d.3.1. 6.25/inch (Pipe Insulation)

        d.3.2. 12.53/2-inches (Tank Insulation)

    d.4. Thermal Conductivity (K-Factor): 0.16 BTU-in/hr-ft^2-°F

    d.5. Operating Temperature Range: -60-degrees Fahrenheit (°F) to 350-degrees Fahrenheit (°F) (standard); as low as -109-degrees Fahrenheit (°F) for specialty applications

d.6. Wind Resistance: 95+ MPH

d.7. Density: 2.0/ft^3 (ASTM D1622)

d.8. Water Absorption: 0.6% by volume (ASTM C727)

d.9. Closed Cell Content: 90%, minimum (ASTM D2856)

d.10. Compressive Strength: 22 psi (ASTM 1621)

d.11. Tensile Strength: 4,000 psi minimum (ASTM D638)

d.12. Weatherability QUV: 0 degradation (3,000-hour test)

e. The thermal insulation shall be installed in accordance with the Thermal Insulation Supplier's recommendations.

e.1. Tank insulation panels shall be designed to snap and interlock into place and shall be fastened together with an integrated bolt and band system per the supplier's recommendations.

e.2. Pipe insulation sections shall be fastened together by snap-fitting connection or integrated bolt and band system per the supplier's recommendations

e.3. All fasteners shall be corrosion resistant.

f. Final inspection shall ensure full encapsulation, proper fit and alignment, and secure fastening of all components.

g. Tank insulation shall be Dragon Jacket Tank Insulation System, or approved equal.

h. Pipe insulation shall be Dragon Jacket Pipe & Valve Insulation System, or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. The Tank Supplier shall provide all components and assembly instructions to the Contractor for installation of the Hydropneumatic Surge Tank System.

B. All piping, fittings, and interconnecting of components to be supplied and installed by the Contractor.

C. Surge tank saddle support anchor bolts shall be designed by Tank Supplier's engineer but shall be furnished and installed by Contractor.

3.2 SAFETY

A. The Contractor shall strictly comply with all applicable statutes, regulations, orders, rules, requirements and standards of all governmental authorities having jurisdiction with respect to the project, including without limitation, federal, state, and local OSHA and health regulations as well as the latest professional practices.

B. The Contractor shall, at its own expense, protect its employees and other persons from risk of injury, bodily harm, or death arising out of or in any way connected with work preformed.

C. Prior to commencing work, all personnel on the jobsite will have a minimum ten (10) hours of OSHA safety training or equivalent training within the previous year.

3.3 RECEIVING

A. When shipped, the surge tank openings shall be suitably covered. Accessories shall be supplied separately. Upon receipt, the vessel and accessory boxes should be carefully inspected for signs of mishandling or damage that may have occurred in shipment. If damage has occurred then report damages to the carrier, and inform the Supplier immediately. Take special precautions to avoid damaging valves, instruments, and controls when uncrating.

3.4 INSPECTION

A. After uncrating, inspect the accessories and vessel thoroughly to ensure that there are no visible signs of damage. Make the following specific checks:

1. Vessel openings, covers and plugs for security of attachment.
2. Valve handles for damage, security of attachment, and proper operations.
3. All nameplates for legibility and security of attachment.
4. Exterior surfaces for dents, chipped paint or other obvious damage.
5. Vessel structural parts for evidence of damage or deformation.
6. Electrical wiring for evidence of damage or for security of connections.
7. All electrical components for evidence of moisture, corrosion, and damage.

3.5 INSTALLATION

A. Surge Tank

1. Install the surge tank on the foundation by lifting the vessel in place and using the lifting lugs provided. The vessel shall be level; shim and grout the supports if required for leveling.

2. Do not use any of the vessel connections for lifting as excessive stress may result. Walking inside of the tank may damage the internal coating of the tank. Take proper precautions before entering the tank.

3. Connect piping from the main pipeline to the surge tank inlet/outlet flange. A drain line and valve shall be connected to the vessel and piped to discharge towards the river as shown on the Plans.

B. Tank Accessories

1. To install the tank-mounted accessories refer to the Tank Supplier drawings and instruction sheets for each item. Make sure all threaded connections are tightly secured with no leaks.

C. Freeze Protection System

1. The heat trace system and insulation shall be installed as specified in this Section and installed in accordance with the manufacturer's recommendations.

2. The heat trace controller shall be installed in the location designated on the drawings and installed in accordance with the manufacturer's recommendations.

D. Level Control System

1. The local control panel (level controller) should be installed in the location designated on the OWNER's Representative drawings.

2. The air compressor should be installed at the location designated on the plans and in accordance with the air compressor instructions. Verify the oil level and check for proper rotation.

3. The Tank Supplier shall provide all components and assembly instructions to the Contractor for installation including surge tank air-water ratio, initial water level, internal surge tank pressure requirements.

4. Check the air compressor for cut-in and cut-out pressure settings. Vent air from air receiver until the air compressor starts, then close vent. Compressor should run until the cut off pressure is reached. Tank Supplier shall provide cut in and cut out pressures.

5. Install the piping from the air compressor to the surge tank in accordance with the Tank Supplier drawings.

6. Connect the wiring for the Add-Air and Vent-Air Solenoid valves coils to the local control panel (level controller).

E. Controls System Integrator Coordination

1. The Contractor's pump station controls system integrator shall coordinate as required with the Tank Supplier's programmer, Heat Trace System Supplier's programmer and others as needed to provide a fully functioning Hydropneumatic Surge Tank System, including full communication and functionality of the Freeze Protection System.

F. Prior to system startup verify the following:

1. Surge tank is connected to the system piping.

2. Level transmitter is attached to surge tank and can be isolated with isolation ball valves. Level gauge assembly is connected to surge tank and wires from the level transmitter to the local control panel are complete and properly terminated.

3. Instrument well is attached to the surge tank and can be isolated with isolation ball valves. Wires from instrument well to the level control panel are complete and properly terminated.

4. Air piping from the air compressor to the surge tank is complete including the installation of the solenoid valves. Check all valves for proper flow direction.

5. Safety relief valve is installed into the designated coupling in the surge tank. An isolation valve shall never be installed between the tank and the safety relief valve.

6. All piping, fittings, and valves have been checked for leaks. Any leaks have been addressed and repairs completed.

7. Two wires each from the solenoid valves to the local control panel are properly terminated in the local control panel.

8. Electrical power is supplied to the local control panel and to the air compressor.

9. Air compressor oil level has been checked for proper level.

10. Air compressor has been checked for proper rotation (rotation arrow on fan blade).

11. Air compressor cut in and cut out pressures have been verified with the Tank Supplier.

3.6 TANK FILLING AND DISINFECTION

A. The structure will be visually tested by filling the tank with water while isolated from the mainline, any leaks or defects which may appear will be repaired and the tank retested until no leakage is observed. See Section 01 65 60 – Pressure Pipe Testing and Disinfection for additional requirements.

B. The Contractor shall disinfect the tank in accordance with AWWA C652 and in coordination with disinfection of the mainline in accordance with Section 01 65 60 – Pressure Pipe Testing and Disinfection.

3.7 HYDROPNEUMATIC SURGE TANK SYSTEM TESTING/STARTUP

A. General

1. Initial Hydropneumatic Surge Tank System Startup should be done after main pipeline has been completed, and all testing requirements passed, and accepted by the OWNER's Representative but prior to Facility Startup or starting pump(s).

2. Hydropneumatic Surge Tank System Startup shall be done without flow in the main pipeline and the pumps turned off and locked out. Tank Supplier to provide a Hydropneumatic Surge Tank System Startup Plan in accordance with the requirements of this Section.

3. Hydropneumatic Surge Tank System Startup shall be performed by the Contractor in the presence of the OWNER's Representative, the Controls System Integrator, and a representative of the Tank Supplier. Tank Supplier shall provide start up support (one trip, two days) to test Hydropneumatic Surge Tank System. Training of OWNER's personnel shall occur during Facility Startup.

B. Start-Up

1. Check all connections to the surge tank. Flange bolts should be tight, couplings should be secure, and no unplugged openings should be present on the vessel.

2. Close air line and drain valves connected to the surge tank.

3. Power to the local control panel should be off during this preliminary set-up of the water level. This initial adjustment can take a considerable length of time on large tanks.

4. Turn on the air compressor. Place HOA switch in Auto (A) position.

5. Slowly open the isolation valve located between the surge tank and the main pipeline. This will allow water to flow into the surge tank and compress the air trapped inside the vessel.

6. Place ball valves in level control in normal operating position.

7. Open the manual bypass around the add-air solenoid valve and the air line ball valve at the surge tank to allow the compressor to lower the water level to low water level (LL). When (LL) has been reached, close the manual by-pass valve. Tank Supplier to provide (LL) water levels.

8. Inspect all connections for leaks. Seal all connections found to leak.

9. Turn on the local control panel.

C. Functional Check of Hydropneumatic Surge Tank System

1. The level gauge assembly should be used to visually verify the water level in the surge tank while the functional checks are being made.

2. Verify that there is power to the local control panel and that the pumps are off and locked out.

3. Temporarily reset time delays using the surge tank control panel's touch screen display to a short interval, about 5 seconds.

4. Low Level Alarm Test (LLA)

   a. Close the isolation valves on each side of the vent air solenoid valve. Open the manual add air valve and allow the water level to drop to Low-Level Set point. Once the Low-Level is reached, close the by-pass valve.

   b. After the time delay has elapsed, Low-Level Alarm light will energize. Manually raise the water level by opening the manual vent air valve until the water level is above the Low-Level Reset, close the by-pass valve. Turn off the Low-Low-Level alarm signal by pushing the reset button.

5. Low-Level Test (LL)

   a. Allow the air compressor to push the water level down to Low-Level by opening the manual add air valve. Once the Low-Level is reached, close the by-pass valve.

   b. After the time delay has elapsed, the vent-air solenoid valve will open and release air (raise the water level) until the water level reaches Low-Level Reset. At this point, the vent air solenoid valve will close.

6. High-Level Test (HL)

   a. Open the manual vent air valve and allow the water level to rise to High-Level Set point. Once the High-Level is reached, close the by-pass valve.

   b. After the time delay has elapsed, the add-air solenoid valve will open which may indirectly cause the air compressor to start. Air will be added to the surge tank until the water level is lowered to High-Level Reset. At this point, the add-air solenoid valve will close. The air compressor will stop after it has reached its cut off pressure.

7. High Level Alarm Test (HLA)

a. Close the isolation valves on each side of the add air solenoid valve. Open the manual vent air valve and allow the water level to rise to High-Level Set point. Once the High-Level is reached, close the by-pass valve.

b. After the time delay has elapsed, High-Level Alarm light will energize. Manually lower the water level by opening the manual add air valve until the water level is below the High-Level Reset, close the by-pass valve. Turn off the High-Level alarm signal by pushing the reset button.

8. Completion of Test

a. Reset all time delays to the Tank Supplier provided values. Time delays may be adjusted to match the actual operating conditions.

b. This step will place the Hydropneumatic Surge Tank System in operation. Open the isolation valves on each side of the solenoid valves (vent air and add air). If the water level is above the High-Level, the system will add air to lower the water level and if the water is below the Low-Level, the system will vent air to raise the water level.

c. The air/water level is now at the proper level for the surge tank to operate in a fully automatic mode.

3.8 FREEZE PROTECTION SYSTEM TESTING/STARTUP

A. Heat Trace System

1. Prior to installation, Contractor shall conduct heat trace insulation resistance and ohm testing per manufacturer's instructions. Testing results shall be submitted, reviewed, and approved by OWNER's Representative prior to heat trace installation.

2. Functionally test each section of heat trace system under load, and according to manufacturer's recommended test procedures.

3. System commissioning shall be performed by Heat Trace System Supplier or approved representative.

4. System commissioning testing and documentation shall conform to manufacturer's standard procedures and at a minimum confirm:

a. Correct cable model number installed on each circuit per circuit isometric drawings.

b. Circuit electrical data conforms to heat trace isometric data including Circuit current.

c. Circuit insulation resistance Circuit voltage.

d. Location and coordinates of power connection kits, end seals, splice/tee kits for each circuit.

5. Documentation of commissioning activities and test results shall be provided per contract requirements, manufacturer's instructions, and NECA 202-2013 document.

3.9 FACILITY STARTUP (PUMP STATION COMMISSIONING)

A. Upon successful Hydropneumatic Surge Tank System Startup, facility startup shall include functional test of the Hydropneumatic Surge Tank System with the pump station in operation and shall include a simulated power failure when pump(s) are running at maximum operating flow conditions.

B. Tank Supplier shall provide facility startup support (one trip, two days), in addition to Hydropneumatic Surge Tank System Startup support, to test and instruct the OWNER's personnel on the supplied components during comprehensive facility startup, see Section 01 60 60 – Facility Startup for additional requirements.

3.10 SUPPLEMENTS

A. Supplements listed below, following "END OF SECTION" are part of this Section and provided for the Supplier(s) and Contractor's reference:

1. Hydropneumatic Surge Tank Control System Schematic

2. Hydropneumatic Surge Tank Schematic

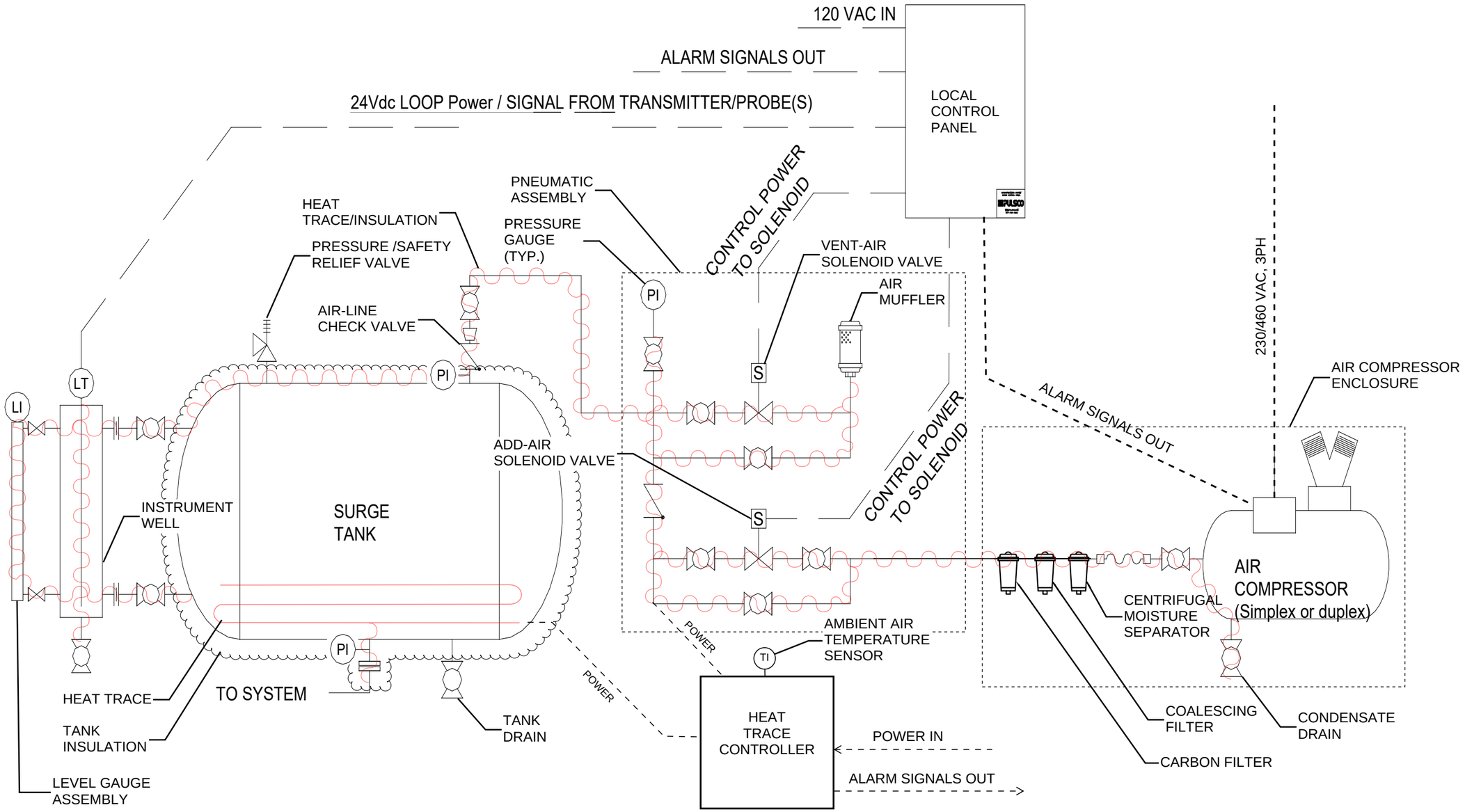
3. Hydraulic System Information

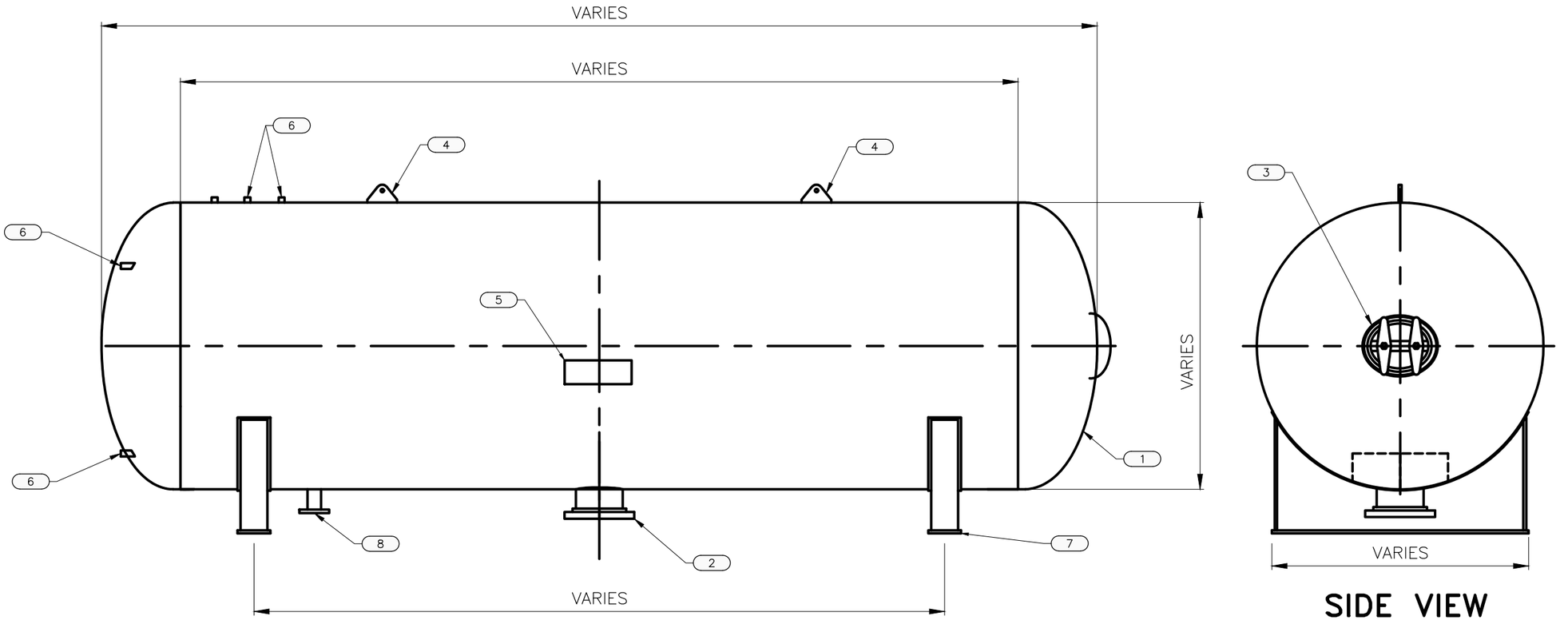
END OF SECTION

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HYDROPNEUMATIC SURGE TANK CONTROL SYSTEM SCHEMATIC

NOTES:
1. THIS SCHEMATIC IS PROVIDED FOR REFERENCE ONLY.
COORDINATE WITH PLANS AND SPECIFCATIONS AS NECESSARY.





SIDE VIEW

NOTES:

1. THIS DRAWING IS PROVIDED FOR REFERENCE ONLY. SURGE TANK SHALL BE CUSTOM MADE TO MEET SPECIFIC PROJECT REQUIREMENTS.
2. INLET/OUTLET CONNECTION, MANWAY, NOZZLES, INSTRUMENTATION PORTS MAY BE RELOCATED AS NECESSARY TO MATCH SITE REQUIREMENTS.

ITEM	NAME/DESCRIPTION
1	HYDROPNEUMATIC SURGE TANK
2	FULL FACE FLANGED INLET/OUTLET CONNECTION, COORDINATE WITH CIVIL PLANS
3	MANWAY
4	LIFTING LUGS
5	NAMEPLATE BRACKET
6	INSTRUMENTATION PORTS (NPT)
7	SUPPORT SADDLE, COORDINATE WITH STRUCTURAL PLANS
8	DRAIN CONNECTION, COORDINATE WITH CIVIL PLANS

N

0 150 300

SCALE IN FEET

J-U-B ENGINEERS, INC.
3611 S. Zintel Way
Kennewick, WA 99337
Phone: 509.783.2144
www.jub.com

PRELIMINARY PLANS

NOT FOR CONSTRUCTION

REUSE OF DRAWINGS
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NO.	DESCRIPTION	BY	APP'L	DATE
	REVISION			

CTUIR/COU JOINT PUMP & PIPELINE PROJECT
UMATILLA, OREGON

HYDROPNEUMATIC SURGE TANK SCHEMATIC

FILE: HYDROPNEUMATIC SURGE TANK SCHEMA
JUB PROJ. # : 30-22-059
DRAWN BY: EE
DESIGN BY: AR
CHECKED BY: DLW
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
LAST UPDATED: 9/30/2025

SHEET NUMBER:
1

Plot Date:9/30/2025 3:23 PM Plotted By: Edie Engelmann
Date Created:9/30/2025 \\JUB.COM\CENTRAL\CLIENTS\ORUMATILLACITY\PROJECTS\30-22-059_CTUIRPODTRANSMISSIONMAIN\DESIGN\CAD\EXHIBITS\HYDROPNEUMATIC SURGE TANK SCHEMATIC.DWG

Hydraulic System Information

The data presented in this section may be used by the Tank Supplier to size the tank independently.

Pump Station

- Steady State Flow Rate = 31.564 cfs (14,167 gpm)
- Pump Sump Water Level = 343.70 ft
- Five (5) Floway 16DKL vertical turbine pumps (3 stages each) in parallel. Each pump has a rated head of 250 ft (3 stages), a rated flow of 3,000 gpm, and a rated speed of 1,770 rpm. Each pump has a variable frequency drive.
- Pump discharge piping: 12-in steel at crown elevation 362.03 ft. Fittings include an APCO silent check valve, a butterfly control valve, and a 90-degree elbow.
- All pumps discharge into a 30-in manifold at elevation 355.5 ft, which, in turn, discharges into the transmission main.

Transmission Main

Material, size, and length: Starting at pump station manifold is a 30-ft long 30-in OD steel (yielding strength 42,000 psi) pipe with a wall thickness of 0.3125-inch. It then transitions into a 36-in OD DR13.5 HDPE (PE4710) pipe for the rest of the transmission main. The steel pipe is only 30 ft in length. The transmission main is essentially a HDPE pipeline. The following distances are the modeled numbers and were adjusted to improve the analysis. The distances given in **Table 1** may differ slightly from distances in the design.

Table 1 Pipeline Elevation Profile

Distance (ft)	Pipe Crown Elevation (ft)	Notes
0	362.03	Start of pipeline
37	355.5	
87	355.5	
131.09	370.3	
209.18	385.19	
328.74	404.09	
578.74	475.3	
828.74	511.66	Top of rise
1316	517.48	
1529	519	
1635	514.3	Local low point
1743	519.48	
1929	521.2	
2079	522.5	High Point
2429	521.8	
2979	519.8	
3314.55	518.71	
3439.78	518.71	Bottom of tank, end of pipeline

Combinational Air Valves

- 10-in CAV 792 ft from pump manifold
- 2-in CAV 1531 ft from pump manifold
- 2-in CAV 1754 ft from pump manifold
- 6-in CAV 2195 ft from pump manifold

Terminal Point of Transmission Main

The transmission main discharges into a 30-in diameter riser pipe with a goose neck at its top. Water discharges into a tank at an elevation of 553.7 ft (goose neck). There is an air gap between the goose neck discharge and the water surface in the tank.

Technical Specifications

City of Umatilla

Prepared for:

City of Umatilla

Prepared by:

Kleinschmidt Associates

October 2025

CITY OF UMATILLA
TECHNICAL SPECIFICATIONS

PROFESSIONAL AND ENGINEER STAMP SEALS

These technical specifications have been prepared under the supervision of a licensed Professional Engineer or Registered Architect registered in the State of Oregon as indicated in the Responsible Person column in the Table of Contents below.



EXPIRES: 12/31/2027

Quinn Culbertson



EXPIRES: 12/31/2027

Charles W. Cutting



RENEWAL DATE: 12/31/2027

Matthew T. Davis



EXPIRES: 12/31/2025

Jennifer G. Esteban



EXPIRES: 12/31/2026

Carl Mannheim



EXPIRES: 06/30/2026

Neil Schweitzer



Eli Elder



Jason Merrick

EXPIRES: 12/31/2026

TABLE OF CONTENTS

Section(s)	Rev. No.	Rev. Date	Responsible Professional
DIVISION 01 – General Requirements			
01 10 00 Summary of Work			Charles W. Cutting
01 22 00 Measurement and Payment			Charles W. Cutting
01 30 00 Administrative Requirements			Charles W. Cutting
01 32 16 Construction Schedule			Charles W. Cutting
01 33 00 Contractor Submittals			Charles W. Cutting
01 43 00 Contractor Quality Assurance			Charles W. Cutting
01 50 00 Construction Facilities and Temporary Controls			Charles W. Cutting
01 55 00 Site Access and Storage			Charles W. Cutting
01 57 10 Stormwater Pollution Prevention			Charles W. Cutting
01 57 19 Spill Prevention, Control, and Countermeasures			Charles W. Cutting
01 57 24 Care and Diversion of Water			Charles W. Cutting
01 60 00 Product Requirements			Charles W. Cutting
01 60 60 Facility Startup			Charles W. Cutting
01 64 00 Owner-Furnished Equipment			Charles W. Cutting
01 65 60 Pressure Pipe Testing and Disinfection			Charles W. Cutting
01 77 00 Project Closeout			Charles W. Cutting
DIVISION 02 – Existing Conditions			
02 41 00 Demolition			Carl Mannheim
DIVISION 03 – Concrete			
03 10 00 Concrete Accessories			Neil Schweitzer
03 11 00 Concrete Forming			Neil Schweitzer
03 20 00 Concrete Reinforcing			Neil Schweitzer
03 30 00 Cast-in-Place Concrete			Neil Schweitzer
03 34 00 Controlled Low Strength Material			Neil Schweitzer
03 60 00 Grouting			Neil Schweitzer
03 65 00 Water Pressure Testing			Neil Schweitzer
DIVISION 04 – Masonry			
04 20 00 Concrete Block Masonry			Neil Schweitzer
DIVISION 05 – Metals			
05 11 00 Structural Steel Framing			Jennifer Esteban
05 21 00 Steel Joist Framing			Jennifer Esteban
05 31 23 Steel Roof Deck			Jennifer Esteban

Section(s)	Rev. No.	Rev. Date	Responsible Professional
05 50 00 Metal Fabrication			Jennifer Esteban
DIVISION 07 – Thermal and Moisture Protection			
07 21 00 Thermal Insulation			Eli Elder
07 26 00 Vapor Retarder			Eli Elder
07 27 26 Fluid Applied Membrane Air Barrier			Eli Elder
07 41 13 Metal Roof and Wall Panels			Eli Elder
07 62 00 Sheet Metal Flashing and Trim			Eli Elder
07 72 33 Roof Hatches			Eli Elder
07 92 00 Joint Sealants			Eli Elder
DIVISION 08 – Openings			
08 11 13 Hollow Metal Doors, Windows, and Frames			Eli Elder
08 36 13 Sectional Overhead Doors			Eli Elder
08 71 00 Door Hardware			Eli Elder
DIVISION 09 – Finishes			
09 28 13 Cementitious Backing Board			Eli Elder
09 65 13 Resilient Wall Base			Eli Elder
09 90 00 Painting and Coatings			Jennifer Esteban
DIVISION 10 – Specialties			
10 44 16 Fire Extinguishers			Eli Elder
DIVISION 23 – Heating, Ventilating, and Air Conditioning			
23 34 13 Axial HVAC Fans			Quinn Culbertson
23 81 26.01 Split-System Air Conditioners – Indoor Units			Quinn Culbertson
23 81 26.02 Split-System Air Conditioners – Outdoor Units			Quinn Culbertson
23 82 39 Heating and Ventilation			Quinn Culbertson
DIVISION 26 – Electrical			
26 05 11 General Electrical Requirements			Matthew T. Davis
26 05 19 Conductors and Cables			Matthew T. Davis
26 05 26 Grounding			Matthew T. Davis
26 05 34 Electrical Boxes and Fittings			Matthew T. Davis
26 05 83 Electrical Equipment Installation			Matthew T. Davis
26 22 00 Lighting and Distribution Transformers			Matthew T. Davis
26 24 16 Panelboard			Matthew T. Davis

Section(s)	Rev. No.	Rev. Date	Responsible Professional
26 24 23 Low Voltage Motor Control Center			Matthew T. Davis
26 25 00 Low Voltage Metal Enclosed Bus			Matthew T. Davis
26 32 01 Engine-Generator Set for Standby Power			Matthew T. Davis
26 35 26 Active Harmonic Filters			Matthew T. Davis
26 36 00 Automatic Transfer Switch			Matthew T. Davis
26 57 00 Lighting Fixtures			Matthew T. Davis
DIVISION 27 – Communications			
27 10 00 Building Telecommunications Cabling System			Jason Merrick
DIVISION 28 – Electronic Safety and Security			
28 20 02 Internet Protocol Surveillance System			Matthew T. Davis
DIVISION 31 – Earthwork			
31 20 00 Earthwork			Carl Mannheim
31 23 17 Rock Excavation			Carl Mannheim
31 33 13 Rock Bolting and Grouting			Neil Schweitzer
DIVISION 32 – Exterior Improvements			
32 31 00 Welded Wire Fence and Gate			Carl Mannheim
32 90 00 Revegetation			Charles W. Cutting
DIVISION 33 – Utilities			Quinn Culbertson
33 05 24 General Piping			Quinn Culbertson
33 05 33 HDPE Pipe			Quinn Culbertson
DIVISION 35 – Waterways and Marine Construction			
35 22 26 Sluice Gates			Quinn Culbertson
35 59 13 Public Safety Barrier			Quinn Culbertson
DIVISION 40 – Process Integration			
40 05 06 Flexible Couplings			Quinn Culbertson
40 05 07 Hangers and Supports			Quinn Culbertson
40 05 24 ASTM Steel Pipe			Quinn Culbertson
40 05 26 AWWA Steel Pipe			Quinn Culbertson
40 05 51 Piping Identification			Quinn Culbertson
40 05 63 Ball Valves			Quinn Culbertson
40 05 64 Butterfly Valves			Quinn Culbertson
40 05 65 Check Valves			Quinn Culbertson
40 05 67 Orifice Sleeve Valves			Quinn Culbertson

Section(s)	Rev. No.	Rev. Date	Responsible Professional
40 05 78 Combination Air/Vacuum Valves			Quinn Culbertson
40 46 16 Polyethylene Tape Coating			Quinn Culbertson
40 61 11 Instrumentation and Control Systems			Jason Merrick
40 64 00 Programmable Logic Controllers			Jason Merrick
40 66 11 Network Systems			Jason Merrick
40 66 33 Metallic and Fiber Optic Communication Cable and Connectors			Jason Merrick
40 67 11 Panels, Consoles, and Appurtenances			Matthew T. Davis
40 71 63 Flow Meters			Quinn Culbertson
40 73 13 Pressure Gauges and Transmitters			Quinn Culbertson
40 75 53 Turbidity Analyzers			Quinn Culbertson
DIVISION 43 – Process Gas and Liquid Handling, Purification, and Storage Equipment			
43 23 31 Vertical Turbine Pumps			Charles W. Cutting
43 25 13 Sump Pumps			Quinn Culbertson
DIVISION 46 – Water and Wastewater Equipment			
46 21 50 Brush-Cleaned Retrievable Wedgewire Screen System			Charles W. Cutting

Appendix A – Geotechnical Investigation Report

Appendix B – Easement (to be provided later)

Appendix C – Permitting Documents

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY OF WORK

PART 1 – GENERAL

1.0 INTRODUCTION

A. The WORK to be performed under this Contract shall consist of furnishing tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all WORK or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The WORK shall be complete, and all WORK, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction and operation of the WORK in good faith shall be provided by the CONTRACTOR as though originally so indicated, at no increase in cost to the OWNER.

1.1 BACKGROUND

A. The Confederated Tribes of the Umatilla Reservation (CTUIR)/City of Umatilla (City) Joint Pump and Pipeline Project is a collaborative project consisting of three major permanent infrastructure components: 1) a new raw water intake pump station/point of diversion (POD), 2) a new raw water transmission main conveying raw water to a new water treatment facility (WTF) that was constructed by others, and 3) a new raw water bypass pipeline conveying raw water from the WTF to the Wanaket Wildlife Area. The POD will be constructed in Lake Wallula on the Columbia River within United States Army Corps of Engineers (USACE) property. The raw water transmission main will be installed from the POD to the WTF across USACE property, BIA/CTUIR trust land (Section 7), and City right-of-way. The raw water bypass pipeline will be installed on private property.

B. An existing POD, owned and operated by the CTUIR, currently delivers raw river water for irrigation use through an existing partially buried pipeline from the Columbia River to a location on BIA/CTUIR trust land where the pipeline transitions to open canal. The canal currently conveys irrigation water across BIA/CTUIR trust land and private property for delivery to the CTUIR's Wanaket Wildlife Area.

C. Due to existing water needs, a Temporary Water System was installed which intercepts raw water at the end of the existing pipeline. The Temporary

Water System includes a 48-inch diameter, 16-foot-tall steel standpipe connected to the existing CTUIR pipeline, above ground 18-inch piping, and appurtenances from the standpipe to a 1.0-million gallon above ground tank, and 12-inch piping and appurtenances from the water storage tank to the WTF facilities. As part of the construction of the Temporary Water System, a gravel access road and gravel tank pad were constructed with imported materials.

D. The pipeline across BIA/CTUIR property (Section 7) and the City right-of-way was designed by J-U-B ENGINEERS, Inc. (J-U-B). Other WORK within Section 7 includes removal and restoration of the CTUIR pipeline and canal. The pipeline will be constructed under a separate contract with the City of Umatilla. Coordination between the two contractors will be necessary, particularly regarding testing and connection of the pipeline segments, connection of the power and fiber optic conduits, commissioning of the pump station, and sharing of the laydown area near the POD. The City will assist with this coordination. The raw water bypass pipeline was constructed as part of the WTF project.

E. The scope of this project, designed by Kleinschmidt Associates (Kleinschmidt) generally includes the POD and a portion of the raw water transmission main within USACE property as shown in the Contract Documents. Kleinschmidt also prepared the environmental and cultural permitting on both the USACE and Section 7 properties for the entire CTUIR/City Joint Pump and Pipeline Project.

F. The City has procured an Automatic Transfer Switch and Standby Generator for installation by the CONTRACTOR. These items are currently stored at the City's Wastewater Treatment Plant and shall be picked up by the CONTRACTOR and transported to the Project Site for installation by the CONTRACTOR. See Specification Sections 01 64 00, 26 32 01, and 26 36 00 for additional information and requirements.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. The WORK of this Contract comprises the construction of a new raw river water intake pump station/POD, and the portion of the new raw water transmission main on USACE property conveying raw water to the new WTF. Also included is the installation of fiber optic cables from the POD to the WTF within conduit installed as part of this project, as part of the pipeline construction project, and as part of the WTF construction contract.

B. The major components of the project include:

1. Construction of a pump station (POD) including pumps and fish screens,
2. Construction of approximately 340 feet of 30-inch and 36-inch diameter pipeline from the pump station to the property line, and
3. Demolition of the existing CTUIR pump station and pipeline.

C. All WORK shall be in accordance with the local, tribal, and state laws and permits and these Specifications.

D. The CONTRACTOR is responsible for site security until WORK is complete and the CONTRACTOR has demobilized from the site.

E. The CONTRACTOR is responsible for repairs and restoration of all disturbed areas to pre-construction conditions.

F. The CONTRACTOR shall protect the existing CTUIR POD and pipeline from damage so that it can continue to be used for water delivery to the Wanaket Wildlife Area and Temporary Water System throughout construction of the new POD and pipeline.

G. The WORK is located within USACE McNary Lock and Dam property on an easement granted to the City. Access to the site and use of the easement shall be in accordance with the easement provisions. A copy of the easement is included in Appendix B.

1.3 CONTRACT METHOD

A. The WORK will be constructed under a single contract consisting of separate pay items as described in Section 01 22 00 – Measurement and Payment.

1.4 PERMITTING REQUIREMENTS

A. The OWNER has obtained the following permits and easements for the project:

1. US Army, Corps of Engineers 299 easement
2. US Army, Corps of Engineers Section 404 permit
3. State of Oregon Department of State Lands Removal-Fill permit
4. State of Oregon Department of Environmental Quality 401 Water Quality Certification
5. State of Oregon Health Authority Construction approval

B. The OWNER will obtain the following permits for the project prior to completion of construction:

1. State of Oregon Fire Marshal Aboveground Storage Tank Permit

C. The CONTRACTOR shall obtain the following permits:

1. State of Oregon Department of Environmental Quality 1200-C Construction Stormwater Permit
2. State of Oregon Scientific Take Permit Rescue/Salvage Authorization
3. State of Oregon Building Codes Division electrical permit

D. Copies of the easement and OWNER-obtained permits are included in Appendices B and C. The CONTRACTOR shall comply with all applicable conditions of the easement and permits including scheduling inspections and closing out the permits with the issuing authorities.

E. The permit conditions and the primary party responsible for complying with each one are summarized in the Permit Condition Summary located in Appendix C. The CONTRACTOR shall provide information and data needed for permit compliance to the OWNER and/or permitting agencies in a timely manner.

F. The OWNER will provide a cultural resources monitor to observe all ground disturbing work including blasting and grading. The CONTRACTOR shall coordinate its schedule with the monitor through the Owner's Representative to ensure the monitor is present whenever ground disturbing work is performed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Administration

B. Proposal Items

C. Schedule of Values

1.1 ADMINISTRATION

A. Authority:

1. Payment will be made monthly based on the schedule of values. Percent completion will be proposed by the CONTRACTOR based on schedule of values and material on hand.

2. Material not on the project site will not be paid for. Once material is on hand, it will be considered part of the job and shall not be removed for any reason until the entire job is complete.

3. The OWNER will make payments for major pieces of equipment and for large lots of materials. If a line item for testing and commissioning exists in the schedule of values, the OWNER may elect to pay 100-percent of the material or equipment cost. If such line items are negligible as compared to the cost of the equipment, the OWNER, at its discretion, may elect to hold up to 20 percent of the cost of major equipment or materials until such a time as the equipment is installed, tested, and accepted by the OWNER.

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

B. Contract Price:

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

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

C. Non-Payment For Rejected Or Surplus Products:

Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products stolen from the jobsite.
3. Products determined as unacceptable before or after placement.
4. Products not completely unloaded from the transporting vehicle.
5. Products placed beyond the lines and levels of the required WORK.
6. Products remaining on hand after completion of the WORK.
7. Loading, hauling, and disposing of rejected products.

1.2 PROPOSAL ITEMS

A. Mobilization:

1. Measurement:

a. Mobilization shall be measured per the lump sum (LS).

2. Payment:

a. The LS contract price for Mobilization shall be full compensation for all labor, equipment, and materials to mobilize to the job site, set up of temporary office(s), install job site fencing and erosion control measures, and all other costs not listed in specific bid items. Phases of the job may require multiple full and/or partial mobilizations by the CONTRACTOR and/or some trades/subcontractors, but Mobilization will only be paid once regardless of the number of mobilizations.

B. Care and Diversion of Water:

1. Measurement:

a. Care and Diversion of Water shall be measured per LS.

2. Payment:

a. The LS contract price for Care and Diversion of Water shall be full compensation for all labor, materials, equipment, and tools required to design, install, and remove the cofferdams and floating silt curtains, provide all temporary dewatering and water treatment system and other items in accordance with the plans and specifications, as listed in proposal and not specifically included in other proposal items.

C. Demolition and Site Restoration:

1. Measurement:

a. Demolition and Site Restoration shall be measured per LS.

2. Payment:

a. The LS contract price for Demolition and Site Restoration shall be full compensation for all labor, materials, equipment, and tools required to demolish and dispose of structures, concrete, piping, restore the site areas impacted by the demolition WORK, and other items in accordance with the plans and specifications, as listed in proposal and not specifically included in other proposal items.

D. Concrete:

1. Measurement:

a. Concrete shall be measured per LS.

2. Payment:

a. The LS contract price for Concrete shall be full compensation for all labor, materials, equipment, and tools required to construct the concrete foundations, walls and slabs including mechanical and electrical equipment slabs in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

E. Metalwork:

1. Measurement:

a. Metalwork shall be measured per LS.

2. Payment:

a. The LS contract price for Metalwork shall be full compensation for all labor, materials, equipment, and tools required to construct the intake screen access platform, interior gratings

and supports, handrails and other metal items, in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

F. Pump House Structure:

1. Measurement:

a. Pump House Structure shall be measured per LS.

2. Payment:

a. The LS contract price for Pump House Structure shall be full compensation for all labor, materials, equipment, and tools required to construct the CMU pump house including metal wall panels, roof system, doors, windows, and other architectural items in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

G. Painting:

1. Measurement:

a. Painting shall be measured per LS.

2. Payment:

a. The LS contract price for Painting shall be full compensation for all labor, materials, equipment, and tools required to furnish and install all paint and coating systems including the pump house structure, piping, equipment, and other items in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

H. Heating, Ventilating and Air Conditioning:

1. Measurement:

a. Heating, Ventilating and Air Conditioning shall be measured per LS.

2. Payment:

a. The LS contract price for Heating, Ventilating and Air Conditioning shall be full compensation for all labor, materials, equipment, and tools required to construct the heating, ventilating and air conditioning system including wall louvers and controls and other items in accordance with the

attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

I. Electrical:

1. Measurement:

a. Electrical shall be measured per LS.

2. Payment:

a. The LS contract price for Electrical shall be full compensation for all labor, materials, equipment, and tools required to furnish, install, test and commission the electrical system including underground feeders, conduit, wiring, motor control centers, panel boards, local disconnect switches, and interior and exterior lighting in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items. Also included is installation, testing and commissioning of the owner-furnished standby generator, and automatic transfer switch including delivery and installation coordination with the suppliers of the equipment.

J. Instrumentation And Control System:

1. Measurement:

a. Instrumentation and Control System shall be measured per LS.

2. Payment:

a. The LS contract price for Instrumentation and Control System shall be full compensation for all labor, materials, equipment, and tools required to furnish, install, test and commission the instrumentation and control system including flow meter, turbidity meter, conduit, fiber optic cable to the WTF and wiring in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items. Security cameras and alarms are also included.

K. Earthwork:

1. Measurement:

a. Earthwork shall be measured per LS.

2. Payment:

a. The LS contract price for Earthwork shall be full compensation for all labor, materials, equipment, and tools required to construct the earthwork, including rock excavation and disposal of excess and unsuitable material, in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

L. Site Improvements:

1. Measurement:

a. Site Improvements shall be measured per LS.

2. Payment:

a. The LS contract price for Site Improvements shall be full compensation for all labor, materials, equipment, and tools required to construct the fences and gates in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

M. Valves, Gates, and Piping:

1. Measurement:

a. Valves, Gates, and Piping shall be measured per LS.

2. Payment:

a. The LS contract price for Valves, Gates and Piping shall be full compensation for all labor, materials, equipment, and tools required to furnish, install, and test all steel and HDPE piping systems, hydraulic gates and actuators, and valves, fittings and appurtenances in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items. Lining and coating of steel pipe is included in this item.

N. Vertical Turbine Pumps:

1. Measurement:

a. Vertical Turbine Pumps shall be measured per LS.

2. Payment:

a. The LS contract price for Vertical Turbine Pumps shall be full compensation for all labor, materials, equipment, and tools required to furnish, factory test, install and commission the vertical turbine pumps in accordance with the attached plans

and specifications, as listed in proposal and not specifically included in other proposal items.

O. Hydropneumatic Surge Tank:

1. Measurement:

a. Hydropneumatic Surge Tank shall be measured per L.S.

2. Payment:

a. The LS contract price for Hydropneumatic Surge Tank shall be full compensation for all labor, materials, equipment, and tools required to design, fabricate, furnish, install, clean, disinfect, flush, inspect and commission the hydropneumatic surge control system (i.e. surge tank, level control system, freeze protection system, accessories and appurtenances) in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items. This includes the verification of the surge analysis and the design of the surge tank saddle supports to foundation connection.

P. Retrievable Drum Screens:

1. Measurement:

a. Retrievable Drum Screens shall be measured per LS.

2. Payment:

a. The LS contract price for Retrievable Drum Screens shall be full compensation for all labor, materials, equipment, and tools required to furnish, install, and commission the retrievable drum screens in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

Q. Start-Up, Testing and Commissioning:

1. Measurement:

a. Start-up and Testing shall be measured per LS.

2. Payment:

a. The LS contract price for Start-up, Testing and Commissioning shall be full compensation for all labor, materials, equipment, and tools required to start-up, test and commission the completed pump and pipeline project in accordance with the

requirements of Section 01 60 60 – Facility Startup and the attached plans and specifications, as listed in proposal and not specifically included in other proposal items. See Specification Sections 01 64 00, 26 32 01 and 26 36 00 for information on the services to be supplied by the Standby Generator and Automatic Transfer Switch supplier and paid for by the City in support of the Start-up, Testing and Commissioning procedures.

R. As-Builts and Demobilization:

1. Measurement:

a. As-Builts and Demobilization shall be measured per LS.

2. Payment:

a. The LS contract price for As-Builts and Demobilization shall be full compensation for all labor, materials, equipment, and tools required to prepare and deliver As-Built drawings and other documentation in Section 01 77 00 – Project Closeout and to demobilize from the site including removal of temporary office(s), job site fencing and erosion control measures, restoration of the Lewis and Clark Trail to its pre-construction conditions, restoration of disturbed areas and other WORK in accordance with the attached plans and specifications, as listed in proposal and not specifically included in other proposal items.

1.3 SCHEDULE OF VALUES LIST

A. The CONTRACTOR shall provide a Schedule of Values List for the LS proposal items:

1. Mobilization
2. Care and Diversion of Water
3. Demolition and Site Restoration
4. Concrete
5. Metalwork
6. Pump House Structure
7. Painting
8. Heating, Ventilating and Air Conditioning
9. Electrical

10. Instrumentation and Control Systems
11. Earthwork
12. Site Improvements
13. Valves, Gates, and Piping
14. Vertical Turbine Pumps
15. Hydropneumatic Surge Tank
16. Retrievable Drum Screens
17. Start-up, Testing and Commissioning
18. As-Builts and Demobilization

B. This list should include a cost breakdown of each component of the larger proposal item. Typically, no cost breakdown item shall be more than 10% of the lump sum cost of the item. The Schedule of Values list shall be submitted to the OWNER at the Pre-Construction Conference for review. The CONTRACTOR shall add, subtract, and modify the breakdown, as required, during review by the OWNER.

1.4 NON-PAYMENT FOR REJECTED OR SURPLUS PRODUCTS OR WORK

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

1.5 AS-BUILTS

A. The final payment of this contract will not be released until complete "As-Built" plans are received and approved by the OWNER's Representative.

B. As-Builts shall be prepared in accordance with Section 01 77 00 – Project Closeout.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Coordination

B. Project Meetings

C. Utility Notification and Coordination

D. CONTRACTOR Use of Site

E. OWNER Use of Site

1.1 COORDINATION

A. Coordinate scheduling, submittals, and WORK of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Coordinate space requirements and installation of mechanical and electrical WORK which are indicated diagrammatically on Construction Plans. Follow routing shown for pipes, ducts, and conduit, as closely as practicable. Utilize spaces efficiently to maximum accessibility for other installations, for maintenance, and for repairs.

C. Coordinate completion and cleanup of WORK of separate Sections in preparation for Substantial Completion.

D. Coordinate facility startup with the OWNER, ENGINEER, vendor(s), and pipeline Contractor (see Section 01 60 60 Facility Startup).

E. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate WORK of various sections having independent responsibilities for installing, connecting to, and placing in service, such equipment.

1.2 PROJECT MEETINGS

A. Preconstruction Conference:

1. After Notice of Award but prior to the commencement of WORK at the Site, a preconstruction conference will be held at the City Hall in Umatilla, Oregon at a mutually agreed time and date. The conference shall be attended by the CONTRACTOR's Project Manager, its

superintendent, and its subcontractors as the CONTRACTOR deems appropriate. Other attendees will be:

a. ENGINEER and the Resident Project Representative (OWNER's Representative).

b. Other representatives of the OWNER.

c. Governmental representatives as appropriate.

d. Utility representatives as appropriate.

e. Others as requested by CONTRACTOR, OWNER, or ENGINEER.

2. The CONTRACTOR shall bring the preconstruction conference submittals in accordance with Section 01 33 00 – Contractor Submittals.

3. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date. However, the CONTRACTOR should be prepared to discuss the items listed below.

a. Status of CONTRACTOR's insurance and bonds.

b. CONTRACTOR's tentative schedule.

c. Transmittal, review, and distribution of CONTRACTOR's submittals.

d. Processing applications for payment.

e. Maintaining record documents.

f. Critical WORK sequencing.

g. Field decisions and Change Orders.

h. Use of Site, office and storage areas, security, housekeeping, and OWNER's needs.

i. Major equipment deliveries and priorities.

j. CONTRACTOR's assignments for safety and first aid.

k. Daily Report Form which the OWNER's Representative will furnish.

l. Submittal Transmittal Form which the OWNER's Representative will furnish.

4. The OWNER's Representative will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.

5. The CONTRACTOR and its subcontractors should plan on the conference taking no more than 4 hours.

B. Progress Meetings:

1. The OWNER's Representative will schedule and hold regular virtual and on-site progress meetings approximately bi-weekly (every other week) during active construction periods and at other times as requested by CONTRACTOR or as required by progress of the WORK. The CONTRACTOR and all subcontractors active on the site shall attend each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and other subcontractors.

2. Progress meetings will not be held between operational start-up of the new point of diversion (POD) and demolition of the existing Confederated Tribes of the Umatilla Indian Reservation (CTUIR) POD and pipeline from approximately April 1, 2027 through October 31, 2027. The OWNER's Representative may call meetings during this time if necessary to address operational and/or warrantee items.

3. The OWNER's Representative will preside at the progress meetings and will arrange for keeping and distributing the minutes. The purpose of the meetings is to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop. During each meeting, the CONTRACTOR shall present any issues that may impact its progress with the intent to resolve these issues expeditiously. The complete agenda will be furnished to the CONTRACTOR prior to the meeting date.

1.3 UTILITY NOTIFICATION AND COORDINATION

A. Coordinate the WORK with various utilities within the project limits. Notify applicable utilities prior to commencing WORK a minimum of 5 days in advance, and if damage occurs, or if conflicts or emergencies arise during WORK.

B. The following utility coordination is required for the WORK:

1. City of Umatilla (City):

a. Obtain a City Right-of-Way Permit to install fiber optic cables.

b. Coordination for access to Wanapa Road water treatment facility (WTF) for fiber optic cable and equipment installation.

c. Coordination for WORK within Wanapa Road right-of-way to install fiber optic cables.

2. Umatilla Electric Cooperative:

a. Umatilla Electric Cooperative (UEC) will furnish electrical conduit for the (1) 2-inch and (2) 6-inch PVC Conduit Systems (Power) for installation by the CONTRACTOR. CONTRACTOR shall coordinate with UEC for pick up at UEC's yard and/or delivery of materials to the site.

b. UEC will furnish new padmount, distribution transformer and Service Metering, for UEC installation.

c. CONTRACTOR shall coordinate with UEC for electrical conduit and transformer pad and foundation inspection prior to backfilling the trenches.

d. CONTRACTOR shall schedule and coordinate new transformer installation with UEC.

e. CONTRACTOR shall schedule and coordinate primary conductor installation with UEC. UEC will install primary service conductors and make connection to transformer.

f. CONTRACTOR shall install secondary service conductors from transformer to Service Entrance Equipment and from Service Entrance Equipment to ATS. CONTRACTOR shall schedule and coordinate secondary conductor inspection and termination by UEC.

g. CONTRACTOR shall schedule and coordinate supply power energization with UEC, including meter installation.

h. CONTRACTOR shall coordinate with UEC for disconnection and demolition of UEC facilities that provide power to the CTUIR POD.

1.4 CONTRACTOR USE OF SITE

A. The CONTRACTOR's use of the Site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices.

B. The CONTRACTOR shall not store or stockpile materials or WORK outside of the limits of the United States Army Corps of Engineers (USACE)

Easement, CTUIR Revocable Use Permit Easement, and City of Umatilla's Wanapa Road right-of-way as shown on the drawings, without written permission from the property owner.

C. After Notice to Proceed and before WORK at Site is started, CONTRACTOR, OWNER's Representative, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of WORK, as applicable, which could be damaged by construction operations. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

D. Documentation:

1. Record and submit documentation of observations made on examination inspections.

2. Upon receipt, OWNER's Representative will review, sign, and return one record copy of documentation to CONTRACTOR to be kept on file in field office.

3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred as a result of CONTRACTOR's operations, and is for the protection of adjacent property owners, CONTRACTOR, and OWNER.

1.5 OWNER USE OF THE SITE

A. Continuous operation of the CTUIR POD and Temporary Water System is of critical importance. Schedule and conduct activities to enable vehicle access to the POD for operation and maintenance at all times.

B. Do not proceed with WORK affecting operation of the existing CTUIR POD and Temporary Water System without obtaining OWNER's advance approval of the need for and duration of such WORK.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 32 16

CONSTRUCTION SCHEDULE

PART 1 – GENERAL

1.0 THE REQUIREMENT

A. WORK shall be scheduled, sequenced, and performed in a manner which minimizes impacts and disruption to the public, and environment within the WORK area.

B. The CONTRACTOR shall incorporate the construction and schedule constraints of this Section in preparing the construction schedules.

1.1 CONSTRUCTION SCHEDULE

A. The construction schedule shall be developed using Critical Path Method (CPM) software and presented in the form of a bar chart, graphically depicting the timescale in calendar days in columns across the top and project activities and events in rows along the left side. Project events shall include the project constraints listed in this Section and the project permits. The schedule shall be developed in sufficient detail to show the sequence and interdependence of activities required for complete performance of the WORK. Ensure all work sequences are logical, and the project schedule shows a coordinated plan of the WORK.

B. The CONTRACTOR shall notify the OWNER of potential deviations from the schedule a minimum of 48 hours prior to altering the course of WORK.

1.2 CONSTRUCTION SEQUENCING

A. During all WORK activities, safe working conditions for personnel shall be maintained at all times. The foregoing includes at least proper trench excavation, the provision of temporary equipment guards, supports, warning signs, walkways, covers over openings, handrailing, and protection of electrical equipment and power supply.

B. Erosion control measures shall be in place prior to commencing construction activity.

1.3 PERMITS

A. The CONTRACTOR shall abide by the conditions of all permits and shall obtain proof of satisfaction of conditions from issuers of permits prior to acceptance of the WORK by the OWNER.

1.4 SCHEDULE CONSTRAINTS

A. It is the CONTRACTOR's responsibility to coordinate and plan the construction activities to integrate each schedule constraint into performance of the overall WORK.

B. The listing of schedule constraints below does not mean that all constraints or special conditions have been identified. The list does not substitute for the CONTRACTOR's coordination and planning for completion of the WORK within the Contract Times.

C. The following constraints affect the construction schedule.

1. Approval of submittals shall be obtained prior to commencing WORK onsite.

2. Erosion and sedimentation control measures shall be in place prior to any ground disturbing activities.

3. Construction activities below the OHW line are restricted to the annual in-water work window each year. The Section 404 permit issued by the United States Army Corps of Engineers (USACE) for the project limits in-water work to December 1 to March 31 each year. A copy of the Section 404 permit is included in Appendix C. WORK below OHW is anticipated to include, but is not limited to, installation and removal of a cofferdam for construction of the new point of diversion (POD) and demolition and removal of the existing POD.

4. Installation of the cofferdam shall be completed no later than March 31, 2027. Dewatering, fish salvage, and supplemental sealing of the cofferdam to reduce leakage that is performed from the interior of the cofferdam may be completed after March 31, 2027.

5. All blasting, installation of the 36-inch pipeline, 2-inch communications conduits, and 6-inch and 2-inch primary power conduits located within 50-feet of the existing Confederated Tribes of the Umatilla Reservation (CTUIR) POD and pipeline system shall be outside of the normal operating season for the system which is April 1 to October 31 each year.

6. The 36-inch pipeline, 2-inch communications conduits, and 6-inch and 2-inch primary power conduits constructed in this project shall be connected to their continuation to the south No later than November 1, 2027. The pipeline and conduits on Section 7 will be completed by the pipeline contractor no later than October 15, 2027.

7. The raw water pump station and pipeline shall be ready for testing and commissioning of the pumps and fish screens, and overall commissioning of the CTUIR/City of Umatilla (City) Joint Pump and Pipeline Project by February 1, 2028. The pump station testing and commissioning process shall be complete by March 1, 2028 (Contract Time Milestone 1) with the pump station and pipeline operational to allow raw water delivery to the Wanapa Road WTF for testing and commissioning activities at the WTF. For the raw water pump station and pipeline to be considered operational the pump station must be substantially complete and ready to deliver water with all testing requirements being passed a minimum of 5 working days prior to the milestone deadline, and all work associated with operation of the pump station and pipeline accepted by the OWNER's Representative in accordance with the Contract Documents.
8. The Umatilla Electric Cooperative (UEC) is anticipated to require a minimum of 90 calendar days following completion of the electric power conduits, and vaults to install their infrastructure and for permanent electric power to be available.
9. Demolition of the CTUIR POD, pipeline and related utility infrastructure shall not occur until the end of the normal operating season for the system which is October 31 each year. Demolition work below OHW is further restricted to the in-water work window between December 1 and March 15 each year.
10. Restoration of the Lewis and Clark Trail (access road) to pre-construction conditions shall not occur until all construction and demolition activities are completed.
11. All WORK shall be completed by December 31, 2028 (Contract Time Milestone 2).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 33 00

CONTRACTOR SUBMITTALS

PART 1 – GENERAL

1.0 GENERAL

A. Wherever submittals are required in the Contract Documents, submit them to the OWNER's Representative.

B. Within 14 days after the Notice of Award, the CONTRACTOR shall submit the following items to the OWNER's Representative for review:

1. A preliminary schedule of submittals and proposed substitutes ("Or-Equal") listed in the Bid.

2. A preliminary project schedule as required in Section 01 32 16 – Construction Schedule.

3. A schedule of values as required in Section 01 22 00 – Measurement and Payment.

4. A list of all permits and licenses the CONTRACTOR shall obtain indicating the agency required to grant the permit and the expected date of submittal for the permit and required date for receipt of the permit.

1.1 SUBMITTAL PROCEDURES

A. Disorganized or incomplete submittals will be returned without review.

B. If a submittal is returned to the CONTRACTOR marked "REVIEWED AND ACCEPTED," formal revision and resubmission will not be required.

C. If a submittal is returned marked "REVIEWED AND ACCEPTED AS NOTED (RESUBMIT FOR RECORD)," CONTRACTOR shall make the corrections on the submittal and resubmit them for information.

D. If a submittal is returned marked "NOT ACCEPTED (RESUBMIT FOR REVIEW)," the CONTRACTOR shall revise it and shall resubmit the required number of copies to the OWNER's Representative for review.

E. If a submittal is returned marked "FOR INFORMATION ONLY (REVIEW WAIVED)," it shall mean either that the submitted material is considered informational in nature and a review is not necessary, or that the submittal is a resubmittal for the record and review is not necessary.

F. Rejected portions of previous submittals shall not be included in resubmittals. Every change from a submittal to a resubmittal or from a resubmittal to a subsequent resubmittal shall be identified and flagged on the resubmittal.

G. Fabrication of an item or WORK on a task requiring material or methodology described by a given submittal, shall be commenced only after the OWNER's Representative has reviewed the pertinent submittals and returned copies to the CONTRACTOR marked either "REVIEWED AND ACCEPTED" or "REVIEWED AND ACCEPTED AS NOTED (RESUBMIT FOR RECORD)". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as changes to the contract requirements.

H. All submittals shall be carefully reviewed by the CONTRACTOR, prior to submission to the OWNER's Representative. Each submittal shall be dated, signed, and certified by the CONTRACTOR as being correct and in strict conformance with the Contract Documents. The OWNER's Representative will only review submittals which have been so certified by the CONTRACTOR. All non-certified submittals will be returned to the CONTRACTOR without action taken by the OWNER's Representative, and any delays caused thereby shall be the total responsibility of the CONTRACTOR.

I. Number the submittals as shown in the Submittal Control Document. Specific items submitted under a general item shall be given a dashed number suffix. For example, under a general item "Valves" (Submittal No. 6), product data for gate valves would be submitted with a dashed number suffix such as Submittal No. 6-01. Resubmittals of the same item shall be given the original number with an alphabetic suffix. For example, the first resubmittal of the product data for the gate valve would be designated Submittal No. 6-01a.

J. Schedule submittals to expedite the Project and send via email to the OWNER's Representative. Coordinate submission of related items. Except for samples of previously agreed upon submittals, ALL SUBMITTALS SHALL BE SUBMITTED ELECTRONICALLY, EACH AS A SINGLE FILE IN PORTABLE DOCUMENT FORMAT (PDF).

K. The OWNER's Representative and/or ENGINEER's review of submittals shall not relieve the CONTRACTOR of the entire responsibility for the correctness of details and dimensions. The CONTRACTOR shall assume all responsibility and risk for any misfits due to any errors and omissions in

submittals. The CONTRACTOR shall be responsible for the dimensions and the design of adequate connections and details.

1.2 SUBMITTAL LIST

A. The CONTRACTOR shall prepare and submit a list of submittals including the name of the submittal item, applicable specifications section, type of submittal (shop drawing, manufacturer's catalog cut, technical information, gradation analysis, certification of compliance, etc.), and planned submission date.

B. Submit the list as a spreadsheet in MS Excel format in addition to Adobe Acrobat .pdf format.

1.3 RECORD DRAWINGS

A. The CONTRACTOR shall maintain one record set of Drawings at the Site. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the information represented on the original Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings. Red ink shall be used for alterations and notes. Notes shall identify relevant Change Orders by number and date. Record drawing information shall include, but not be limited to:

1. Identification of vertical control used for describing the elevations of structures.

2. Horizontal distances to culvert ends, roadway widths, and existing utilities. A minimum of two dimensions shall be provided to prominent, above grade features, dimensions shall be no closer than 40 degrees of each measurement for a given point.

B. Copies of the record drawings shall be submitted on completion of WORK.

C. Final payment will not be acted upon until the record drawings have been prepared and delivered to the OWNER's Representative. Said up-to-date record drawings shall be in the form of a set of prints with carefully plotted information overlaid.

D. Upon Substantial Completion of the WORK and prior to final acceptance, the CONTRACTOR shall finalize and deliver a complete set of record drawings to the OWNER, conforming to the construction records of the

CONTRACTOR. This set of drawings shall consist of corrected Drawings showing the reported location of the WORK. The information submitted by the CONTRACTOR will be assumed to be correct, and the CONTRACTOR shall be responsible for the accuracy of such information, and for any errors or omissions which may appear on the record drawings as a result.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 43 00

CONTRACTOR QUALITY ASSURANCE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Quality Control

B. Quality Assurance

C. References

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals

1.2 QUALITY CONTROL

A. The CONTRACTOR shall provide quality control, which shall include the initial and subsequent inspections of CONTRACTOR's WORK to ensure that the WORK conforms to the Contract Documents.

B. CONTRACTOR shall designate the person responsible for CONTRACTOR's quality control while WORK is in progress, and shall notify OWNER's Representative, in writing, prior to any change in quality control representative assignment.

C. CONTRACTOR shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce WORK of specified quality.

D. Comply fully with manufacturers' instructions, including each step in the sequence.

E. Should manufacturers' instructions conflict with Contract Documents, request clarification from OWNER's Representative before proceeding.

F. Comply with specified standards as a minimum quality for the WORK except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

G. Perform WORK by persons qualified to produce workmanship of specified quality.

H. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

I. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

J. CONTRACTOR shall pay for and schedule testing for quality control. The CONTRACTOR shall pay for and schedule an independent testing laboratory to do testing for quality assurance.

K. Re-testing of quality assurance tests required because of non-conformance to specified requirements shall be performed at no additional cost to the OWNER. CONTRACTOR shall be responsible for payments due by re-testing.

1.3 QUALITY ASSURANCE

A. The OWNER or the OWNER's Representative will perform observation of the WORK and will review the quality assurance testing done by the CONTRACTOR's independent testing laboratory. The OWNER will pay for observation and review of the quality assurance testing.

B. The CONTRACTOR's independent testing laboratory shall perform Quality Assurance testing. Testing will occur after CONTRACTOR 's Quality Control measures. CONTRACTOR shall submit the name and qualifications of the testing agency and its personnel in accordance with Section 01 33 00 – Contractor Submittals.

C. The CONTRACTOR shall coordinate WORK with the OWNER's Representative and cooperate with testing personnel. The CONTRACTOR shall:

1. Submit weekly schedules and updates by noon Friday for the following week's WORK elements with days of requiring testing services clearly identified.

2. Notify OWNER's Representative and testing company 24 hours prior to expected time for operations requiring testing services.

3. Failure of CONTRACTOR to provide adequate notice (as specified above) shall not be grounds for claims of delay by the CONTRACTOR.

4. CONTRACTOR shall schedule all required tests and notify the OWNER or the OWNER's Representative.

5. Quality assurance testing results shall be sent to the CONTRACTOR and the OWNER's Representative at the same time.

1.4 REFERENCES

A. Conform to reference standard by date of issue current on date of Contract Documents.

B. Should specified reference standards conflict with Contract Documents, request clarification from OWNER's Representative before proceeding.

C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Electric Service

B. Telephone Service

C. Water

D. Sanitary Facilities

E. Fire Protection

F. Field Offices

G. Security and Access

H. Dust Control

I. Rubish Control

J. Invasive Plant Management

K. Chemicals

L. Protection of Existing Utilities and Structures

1.1 UTILITIES

A. Electric Service:

1. CONTRACTOR shall coordinate with Umatilla Electric Cooperative (UEC) to arrange temporary power to the project and to their construction trailer(s).

B. Telephone Service:

1. The CONTRACTOR shall provide telephone service for its use. Mobile telephone service is available at the site.

C. Water:

1. The CONTRACTOR shall furnish both potable and non-potable water for its use, including all pumps, storage tanks, hoses, and connectors as necessary to distribute water at the job site.

D. Sanitary Facilities:

1. Sanitary facilities shall be provided by the CONTRACTOR for all persons employed on the project, beginning with the first person employed and shall be of the chemical type.

2. Such conveniences shall be erected and maintained in the number, manner, and place approved by the OWNER's Representative immediately upon commencing work. The Sanitation Laws of the State of Oregon and any applicable county sanitary laws shall be complied with.

E. Temporary Fire Protection:

1. CONTRACTOR shall provide temporary fire protection at all times.

2. Provide adequate numbers and types of fire extinguishers.

3. Store combustible materials in fire-safe containers in fire-safe locations.

4. Prohibit smoking in hazardous fire-exposure locations.

5. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

1.2 FIELD OFFICES

A. The CONTRACTOR shall supply a field office for its use where construction documents shall be kept. The office shall be large enough to keep record drawings and the CONTRACTOR shall permit access to OWNER's inspectors and ENGINEERS as necessary. The field office shall also provide space to conduct construction meetings and accommodate the CONTRACTOR's representatives in addition to up to 3 representatives of the OWNER with seating around a table for all meeting participants.

B. The CONTRACTOR shall provide a field office for the exclusive use of the OWNER's Representative. The field office shall be a prefabricated or mobile unit in like-new condition. Field office shall be a minimum of 160 square feet. Field office shall have interior lighting, electrical outlets, and a fire extinguisher. Field office shall include operable windows, heat, and air conditioning. Field office shall have lockable exterior doors and a landing and steps at the doors. WiFi internet access shall be provided.

1.3 SECURITY AND ACCESS

A. Protection of The Public:

1. Lewis and Clark Trail is open to the public for non-motorized vehicle use at all times. The CONTRACTOR shall plan its operations to allow

public use of the trail throughout construction. Limit construction vehicle speeds on the trail to 10 mph.

2. Fence, barricade, or otherwise block off the work area to prevent unauthorized entry.

3. Erect and maintain barricades, lights, danger signals, and warning signs in accordance with MUTCD.

4. Adequately barricade and post open cuts in or adjacent to the trail.

B. Security Fences:

1. Before starting work, install security fence with lockable gates as necessary to provide security for the CONTRACTOR's equipment and materials. Extent of fencing to be determined by the CONTRACTOR.

2. Remove fences and other barriers when no longer needed.

C. Access Restrictions:

1. Trail Access: Prevent unauthorized vehicles from entering Lewis and Clark Trail. Lock gate when not in active use.

2. Contractor Operations: Access shall be restricted to the immediate work area and access route identified to be used during construction. CONTRACTOR shall confine personnel to the immediate work vicinity while on site.

3. Emergency Site Access during Construction: Fire lanes and emergency vehicle access must remain open during construction.

1.4 DUST CONTROL

A. The CONTRACTOR shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. Dusty materials in piles or in transit shall be covered when practicable to prevent blowing.

B. Buildings or operating facilities which may be affected adversely by dust shall be adequately protected from dust. Existing or new machinery, motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

1.5 RUBBISH CONTROL

A. During the progress of the WORK, the CONTRACTOR shall keep the Site and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The CONTRACTOR shall dispose of all rubbish and

waste materials of any nature occurring at the Site and shall establish regular intervals of collection and disposal of such materials and waste. The CONTRACTOR shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the Site in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the Occupational Safety and Health Administration (OSHA) Safety and Health Standards for Construction.

1.6 INVASIVE PLANT MANAGEMENT

A. The CONTRACTOR shall be responsible for control and management of invasive shrubs and noxious weeds throughout the duration of the project. See Specification Section 32 90 00 for specific requirements.

1.7 CHEMICALS

A. All chemicals used during project construction or furnished for project operation, no matter their classification, shall show approval of either the U.S. Environmental Protection Agency or the U.S. Department of Agriculture. Use of all such chemicals and disposal of residues shall be in strict accordance with the printed instructions of the manufacturer.

B. Submit list of chemicals with MSDS sheets to bringing onsite.

1.8 PROTECTION OF EXISTING UTILITIES AND STRUCTURES

A. CONTRACTOR shall be responsible for the design and construction of temporary shoring of all pipelines, duct banks, building foundations, retaining walls, and other existing or new utilities and structures encountered when performing the work.

B. Temporary shoring shall be sufficient to prevent deflection or settlement of existing utilities and structures in either the horizontal or vertical direction.

C. Particular care shall be taken to protect the existing CTUIR pump station, pipeline, and electrical service from damage or operational interruptions throughout construction. Repair any damage within 24 hours.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 55 00

SITE ACCESS AND STORAGE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Road Limitations

B. CONTRACTOR's Work and Storage Areas

1.1 SUBMITTALS

A. See Section 01 33 00 – Contractor Submittals for requirements for the mechanics and administration of the submittal process.

B. Submit a Traffic Control Plan for the Lewis and Clark Trail taking into consideration the single lane width of the trail, joint use of the trail with the pipeline contractor, and the potential for public use of the trail during construction of the WORK.

1.2 ROAD LIMITATIONS

A. The CONTRACTOR shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the WORK.

B. Road Use: Nothing herein shall be construed to entitle the CONTRACTOR to the exclusive use of any public street, trail, access road, alleyway, private access road or parking area during the performance of the WORK hereunder, and it shall so conduct its operations as not to interfere unnecessarily with the authorized WORK of utility companies or other agencies in such streets, alleyways, or parking areas, or of local property OWNER. No street or lanes within a roadway or private property access route shall be closed to the public or property owner without first obtaining permission of the property owner and OWNER's Representative and proper governmental authority with an approved Traffic Control Plan.

C. United States Army Corps of Engineers (USACE) Property Use: Project site is located on USACE McNary Lock and Dam Property. The OWNER has obtained an easement from the USACE for construction of the WORK. CONTRACTOR shall utilize access to the project site shown on Plans, shall comply with the applicable easement terms, and shall coordinate any special

needs other than access shown with the OWNER. A copy of the easement is included in Appendix B.

1.3 CONTRACTOR'S WORK AND STORAGE AREA

A. The CONTRACTOR shall use the designated areas on the drawings for temporary construction staging and storage. The CONTRACTOR shall make its own arrangements and secure legal use for any other necessary off-site staging yards, field offices, storage, or shop areas necessary for the proper execution of the WORK and shall provide for the use of such lands at its own expense.

B. Joint use of the laydown area 2 with the pipeline contractor as needed to support construction of the pipeline will be coordinated between the contractors by the Owner's Representative.

C. The CONTRACTOR shall direct its employees to park in areas under the control of the CONTRACTOR. Public right-of-way or private property other than that shown for project limits shall not be used for employee parking unless approved by the OWNER and property owner.

D. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The CONTRACTOR shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 57 10

STORMWATER POLLUTION PREVENTION

PART 1 – GENERAL

1.0 DESCRIPTION

A. The WORK of this section consists of implementing control measures to prevent Stormwater Pollution during construction activities, in accordance with Federal, State, and local regulations, and in accordance with the Erosion and Sediment Control Plan (ESCP) to be prepared for this project.

B. In the event of conflict between these specification requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

C. The CONTRACTOR shall be responsible for obtaining a Construction Stormwater General Permit from the Oregon Department of Environmental Quality (DEQ NPDES #1200-C Permit) for its work.

1.1 SUBMITTALS

A. Submit draft ESCP for review after contract award and before the pre-construction conference.

B. Plans showing proposed arrangements and methods for control of erosion, sedimentation, and pollutant conveyance in stormwater resulting from construction activities. Show that the ESCP satisfies all Federal and State National Pollutant Discharge Elimination System (NPDES) permit requirements.

C. Provide sufficient information for evaluation of:

1. Erosion protection measures and products;
2. Drainage management strategies; and
3. Surface restoration.

D. Submit schedules for inspection and monitoring of all stormwater pollution prevention measures.

E. Submit manufacturer's product information and installation recommendations for silt fence, filter fabric and erosion control blanket, straw bales, and any other materials proposed for use on this project.

1.2 QUALITY ASSURANCE

A. Before commencing construction activities, such as grading, excavation or filling in any part of the site, CONTRACTOR shall plan for temporary structures to guide runoff away from the WORK area and to capture eroded material before it reaches natural water courses. The measures shall be in accordance with reviewed and approved stormwater pollution prevention plans.

B. Arrange construction activities to minimize erosion to the maximum practical extent. Clearing, excavation, and grading shall be limited to those areas of the project site necessary for construction. Minimize the area exposed and unprotected.

C. Clearly mark and delineate the limits of WORK activities. Equipment shall not be allowed to operate outside the limits of WORK or to disturb existing vegetation. Excavation and grading shall be completed during the dry season to the extent possible.

1.3 REGULATORY REQUIREMENTS

A. Apply for all required permits in a timely fashion, as there may be significant lead time in obtaining permits from the Oregon Department of Environmental Quality.

B. Implement the requirements of the NPDES for erosion control due to stormwater runoff during construction as administered by the Oregon Department of Environmental Quality (ODEQ).

C. ODEQ Permit Requirements:

1. The CONTRACTOR shall file a Notice of Intent (NOI) at least 14 calendar days before commencing construction activities, implement the accepted ESCP during construction and, upon completion of the construction, file a Notice of Termination (NOT), all as described in the following requirements. Implement all good housekeeping practices, inspections and record keeping.

2. The CONTRACTOR shall provide a Draft ESCP for the project which includes the following information and forms:

    a. A site description identifying sources of pollution, including a site map.

    b. A description of how you will prevent erosion, sediment, and other pollutants from contaminating stormwater.

c. A description of how you will control stormwater flow from your site.

d. Documentation supporting permit eligibility regarding the Endangered Species Act.

e. Documentation supporting permit eligibility regarding local Total Maximum Daily Load (TMDL) requirements.

f. Clearly outlined roles and responsibilities of different operators.

g. The protocol you will use to inspect your site.

h. Expected sequencing of operations and construction schedule.

i. Weather monitoring procedure.

j. Controls for other potential onsite stormwater pollutants.

k. Applicable specifications.

l. Maintenance and inspection procedures and forms.

m. Description of potential non-stormwater discharges at site.

n. NOI form. (Completed)

o. Notice of Termination NOT form. (Template)

p. CONTRACTOR and Sub-contractor Certification forms.

q. Other record keeping forms and procedures.

r. Good housekeeping practices and procedures, including vehicle wash-down areas, protection of equipment storage and maintenance areas, and sweeping of roadways related to hauling activities.

3. The CONTRACTOR and the OWNER's Representative will jointly review the draft ESCP and agree to any needed revisions. The CONTRACTOR and the OWNER's Representative will then accept and sign the revised ESCP. When the ESCP is accepted, it will be the document in force on the project. The accepted ESCP will describe and ensure implementation of the practices which will be used to reduce the pollutants in stormwater discharges to assure compliance with the terms and conditions of the ODEQ 1200C permit. Place the ESCP and all updates in a three-ring binder so that completed inspection forms and other records may be inserted. The CONTRACTOR shall maintain a current copy of the ESCP and all

associated records and forms at the jobsite throughout the duration of the project. The ESCP shall be available for public inspection and for the inspection and use of the OWNER's Representative.

4. Implement the ESCP as required throughout the construction period and maintain all erosion control elements in proper working order. Do not perform clearing and grubbing or earthwork until the ESCP has been implemented. Prior to construction, the CONTRACTOR and all subcontractors shall sign certifications (included in the ESCP) that they understand the requirements of the NPDES permit. All subcontractors shall comply with the requirements of the NPDES under the supervision of the CONTRACTOR. The CONTRACTOR shall designate the erosion control supervisor who will be responsible for implementing the ESCP. The erosion control supervisor shall be familiar with the ESCP procedures and practices and shall ensure that emergency procedures and the ESCP are updated as needed and available for inspection. The ESCP (including inspection forms) and all data used to complete the NOI shall be provided to the OWNER's Representative at the completion of the project.

5. Inspections and Revisions to Plan:

    a. The CONTRACTOR and the OWNER's Representative will perform a weekly inspection of the site. The inspection shall include disturbed areas that have not been finally stabilized, areas used for storage of materials, locations where vehicles enter or exit the site, and all erosion and sediment controls that are included in the Plan. Inspections shall be documented on forms provided In the Plan. The inspection forms shall be retained onsite in the Plan notebook throughout the construction period.

    b. It may be necessary to revise the Plan during construction to make necessary improvements or revisions or to respond to unforeseen conditions noted during construction or site inspections. For that purpose, the Plan shall specify the mechanism whereby revisions may be proposed by the CONTRACTOR or the OWNER's Representative and incorporated into the Plan, including review and acceptance of minor changes. The CONTRACTOR and the OWNER's Representative will jointly accept and sign each revision to the Plan before implementation. Accepted modifications will be implemented within 7 calendar days following the date of the

inspection when deficiencies or necessary corrections are first noted.

c. Temporary erosion and pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during design, that are needed prior to installation of permanent control features, or that are needed temporarily to control erosion that developed during normal construction practices but are not associated with permanent control features on the project.

d. Provide additional temporary erosion and pollution controls made necessary by CONTRACTOR's errors or negligence at no additional cost to the Owner.

e. Maintain erosion and sediment control features until final acceptance of project.

6. NOT. Upon final acceptance, the CONTRACTOR shall file a NOT within 30 days after any one of the following criteria occurs:

a. Final stabilization has been achieved on all portions of the site for which the permittee is responsible,

b. Another operator/permittee assumes control over all areas of the site that have not achieved final stabilization,

c. Coverage has been obtained under an individual or alternative NPDES permit.

1.4 JOB CONDITIONS

A. The CONTRACTOR shall maintain records of WORK performed on the sediment control structures.

B. The CONTRACTOR shall not remove any erosion or sediment control measure without prior permission from the OWNER’s Representative.

C. The CONTRACTOR shall obtain approval from the OWNER’s Representative prior to making changes to erosion control plans.

1.5 SEQUENCE OF CONSTRUCTION

A. The CONTRACTOR shall be responsible for arranging and conducting an Erosion and Sediment Control meeting/briefing to inform all parties scheduled to be on-site during the project of the measures to be implemented for proper erosion and sediment control (may be included as part of the Pre-Construction Meeting).

1. Installation of silt fences, stabilized construction entrances, compost socks, and all other forms of erosion and sediment control shall not begin until after this meeting has occurred.

B. The CONTRACTOR shall notify the OWNER's Representative in writing and by telephone of the following events:

1. The required erosion and sediment control meeting/briefing.
2. Following installation of required sediment control structures.
3. Prior to removal of or modification to sediment control structures.
4. Prior to removal of all sediment control structures.

C. Silt fences, stabilized construction entrances, compost socks, and all other forms of erosion and sediment control shall be installed, inspected, and accepted by the OWNER's Representative before beginning any utility excavation.

D. Temporary silt fences and/or compost socks shall be installed around any stockpiles and/or excavated material that cannot be backfilled during the same day in which it was excavated. Temporary silt fences and/or compost socks shall also be placed immediately downstream of any utility trench that has not been backfilled at the end of the working day. Temporary silt fences and/or compost socks shall be installed prior to leaving the work site for the day.

E. Silt fences and stabilized construction entrances, compost socks shall be inspected by the CONTRACTOR weekly. Repairs to these devices shall be completed prior to leaving the work site for the day.

F. The CONTRACTOR shall prevent the deposition of materials onto paved areas. The CONTRACTOR shall inspect the paved areas for deposited materials weekly and remove the materials immediately.

G. Failure to maintain silt fences, stabilized construction entrances, and/or compost socks shall be cause for an immediate stop-work order.

H. Silt fences and/or compost socks shall be removed with permission of the OWNER's Representative within 20 working days after final acceptance of the project and/or after the establishment of permanent stabilization of all excavations and fill areas.

PART 2 – PRODUCTS

2.0 EQUIPMENT

A. Before the WORK begins, sufficient equipment shall be available on the site to assure that the operation and adequacy of the erosion control plans can be continuously maintained.

2.1 EROSION CONTROL PRODUCTS

A. Silt fences, compost socks, straw bales, jute matting, and other erosion control materials shall be selected by the CONTRACTOR and suitable for the intended use.

B. Pollution prevention measures shall be installed by the CONTRACTOR consistent with the requirements set forth by the ODEQ, the United States Environmental Protection Agency, and the United States Army Corps of Engineers' specifications.

2.2 EROSION CONTROL MEASURES

A. Erosion control measures shall consist of silt fencing, compost socks, barrier protectors, straw bales, temporary soil retention blankets, excelsior drainage filters, sediment traps and berms.

B. Berms and excelsior drainage filters shall be used to form sediment traps and to control run-on and run-off into other areas, including creeks, streams, marshes, access roads, well areas, and the staging areas.

C. Erosion control measures shall be used to contain only direct precipitation in the construction zone. The contained water shall be allowed to percolate into the ground or drain slowly through the drainage filter sediment traps.

D. Earthen sediment traps or holding ponds shall not be used unless accepted by the OWNER's Representative.

PART 3 – EXECUTION

3.0 GENERAL DESCRIPTION

A. Furnish, install, maintain, and operate necessary control measures and other equipment necessary to prevent erosion. Temporary measures shall be to CONTRACTOR's own design and CONTRACTOR shall be solely responsible for risks related to the management of erosion control during construction.

3.1 METHODS

A. Construct berms to reduce runoff velocity as well as direct surface runoff around and away from all fuel containment, storage, and borrow areas.

B. Divert surface runoff around and away from cut and fill slopes by constructing berms or ditches at the base of disturbed slopes. Provide conveyance for the runoff in temporary pipes or protected channels to temporary sediment traps.

C. Place drainage filters around all catch basins to create sediment traps to control run-off from the construction area.

D. Excess water used for dust control shall be contained within the disturbed areas by the erosion control measures.

3.2 MAINTENANCE OF TEMPORARY FACILITIES

A. Inspect erosion and sediment control structures weekly. Ensure erosion and sediment control structures remain effective throughout excavation and grading operations. Relocate structures as necessary.

B. Inspect control structures after each significant rainfall. Promptly repair breaches which occur.

C. The CONTRACTOR shall remove entrapped sediment from behind excelsior drainage filter after each storm.

D. Stabilized Construction Entrance: The stabilized construction entrances shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate or removal and replacement of existing aggregate. All sediment spilled, dropped, or washed on to public rights-of-way must be removed immediately. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

3.3 DISPOSAL OF SEDIMENT FROM STORMWATER POLLUTION CONTROL STRUCTURES

A. Sediment excavated from temporary sediment control structures shall be disposed on the site with general fill, or with topsoil. Sediment shall be allowed to dry out as required before reuse.

B. CONTRACTOR shall place the sediment removed from traps and other structures where it will not enter a storm drain or watercourse and where it will not immediately reenter the basin.

3.4 REMOVAL OF TEMPORARY STORMWATER POLLUTION CONTROL MEASURES

A. All temporary control measures shall be removed with permission of the OWNER's Representative within 20 working days after final acceptance of the project, and/or once grading is completed, and slopes have stabilized.

– End of Section –

SECTION 01 57 19

SPILL PREVENTION, CONTROL, AND COUNTERMEASURES

PART 1 – GENERAL

1.0 DESCRIPTION

A. This WORK shall consist of control measures required by the drawings and specifications, as ordered by the OWNER's Representative, as required by the permits for the WORK, or as required during the life of the Contract to control water pollution and water runoff using filter netting, gravel, mulches, silt fences, compost filter socks, compost berms, straw bales, and other control devices or methods. The CONTRACTOR is solely responsible for ensuring that pollution control measures at the site meet or exceed all applicable permit conditions, laws, rules, or regulations, and any direction by the project drawings, specifications, or the OWNER's Representative in no way relieve the CONTRACTOR of this responsibility. All drain trenches and catch basins shall be protected and maintained free flowing and free of debris. All roadways shall be maintained free of debris.

B. In the event of conflict between these specification requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

1.1 SUBMITTALS

A. The CONTRACTOR shall submit the following site-specific plans:

1. Spill Prevention, Control, and Countermeasure Plan (SPCCP).
2. Construction sequence plan for pollution prevention measures with quantities of maximum disturbed area per phase.

B. CONTRACTOR shall identify a responsible party who will be on site during all dredging/earthwork and construction activities.

C. Product data including manufacturer's technical data and installation instructions for the following:

1. Turbidity Curtain – include proposed layout and anchoring system, and installation and removal methods
2. Dewatering sedimentation tanks or basins and/or filtration systems
3. Compost Sock
4. Silt Fence

5. Erosion Control Blankets

1.2 PROTECTION OF WATER RESOURCES

A. The CONTRACTOR shall comply with all permit requirements associated with this project. Copies of the permits are included in Appendix C.

B. All water resources (i.e., ground and surface waters), including all drains, shall be protected from leaching and/or run-off of chemical pollutants, solid wastes, and construction site debris.

C. Prior to construction, the CONTRACTOR shall submit for review and approval by the OWNER's Representative, a Spill Prevention, Control, and Countermeasure Plan (SPCCP) that includes a schedule and methods for accomplishment of site-specific pollution prevention measures for the duration of the project.

1. The SPCCP shall be submitted to the OWNER's Representative at least ten (10) days prior to commencement of the WORK.

2. No WORK shall begin until the pollution prevention measures schedule and plan have been approved by the OWNER's Representative.

3. If conditions change during construction, the CONTRACTOR shall revise the plan and resubmit to the OWNER's Representative for review and approval.

4. It is the CONTRACTOR's responsibility to develop and implement a pollution prevention plan that includes adjustments required during operations to protect the Columbia River and to meet all permit conditions if turbidity cannot be contained with installed pollution prevention measures.

D. A chemical and oil spill prevention and cleanup plan shall be provided as part of the SPCCP prior to commencing WORK and implemented during the WORK. The CONTRACTOR shall maintain on site, sufficient quantities of absorbent materials for use in case of chemical or oil spills. In the event of any actual or suspected spill of any chemical, petroleum product, or wastewater, the CONTRACTOR shall immediately notify the OWNER's Representative and immediately take all measures necessary to control the spread of the spilled material, and to clean it up.

E. Storage and/or use of chemicals, fuels, oils, greases, bituminous materials, solids, waste washings, and cement shall be handled appropriately as to prevent leaching or surface run-off into public waters or drains. All OWNER's Representative approved storage areas for these materials must be diked.

F. Disposal of any waste materials on the construction site is prohibited.

G. Water resulting from or contaminated by construction operations shall not be directly discharged into any bodies of water or drainage systems.

H. There shall be no discharge of suspended and/or settle-able solids in amounts that cause visible contrast to natural conditions beyond the extent of the installed turbidity curtain or cofferdam.

1.3 PROTECTION OF FISH AND WILDLIFE RESOURCES

A. The CONTRACTOR shall manage and control construction activities to minimize interference with and damage to fish and wildlife. Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat related to the project and critical to the survival of fish and wildlife, except as indicated or specified.

1.4 POLLUTION PREVENTION

A. The CONTRACTOR shall provide all labor, equipment, and materials necessary to construct temporary and/or permanent control measures to control erosion and limit sediment discharges to streams, rivers, lakes, canals, or other waterbodies from construction operation. Such measures shall include the construction of temporary berms, diversion ditches, dike checks, sediment structures (traps, basin(s), embankments), silt fence, compost filter sock, and the use of mulches, straw bale barriers, mats, seeding or other control measures as necessary and as noted on the drawings.

B. The CONTRACTOR shall comply with all applicable Federal, State and Local regulations and laws. In the event of a discharge to streams, rivers, lakes, or canals that causes a visible plume in the receiving water body, the CONTRACTOR shall immediately notify the Construction Representative and the Site Environmental Supervisor.

C. The CONTRACTOR shall perform pollution prevention measure inspection and maintenance at least weekly, and after every storm (wind, wave, high water) event.

D. Pollution prevention measures shall be installed by the CONTRACTOR consistent with the requirements set forth by the State of Oregon, United States Environmental Protection Agency, and the United States Army Corps of Engineers' specifications.

E. The CONTRACTOR shall make every effort to minimize erosion from construction, including, but not limited to, the following:

1. Use of extreme caution to limit disturbances of natural areas to the absolute minimum required.
2. Sequencing of backfilling operations to maintain natural traps for eroded material and any other measures effective in minimizing erosion and limiting sediment discharge.
3. Except as indicated on the project plans, spoils shall not be deposited in or near rivers, streams, or impoundments nor otherwise located to be susceptible to erosion due to high water, flooding, or rainwater runoff.
4. Shaping of the top of earthwork in a manner to permit and facilitate the runoff of rainwater.
5. Installation of vegetative groundcover or stabilization per local best practices, as per the contract documents.
6. Turbidity Curtain: the CONTRACTOR shall provide a pre-manufactured turbidity curtain (see detail on Drawings) of continuous construction.

F. All pollution prevention measures must be constructed prior to beginning any land or sediment disturbances. These measures and devices cannot be removed until the disturbed areas are stabilized as deemed appropriate by the OWNER's Representative. All devices must be properly maintained and kept in optimum operating condition for the duration of construction.

G. Runoff from any land disturbing activity shall not be directly discharged or have the potential to be discharged off site, onto roadways, or into a watercourse. Accumulated sediment in a properly designed trap shall be removed as directed by the OWNER's Representative.

H. All sites shall be stabilized with pollution prevention measures, such as straw mulch, biodegradable coir fabric matting, excelsior, or per local best practices within fourteen (14) days of final grading. If construction is suspended, or sections completed, areas shall be immediately stabilized with appropriate pollution prevention measures. Maintenance shall be performed as necessary to ensure continued stabilization.

I. Temporary sediment trapping devices, such as silt fences and compost socks, shall be removed upon approval of the OWNER's Representative.

J. All points of construction ingress and egress, including through the turbidity curtain, shall be protected to prevent the deposition of materials into the waterway All materials deposited into the waterway shall be removed immediately.

1.5 DUST AND FUME CONTROL

A. The control of potentially harmful dusts, fumes, mists, gases, smoke, sprays, or vapor shall be accomplished by accepted engineering control measures, for example, enclosure or confinement of the operation, ventilation, and substitution of less toxic materials.

PART 2 – PRODUCTS

2.0 SILT BARRIERS

A. Unless specified otherwise on the project drawings, the silt fence, compost filter sock, stabilized construction entrances, or rock filter berms shall be in conformance with the requirements of the Oregon Erosion Control Manual.

2.1 EROSION CONTROL MATTING

A. Erosion control matting shall be North American Green BioNet, or an approved equivalent, with a functional longevity of 18 months and fully biodegradable materials.

2.2 TURBIDITY CURTAIN

A. The turbidity curtain shall be a pre-manufactured turbidity curtain consisting of an impervious membrane, with an integral foam billet floatation system and a continuous integral weight system to anchor the curtain to the river bottom and prevent movement of the curtain base. The curtain shall be capable of withstanding the wind and current conditions at the site without allowing the release of the contained sediment laden water. The curtain shall be 10% greater than the depth of the water to allow for water level fluctuations.

B. Anchoring for the turbidity curtains shall be per the manufacturer's recommendations.

C. Acceptable curtain is Elastec Type II Fastwater Screen with impervious membrane, or approved equivalent.

PART 3 – EXECUTION

3.0 INSTALLATION OF EROSION AND SEDIMENT CONTROLS

A. Unless specified otherwise in the project drawings, install erosion and sediment controls as specified by the Oregon Erosion Control Manual, and per the manufacturer, including any staking, anchoring, or site preparation.

3.1 INSTALLATION OF TURBIDITY CURTAIN

A. The CONTRACTOR shall install turbidity curtain in locations shown conceptually on project drawings and in accordance with the manufacturer's instructions, to encircle and protect the WORK area. The turbidity curtain shall be firmly anchored in place, per manufacturer's recommendations. The area of proposed installation shall be inspected, and obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment should be removed.

B. The CONTRACTOR shall submit their proposed means, methods, and drawings regarding the installation of the turbidity curtain to the OWNER's Representative for acceptance prior to installation and after consultation with the manufacturer. Additional components to be included in the installation include, but are not limited to, anchor systems, ropes, marker buoys, lights, and repair kits.

1. Anchor systems shall be installed to keep the deployed curtain in place for optimum containment. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances, such as boats, wave action, or winds, and water level fluctuations.

2. Ropes and stakes shall be provided as needed to secure curtain tie-downs to beaches or riverbanks.

3. Tow bridles may be necessary for anchoring or towing longer curtains sections.

4. The curtain installation shall be performed in a manner to allow fish and aquatic species to exit the contained area as the curtain is deployed. Any fish isolated for the river by the curtain shall be removed and returned to the river.

3.2 MAINTENANCE

A. The CONTRACTOR shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections in accordance with the Project drawings and relevant permit conditions to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures.

B. Turbidity Curtain: The turbidity curtain shall be inspected daily and repaired or replaced immediately, if a deficiency is found during the inspection. It is

not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt shall be stabilized away from the waterbody. The barrier shall be carefully removed to minimize the release of attached sediment. Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain. If the curtain is oriented in a manner that faces the prevailing winds or waves, frequent checks of the anchorage shall be made.

C. Silt Fence, compost filter socks, compost berm, or rock filter berms (collectively "silt barriers"): Silt barriers shall be inspected in accordance with the Project permits. Any required repairs shall be made promptly. Close attention shall be paid to the repair of damaged silt barriers resulting from end runs and undercutting. Should the fabric on a silt fence decompose or become ineffective, and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits shall be removed when deposits reach one-third of the height of the barrier and/or when bulges develop in the silt barrier. When a silt barrier is no longer required and approval has been given by the OWNER's Representative, it shall be removed or disposed of in an approved manner. The immediate area occupied by the silt barrier and any sediment deposits shall be shaped to an acceptable grade. The areas disturbed by this shaping shall be seeded and mulched in accordance with the permanent vegetation cover standards for the project.

D. Stabilized Construction Entrance: The stabilized construction entrances shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate or removal and replacement of existing aggregate. All sediment spilled, dropped, or washed on to public rights-of-way must be removed immediately.

E. When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

3.3 INSPECTIONS

A. General: The CONTRACTOR shall perform inspections in accordance with the schedule established in this section and relevant permit conditions.

B. Inspections Details: Disturbed areas and areas used for material storage, if applicable, that are exposed to precipitation shall be inspected for evidence

of, or the potential for, pollutants entering the drainage system and/or receiving waters. Pollution prevention measures identified on the project drawings shall be observed to ensure that they are operating correctly. Discharge locations or points shall be inspected to ascertain whether pollution prevention measures are effective in preventing significant impacts to receiving waters. Specific inspection scheduling requirements mentioned in previous sections apply if they are stricter than this paragraph.

C. Deficiencies found during inspections shall be noted and corrective action begun within one business day of their discovery. The corrective actions shall be completed within a reasonable timeframe as determined by the OWNER's representative.

– End of Section –

SECTION 01 57 24

CARE AND DIVERSION OF WATER

PART 1 – GENERAL

1.0 SUMMARY

A. This section describes the dewatering, disposal, and/or diversion of any water which might be required for performance of contract work. The work includes; the cofferdam for construction of the pump station, dewatering the cofferdam, and groundwater seepage from excavation and grading areas.

B. The cofferdam scheme shown on the plans is for the CONTRACTOR's information only and shall not be construed as prescriptive in any way. It is the responsibility of the CONTRACTOR to develop a cofferdam scheme that provides for completion of the necessary work within the schedule to meet contract terms, and in compliance with all applicable permits.

C. The In-Water Work covered by this Section is considered to comprise five primary elements as defined, but may include additional elements as necessary:

1. Fish Protection – All efforts related to protection of aquatic and terrestrial species during the performance of this Contract.

2. Fish Exclusion – Efforts to exclude fish from active in-water work activities.

3. Cofferdam – Efforts to install cofferdam or other similar materials to isolate work areas from inundation by the reservoir.

4. Dewatering – Efforts to draw-down water from isolated or partially isolated work areas with the intention to dry out these zones.

5. Fish Salvage – Efforts to capture and rescue aquatic life from areas within the cofferdam(s) and to relocate these life-forms to free-flowing waters.

D. The upland work covered by this section consists of the following elements:

1. Excavation Dewatering – Efforts to remove groundwater, seepage, or stormwater runoff flowing into excavated areas from the surrounding soils to maintain an adequately dry excavation for performance of the WORK.

a. When an In-Water area has been dewatered and temporarily converted to a work area for construction, the provisions for

Excavation Dewatering as performed to construct the proposed improvements shall apply.

b. If an In-Water area that has been dewatered and temporarily converted to a work area for construction becomes inundated by the free-flowing river waters due to a cofferdam breach, overtopping or other similar event, the provisions for In-Water Work shall apply; all work to remove water from these areas shall be subject to In-Water Work requirements.

E. The CONTRACTOR is solely responsible for determining the quantity and quality of water to be removed from the excavations and cofferdam to complete the project. The CONTRACTOR shall develop contingency plans to accomplish fish salvage, cofferdam dewatering, and excavation dewatering if the quantity of water is underestimated. Implementation of the contingency plans shall be at no additional cost to the OWNER.

1.1 RELATED SECTIONS

Section 01 32 16 – Construction Schedule
Section 01 33 00 – Contractor Submittals
Section 01 57 10 – Stormwater Pollution Prevention Plan
Section 01 57 19 – Spill Prevention, Control, And Countermeasures

1.2 EXISTING FACILITIES

A. The existing pump station, pipeline, electrical system, and appurtenances will remain in operation throughout the construction period and shall be protected from damage by the CONTRACTOR. The pump station will be operated by the OWNER and access for operation and maintenance of the pump station shall be provided at all times.

B. Unless indicated otherwise, temporary pumping, piping, use of water, power, lighting, controls, instrumentation, alarms, security devices, and safety devices shall be provided by the CONTRACTOR.

1.3 PERMITS

A. The CONTRACTOR shall abide by the conditions of permits and shall obtain proof of satisfaction of conditions from issuers of permits prior to acceptance of the WORK by the OWNER.

B. Conditions affecting the CONTRACTOR are found in the permits included in Appendix C.

C. The work plans submitted as required by this Section shall be subject to regulatory review and approval as outlined in the permits applicable to the

Project. The CONTRACTOR shall allow for adequate review time as noted in the permit conditions; review periods by the OWNER's Representative and regulatory authorities shall not run concurrently, unless explicitly authorized by the OWNER's Representative and the regulatory agency(ies) participating in the plan review.

1.4 SCHEDULE CONSTRAINTS

A. General: It is the CONTRACTOR's responsibility to coordinate and plan the elements associated with the WORK of this Section to integrate each schedule constraint into performance of the overall WORK.

1.5 HYDROLOGIC CONSTRAINTS

A. Reservoir Levels: The project is located on the Columbia River in Lake Wallula, the reservoir impounded by the McNary Project. Reservoir levels are regulated by the U.S. Army Corps of Engineers to achieve the hydropower, navigation, and other functions of the McNary Project.

B. Historic reservoir elevation data from 1960 to the present are available at https://www.nwd-wc.usace.army.mil/dd/common/projects/www/mcn.html. Note that the elevations reported on the website are based on the NVGD29 datum and are approximately 3.3 feet lower than the NAVD88 datum used on the drawings.

C. Table 1.1 shows the exceedance probability for historic water levels over two time periods, 2001-2021 and 1960-2021. These elevations have been adjusted for the NAVD88 datum used on the drawings.

Table 1.1 Lake Wallula Historic Water Levels in NAVD88 Vertical Datum

WATER LEVEL	2001-2021 (FEET, NAVD88)	1960-2021 PERIOD OF RECORD (FEET, NAVD88)	PER USACE[1] (FEET, NAVD88) (USACE n.d.)
100% exceed.	338.5	338.4	
98% exceed.	340.8	340.3	
95% exceed.	341.1	340.7	
5% exceed.	342.9	343.2	
2% exceed.	343.0	343.4	
0% exceed.	343.6	344.3	
Minimum Pool			338.3
Normal Full Pool			343.3

[1] USACE (2022). https://www.nwd-wc.usace.army.mil/dd/common/projects/www/mcn.html. Accessed on July 13, 2022.

WATER LEVEL	2001-2021 (FEET, NAVD88)	1960-2021 PERIOD OF RECORD (FEET, NAVD88)	PER USACE[1] (FEET, NAVD88) (USACE n.d.)
Maximum Pool (Flood)			360.3

1.6 FISH PROTECTION, EXCLUSION, DIVERSION, DEWATERING, AND FISH HANDLING & RELOCATION

A. Fish Protection:

1. Fish and other aquatic and terrestrial species shall be protected at all times throughout the project duration. This project has the potential to result in damage or loss of life to various species, including Endangered Species Act Listed Species and supporting habitat. The CONTRACTOR shall consider protection of these life forms as a constraint to the project. Additional information about constraints of construction operations are contained in the applicable project permit conditions and supporting documentation.

2. Temporary diversion of water work plans and in-field efforts associated with construction of the proposed project as required in this section shall be developed such that a highly coordinated and collaborative effort involving the CONTRACTOR, the OWNER, regulatory agencies and others will result in minimization of impact to living species within the in-water work area, and the broader project area.

B. Fish Exclusion:

1. The CONTRACTOR shall provide all materials and labor required for the exclusion of fish from any in-water area where work is proposed. This work consists of, but may not be limited to:

   a. Furnishing, installing, maintaining, and removing block nets or panels, turbidity curtains, and other fish exclusion materials or devices.

   b. The CONTRACTOR shall develop and document the proposed method to exclude fish from in-water work areas.

2. The turbidity curtains may be used as the primary fish exclusion method provided that they are constructed, deployed, maintained and removed in a way that achieves the objectives of both excluding fish from the work area and preventing the discharge of silt and sediment from the work area.

C. Cofferdam:

1. The CONTRACTOR shall provide all materials and labor required for the exclusion of the reservoir from in-water area where WORK is proposed. This work consists of, but may not be limited to, furnishing, installing, maintaining and removing cofferdam structures, dewatering pumping, piping, and similar materials for the control and removal of water from the work area.

2. Cofferdam work shall also include all design and planning efforts necessary to safely execute the work in accordance with the project permits.

3. Cofferdam work includes the initial installation of cofferdam materials and dewatering systems, and ongoing maintenance of these materials and systems under varying reservoir conditions while the WORK areas remain dewatered.

    a. Unless otherwise noted, or explicitly approved by the OWNER's Representative and/or regulatory agencies, all materials proposed to be used for the cofferdam shall be considered temporary and shall be removed from in-water areas when no longer needed.

4. Cofferdam work includes the removal of all cofferdam materials to the pre-project rock surface elevation such that the reservoir bed is restored to pre-project conditions and water is re-introduced to in-water work areas.

D. Dewatering:

1. The CONTRACTOR shall provide all materials and labor required to perform dewatering of any in-water area where work is proposed. This work consists of, but may not be limited to, variable-rate pumping, piping, treatment, and fish salvage.

2. The CONTRACTOR shall operate all pumps required to perform dewatering in a manner and at an appropriate draw-down rate for successful fish salvage efforts.

    a. The CONTRACTOR shall supply all proposed pumps in duplicate and have the duplicate pumps on the project site to ensure readiness of backup pumping for each pump proposed to be utilized.

    b. All pumps used for dewatering of work in areas which may contain aquatic life shall utilize fish screens which are compliant with the project permits. The CONTRACTOR shall monitor and maintain fish screens throughout their use.

c. Only after the work area has been isolated from the river, fish salvage efforts have concluded, and aquatic life is no longer present in the work area shall approval be requested from the Owner's Representative to remove fish screens from any active pumps.

3. Dewatering work requires close coordination with the CONTRACTOR's fish salvage efforts, and only after the fish salvage has been completed can the dewatering work be fully completed.

4. The CONTRACTOR shall plan the dewatering such that fish salvage efforts are completed immediately after isolation of the work area.

5. The CONTRACTOR's site preparation, methods, and procedures for dewatering of the isolated in-water work area shall:

   a. Occur at a draw-down rate sufficient enough to allow the fish salvage team to safely capture and relocate all fish species and other aquatic organisms and avoid injury, death or stranding in compliance with the applicable permits.

   b. Provide safe personnel access to the areas where the fish salvage efforts are required for the OWNER's Representative, OWNER and/or regulatory agencies to monitor the work.

6. The CONTRACTOR is solely responsible for determining the quantity and quality of water to be removed from the cofferdam to accomplish the fish salvage and construction of the pump station. The CONTRACTOR shall develop contingency plans to accomplish fish salvage and cofferdam dewatering if the quantity of water is underestimated.

E. Fish Salvage:

1. The CONTRACTOR will lead a qualified team to perform Fish Rescue and Salvage (FR&S) field work during Dewatering. The CONTRACTOR shall be required to safely remove and/or transport aquatic species during dewatering.

1.7 EXCAVATION DEWATERING

A. The CONTRACTOR shall provide all materials and labor required to perform dewatering of any excavated area where work is proposed. This WORK consists of, but may not be limited to, variable-rate pumping, piping, treatment, and monitoring of inflows to safely complete work within appropriately dry excavated areas.

B. The CONTRACTOR shall provide all materials and labor required to perform required treatment(s) of any discharge effluent resulting from excavation dewatering. This work consists of, but may not be limited to; detention, settling, coagulation and chemical treatment of effluent prior to discharge into any receiving stream or waterway. All excavation dewatering effluent shall be disposed of in accordance with applicable permits and regulations.

C. Excavation dewatering discharge locations shall not result in environmental degradation or erosion; implement Best Management Practices in accordance with the approved site-specific Construction Stormwater General Permit and Erosion and Sedimentation Control Plans applicable to the project at effluent discharge locations.

D. The CONTRACTOR is solely responsible for determining the quantity and quality of water to be removed from the cofferdam and excavations to dewater the site. The CONTRACTOR shall develop contingency plans to accomplish dewatering if the quantity of water is underestimated.

1.8 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 00 – Contractor Submittals:

1. Work Plan(s)

a. Submit Work Plan(s) for the Care and Diversion of Water During Construction, representing the approach, design and methodologies to be used in performance of the work required in this section. The Work Plan shall identify permit constraints and all efforts described shall conform to permit conditions as applicable.

b. The Work Plan(s) for In-Water Work and Excavation Dewatering work may be submitted separately as individual Work Plans, or as sections within a single Work Plan. Submission of individual Work Plans does not relieve the CONTRACTOR of responsibility to coordinate all work in accordance with each plan.

c. In-Water Work: The Work Plan shall include a full description of all CONTRACTOR efforts, materials, equipment and labor related to each of the (5) primary elements of in- water work defined above. The Work Plan shall generally be divided into sections correlating to each of the In-Water elements.

i. Include a Work Plan summary and supporting calculations as necessary to demonstrate that the

cofferdam will function as intended, with adequate capacity to minimize the risk of overtopping/breach, in accordance with the contract requirements, and in a safe manner for performance of work within the work area.

ii. Include a list of materials related to Fish Exclusion, including nets, pump screens or other devices proposed for the purpose of fish exclusion.

iii. Include cofferdam material/product information and cut-sheets for all proposed elements as applicable, including but not limited to; sheet pile profiles, structural bracing and struts, cofferdam sack and fill materials, aqua dam materials, and earthen or rockfill materials.

iv. Include dewatering material/product information and cut-sheets for all proposed elements as applicable, including but not limited to; pumps, fish screens, sediment traps, piping, hoses, and power generating equipment supporting the dewatering efforts.

v. Include a detailed description of the areas where fish salvage will be required, the fish salvage equipment and procedures to be used and the qualifications of the personnel who will perform the fish salvage. Include the proposed sequence of cofferdam construction and dewatering for coordination with the fish salvage efforts.

d. Excavation Dewatering Work: The Work Plan shall include a full description of all CONTRACTOR efforts, materials, equipment and labor related to excavation dewatering.

i. Include excavation dewatering material/product information and cut-sheets for all proposed elements as applicable, including but not limited to; pumps, sediment traps, piping, hoses, and power generating equipment supporting the dewatering efforts.

e. The Work Plan(s) will be reviewed by the OWNER's Representative and regulatory agencies as applicable.

f. Coordinate all items of the Work Plan(s) with the plans of all other work occurring within or affecting the work area including, but not limited to; excavation shoring, construction access, permanent structure form work, sequencing, schedule,

permit conditions and environmental monitoring/sampling plans.

2. Working Design Drawings

   a. Submit Working Design Drawings for the Care and Diversion of Water During Construction, representing the design, detailing, placement, sequencing and installation of any structures or materials and methodologies to be used in performance of the work required in this section.

   b. In-Water Work: The Working Design Drawings shall clearly show the plan layout, details and quantities for any temporary items installed to perform the WORK.

      i. Include a summary of design, details, and supporting calculations as required for any physical elements proposed to restrict water from entering the Work Area(s).

      ii. Show plan areas where fish salvage will be required, and any sequencing related to fish salvage efforts.

   c. Excavation Dewatering Work: The Working Design Drawings shall include the layout, size and configuration of any proposed piping, pumping, detention and treatment elements required to accommodate the dewatering of all excavated areas.

      i. The location and details of effluent discharge points shall be clearly illustrated.

   d. The Working Design Drawing submittal(s) shall be considered an attachment to, or incorporated within, the Work Plan(s).

   e. The Working Drawings and supporting calculations shall be prepared by an engineer licensed in the State of Oregon and shall bear the seal and signature of that engineer.

   f. The Working Design Drawings will be reviewed by the OWNER's Representative and regulatory agencies as applicable.

   g. Coordinate all items of the Working Design Drawings with the plans of all work occurring within or affecting the Work Area including, but not limited to; excavation shoring, construction access, permanent structure formwork, sequencing, schedule, permit conditions and environmental monitoring/sampling plans.

PART 2 – PRODUCTS

2.0 MATERIALS

A. As required to perform the work described in this Section.

PART 3 – EXECUTION

3.0 GENERAL

A. As outlined in this Section, the submittals required for Care and Diversion of Water During Construction shall be submitted for review and approval. Unless otherwise specified, all facilities, equipment, and structures for care and diversion of water during construction shall become the property of the CONTRACTOR and shall be removed upon completion of the work except the permanent features of the project shown in the Contract Documents.

3.1 QUALITY CONTROL

A. Quality control shall be established and maintained for the Care and Diversion of Water During Construction, which shall include, but not be limited to:

1. Any necessary diversions and other structures are constructed in accordance with the approved design.
2. Regular maintenance is instituted and carried out as long as water control and pumping are required.
3. Water passages, structures, and sumps are kept clear of dirt, rocks, wood, trash, or other debris.
4. The work areas are kept free of running or standing water as necessary.
5. Water used in processing, cleanup, or curing is controlled and properly disposed of.
6. The care and diversion of water shall comply with the requirements of Section 01 57 01 – Stormwater Pollution Prevention, Section 01 57 19 – Spill Prevention, Control, and Countermeasures, and all applicable permits.
7. Required removal and cleanup of facilities for care and diversion of water during construction is done in a satisfactory manner.

– End of Section –

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

A. Products:

1. Items obtained for incorporating into the WORK, whether purchased for Project or taken from previously purchased stock. The term “product” includes the terms “material,” “equipment,” “system,” and terms of similar intent.

B. Named Products:

1. Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.

C. New Products:

1. Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.

D. Or Equal Product:

1. Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

E. Basis-of-Design Product Specification:

1. A specification in which a specific manufacturer's product is named including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 QUALITY ASSURANCE

A. Compatibility of Options:

1. If CONTRACTOR is given the option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1. Delivery and Handling:

a. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

2. Storage:

a. Store products to allow for inspection and measurement of quantity or counting of units. Store materials in a manner that will not endanger Project structure.

b. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with

ventilation adequate to prevent condensation. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage. Protect stored products from damage and liquids from freezing.

1.5 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve CONTRACTOR of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty:
    a. Written warranty furnished by individual manufacturer for a particular product.
2. Special Warranties:
    a. Prepare a written document that contains appropriate terms and identification, ready for execution.
3. Manufacturer's Standard Form:
    a. Modified to include Project-specific information and properly executed.
4. Specified Form:
    a. When specified forms are included with the Specifications, prepare a written document using indicated form properly executed. See other Sections for specific content requirements and particular requirements for submitting special warranties.
5. Submittal Time:
    a. Comply with requirements in Section 01 77 00 – Project Closeout.

PART 2 – PRODUCTS

2.0 PRODUCT SELECTION PROCEDURES

A. General Product Requirements:

1. Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

B. Standard Products:

1. If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.

2. The OWNER reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

3. Where products are accompanied by the term "as selected," The OWNER will make selection.

4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

C. Product Selection Procedures:

1. Products:

a. Non-restricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

2. Manufacturers:

a. Non-restricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

3. Basis-of-Design Product:

a. Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings

and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

4. Visual Selection Specification:

   a. Where Specifications include the phrase "as selected by OWNER from manufacturer's full range" or similar phrase, select a product that complies with requirements. The OWNER will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.1 COMPARABLE PRODUCTS

A. Conditions for Consideration:

1. OWNER will consider CONTRACTOR's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, the OWNER may return requests without action, except to record noncompliance with these requirements:

   a. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the WORK.

   b. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.

   c. Evidence that proposed product provides specified warranty.

   d. List of similar installations for completed projects with project names and addresses, if requested.

   e. Samples, if requested.

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 01 60 60

FACILITY STARTUP

PART 1 – GENERAL

1.0 SUMMARY

A. Facility startup of the complete Confederated Tribes of the Umatilla Indian Reservation (CTUIR)/City of Umatilla (City) Joint Pump and Pipeline system from the pump station to the water treatment facility, is prerequisite to satisfactory completion of the contract requirements and shall be completed within the Contract Times.

B. Conduct all test, check out, startup, and related requirements indicated in the Contract Documents and provide documentation of same to the OWNER's Representative prior to requesting Substantial Completion from the OWNER's Representative. Where manufacturer onsite inspections are required before startup, the manufacturer shall furnish a written statement that the installation and check out is complete and proper and that the item(s) are ready for startup.

C. Startup of the facility is a complex operation requiring the combined expertise of the CONTRACTOR, Subcontractors, equipment suppliers, the ENGINEER, the OWNER's Representative, and the OWNER. The CONTRACTOR shall be responsible for coordinating all parties for a successful startup. The water treatment facility (WTF) staff may be available for technical and operational advice prior to and during startup.

D. A prerequisite to start-up is the completion of the pipeline from the limits of the pump station contract to the WTF, including connections at each end to allow water to be delivered to the WTF. The OWNER's Representative will coordinate meetings with the pipeline contractor, WTF staff and the CONTRACTOR to plan and execute the facility startup.

E. General requirements for startup activities are included in this Section. More specific requirements may also be included in other portions of the Contract Documents.

F. Temporary facilities may be necessary. If so, CONTRACTOR shall design, provide, operate, and later decommission them.

G. During startup, raw water shall be wasted either at the pump station using the energy dissipation valve and piping or at the WTF.

1.1 DEFINITIONS

A. Startup is defined as testing, demonstrations, and other activities as required to achieve Substantial Completion. Startup includes pre-commissioning and commissioning activities, manufacturer's services, certifications of readiness for testing, and troubleshooting, checkout, and shakedown activities.

B. Facility startup is the systematic demonstration through testing and extended operation that major equipment and auxiliary systems, including related components, sub-systems, and systems operate properly and consistent with their intended function. Facility startup involves balancing, adjustments, calibration, loop checks, and loop validation. Facility startup shall simulate shutdown conditions, failure conditions, power fail and restart, bypass conditions, and failure resets. Facility startup will not be considered complete until successful results and documentation of tests and manufacturer's certifications required by the Contract Documents are submitted and accepted by the OWNER's Representative.

1.2 SUBMITTALS

A. Schedule: The schedule for facility startup shall be submitted under Section 01 32 16 Construction Schedule.

B. Facility Startup Plan: Not less than 60 Days prior to startup, submit for review a detailed Facility Startup Plan. The CONTRACTOR shall revise the Plan as necessary based on review comments. The Plan shall include:

1. Schedules for manufacturers' on-site, post installation equipment certifications
2. Schedules for submitting final Technical Manuals
3. Schedule for training the OWNER's personnel
4. List of OWNER and CONTRACTOR-furnished supplies
5. Detailed schedule of operations to achieve successful facility startup.
6. Checklists and data forms for each item of equipment
7. Address coordination with the OWNER's staff.
8. Designate a representative of the CONTRACTOR who has the authority to act in matters relating to startup and has experience in testing pump stations and pipelines. The Plan shall also designate the roles and responsibilities of any Subcontractors that may be involved in startup activities.

9. Safety, startup, and testing procedures and proposed inspection and certification forms and records.

10. Cleaning and testing of water-holding structures, pipelines and other equipment. Schedule and plan shall indicate source of water, testing and cleaning sequence, and the disposal of the water following testing and cleaning.

C. Records and Documentation

1. Where required by the specifications, submit equipment installation certifications under those sections.

2. Records of facility startup as indicated below.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.0 MALFUNCTIONS

A. During the facility startup, all components, subsystems, systems, and equipment must properly run continuously 24 hours per day at rates indicated by the OWNER's Representative throughout the test period. Unless indicated otherwise, if any item fails or malfunctions during the test, the item shall be repaired, and the test restarted at time zero with no credit given for the operating time before the failure or malfunction. Malfunctions satisfying all 3 of the following conditions will allow the demonstration period to resume at the elapsed time when the malfunction started:

1. Malfunction did not cause any interruption of the continuous operation of any other components, subsystems, systems, and equipment.

2. Malfunction was corrected without causing or requiring any components, subsystems, systems, and equipment to cease operations.

3. Malfunction was corrected within one hour of the time the malfunction was detected (the one-hour period includes the time required to locate the cause of the malfunction, beginning upon CONTRACTOR's notification from the OWNER's Representative that a malfunction has occurred and ending when the item is corrected, and the system is successfully placed back into operation).

B. The CONTRACTOR shall arrange for manufacturer's representatives to visit the Site as often as necessary to correct malfunctions.

3.1 PREREQUISITES

A. Facility startup activities shall be scheduled according to Section 01 32 16 – Construction Schedule. The 7 Day demonstrations shall start prior to midday on a Monday, Tuesday, or Wednesday. Testing periods shall not include holidays, based on the OWNER's calendar.

B. The following shall be completed before facility startup begins:

1. All Technical Manual information required by the Contract Documents has been submitted.
2. Safety equipment, emergency shower and eyewash units, fire extinguishers, gas detectors, protective guards and shields, emergency repair kits, safety chains, handrails, gratings, safety signs, and valve and piping identification required by the Contract Documents are provided. Devices and equipment shall be fully functional, adjusted, and tested.
3. Manufacturer's certifications of proper installation have been accepted.
4. Leakage tests, electrical tests, and adjustments have been completed.
5. The OWNER’s Representative has approved the Facility Startup Plan.
6. Individual instrumentation loops (analog, status, alarm, and control) have been verified functionally.
7. Water quality monitoring instruments, flow switches, timing relays, level switches, vibration switches, temperature switches, RTD monitors, pressure regulating valves, and other control devices to the settings determined by the OWNER’s Representative or the equipment manufacturer have been adjusted for accuracy.
8. Individual interlocks between the field-mounted control devices and the motor control circuits, control circuits of variable-speed controllers, and packaged system controls have been verified.

3.2 GENERAL

A. Startup Records: The CONTRACTOR shall maintain the following during testing and startup and submit originals to OWNER’s Representative:

1. Lubrication and service records for each mechanical and electrical equipment item
2. Hours of daily operation for each mechanical and electrical equipment item

3. Logs of electrical measurements and tests
4. Instrumentation calibration and testing logs
5. Testing and validation of SCADA inputs, outputs, logic functions, status indications, and alarms
6. Factory and field equipment settings
7. Log of problems encountered, and remedial action taken
8. Other records, logs, and checklists as required by the Contract Documents

3.3 FACILITY STARTUP

A. The following systems shall be tested during the startup:

1. HVAC System
2. Drum Screens
3. Pumps

B. After individual equipment items and subsystems have been tested and certified as required by the Technical Specifications, startup of the complete pump station and pipeline project to deliver water from the Columbia River to the raw water storage tank at the WTF shall be conducted. Individual items of equipment shall be tested as part of the complete system to the maximum extent possible.

C. Due to the limited raw water storage volume at the WTF it may be necessary to periodically drain the raw water tank at the WTF prior to resuming startup activities. The CONTRACTOR shall coordinate draining the raw water tank with the WTF's OWNER and operator.

D. Subject to the malfunction criteria above, each system shall be demonstrated for a continuous, 7 Day, 24 hour/day period. If any system malfunctions, the item or equipment shall be repaired, and the test restarted at time zero with no credit given for the elapsed time before the malfunction.

E. The CONTRACTOR shall demonstrate the manual and automatic modes of operation to verify proper control sequences, software interlocks, proper operation of software logic and controllers, etc. System testing shall include the use of water or other process media, as applicable, to simulate the actual conditions of operation.

F. Systems testing activities shall follow the detailed procedures and checklists in the Facility Startup Plan. Completion of systems shall be documented by a report.

G. Furnish the OWNER’s Representative and OWNER at least 10 Days written notice confirming the start of facility startup. The OWNER's staff may observe the startup.

– End of Section –

SECTION 01 64 00

OWNER-FURNISHED EQUIPMENT

PART 1 – GENERAL

1.0 SUMMARY

A. This section generally describes the logistical aspects of equipment and materials that will be furnished by OWNER.

1.1 RELATED SECTIONS

Section 26 32 01 – Engine-Generator Set for Standby Power
Section 26 36 00 – Automatic Transfer Switch

1.2 OWNER FURNISHED EQUIPMENT AND MATERIALS

A. The CONTRACTOR shall include in his Contract price all costs in connection with handling, storing, protecting, and installing materials, supplies, or equipment furnished by the OWNER and shall make good all losses and breakage due to carelessness or negligence while same are in his possession. The obligations of the CONTRACTOR under this section shall not extend to defective materials or equipment supplied by the OWNER, and the OWNER will reimburse the CONTRACTOR for CONTRACTOR's cost, for work in relation to defective material supplied by the OWNER.

B. Equipment and material furnished by OWNER will be:

1. Automatic Transfer Switch
2. Standby Generator

C. A copy of the approved shop drawings and installation requirements for the Owner-furnished equipment are included in Attachment 1.

D. A copy of the specifications, purchase order and manufacturer's information for Owner-furnished equipment are included in Attachment 1.

1.3 DELIVERY OF EQUIPMENT

A. All Owner-furnished equipment is stored at the City's Wastewater Treatment Plant, 1205 3rd St. Umatilla OR, 97882 and shall be picked up by the CONTRACTOR and transported to the Project Site for installation by the CONTRACTOR.

B. The CONTRACTOR shall provide all necessary equipment, vehicles, and labor to load, transport, and unload equipment from the Wastewater Treatment Plant to the Project Site.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. CONTRACTOR shall review specifications, manufacturer's information, approved shop drawings and installation requirements for the Owner-furnished equipment.

B. CONTRACTOR shall carefully examine each shipment of Owner-furnished equipment or material upon pickup from the Wastewater Treatment Plant. Defective items shall be brought to the attention of the OWNER's Representative. Upon inspection and acceptance by the CONTRACTOR, the CONTRACTOR shall assume custody, and provide insurance for and be responsible for, the Owner-furnished equipment and materials. The Owner-furnished equipment and materials shall be properly handled to prevent damage. The OWNER will not accept title to the equipment until the project is substantially complete.

C. Damaged or misplaced Owner-furnished items shall be replaced by the CONTRACTOR at no cost to the OWNER. Replacements shall conform to the original equipment specifications.

D. CONTRACTOR to install all equipment and materials per Owner-furnished installation requirements.

1.5 OWNER-FURNISHED TECHNICAL ASSISTANCE

A. Field service representatives from suppliers for Owner-furnished equipment will be provided in accordance with the purchase orders, specifications, and agreements with the Owner-furnished equipment suppliers. CONTRACTOR will be responsible for coordinating with supplier's representative for providing necessary services.

B. The Owner-furnished equipment suppliers will provide technical services at no cost to the CONTRACTOR, as detailed in the agreements between OWNER and the suppliers.

C. If the CONTRACTOR requires additional time from supplier representatives for installation supervision or assistance, installation review, instrumentation calibration, or other field services beyond what is detailed in the agreements between the OWNER and the suppliers, the CONTRACTOR shall include these costs in their bid. No additional charges by suppliers will be paid by OWNER for supplier's services.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

ATTACHMENT 1

APPROVED SHOP DRAWINGS, INSTALLATION REQUIREMENTS SPECIFICATIONS, PURCHASE ORDER, AND MANUFACTURER'S INFORMATION

SUBMITTAL REVIEW COMMENTS

DATE:	03/25/2025	**PROJECT:**	CTUIR/COU Joint Pump and Pipeline Project, Electrical Equipment Procurement
SUBMITTAL NO.:	001 Rev 2	**PROJECT NO.:**	30-24-077
SPEC SECTION:	26 32 01 - Engine-Generator Set for Standby Power 26 36 00 - Automatic Transfer Switch	**REVIEWER'S NAME:**	Matthew T. Davis, P.E. Sr. Electrical Engineering Advisor Kleinschmidt Associates, Inc.
DESCRIPTION:	1. 1,250kW Diesel Engine-Generator 2. 2,000A Automatic Transfer Switch	**PAGES:**	111

SUBMITTAL TYPE: ☒ **SHOP DRAWING** ☐ **SAMPLE** ☒ **INFORMATION**

✓	1. REVIEWED		4. FURNISH AS CORRECTED
	2. REJECTED		5. REVISE AND RESUBMIT
	3. SUBMIT SPECIFIC ITEM		

NO.	COMMENT	RELATED SPEC PARA. DRAWING #
1	GENERAL SUBMITTAL (overall): Thank you for the revisions and submittal document conformance and consistency.	
2		

This review 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 shop drawings during this review do not relieve contractor from compliance with the requirements of the plans and specifications. Approval of a specific item shall not include approval of an assembly of which the item is a component. Contractor is responsible for: dimensions to be confirmed and correlated at the jobsite; information that pertains solely to the fabrication processes or to the means, methods, techniques, sequences and the 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.

J-U-B ENGINEERS, INC.

Date: 04/03/2025	By: Cliff Woods, P.M.P.

Submittal Review Responce

1. pdated Breaker information on Page 14 to reflect LSIG.
2. Selected the correct 244-9869 LSIG Breaker on page 41.
3. Page 3 updated to Reflect AGM batterys to match spec sheet on pages 29-31.
4. The block heater and strip heater are the only options available in 208V. The battery charger and battery heating pads are only available in 120V.
5. Highlighted ATS details on pages 105 - 107 per request.

Be sure to check final documents for font issues, like these - it does occasionally occur.

Electric Power Submittal







Project: CTUIR/COU

Equipment: Cat 1250 KW Generator & 2000 amp Asco ATS

Prepared By:

Mark Mandrak| Power Systems Specialist
Western States Equipment Company
Mark.Mandrak@wseco.com

Cell: 208-407-6994

Proposal

Project: CTUIR/COU project **Date: 12/16/2024** **Quote: CSQ #31440101**

Attn: City of Umatilla **Valid: 30 days** **From: Andrew Erickson**

Generator Set:

Manufacturer: Caterpillar **Model:** C32 **KW:** 1250 **Rating:** Standby **Fuel:** Diesel **Voltage:** 277/480 3 ph 4 wire **Frequency:** 60 hz **UL2200 Listed:** Yes **IBC Certified:** Yes **Misc Items:**

Controls:

Control Panel: GCCP 1.2 **Monitoring Contacts:** Run & Trouble 1 set each **Speed Control:** Electronic Isochronous **Remote Alarm Panel:** None **Alarm Panel Mounting:** Not Applicable **Remote Emergency Stop:** external on enclosure **Remote Communications:** Modbus RS-485 **Misc Items:**

Accessory Systems:

Coolant Heater: Yes 208/240 vac **Battery Heater:** None **Alternator Heater:** None **Battery Charger:** 10 amp NFPA110 **Battery System:** AGM, Rack and Cables 24 vdc **Misc Items:**

Added 120 vac

Added 208 vac

Alternator / Breaker:

Excitation System: PMG Brushless **Voltage Regulator:** D350 **Ground Fault:** GFI Alarm or shutdown **Circuit Breaker # 1:** 2000 amp LSIG – 100% rated **Circuit Breaker # 2:** n/a **Circuit Breaker # 3:** n/a **Misc Items:**

Packaging:

Enclosure: Sound Attenuated **Sound Level:** 75 dba @ 23 ft **Fuel Tank:** 24 hour - 2100 gallons **Fuel Tank Type:** Double Wall UL142 **Exhaust System:** Interior Mounted **Enclosure Color:** White **Electrical Package:** 100 Amp Load Center & GFI receptacle **Misc Items:** 7.5 gallon fuel spill containment

Automatic Transfer Switch:

ATS Number: ATS-1 **Manufacturer:** Asco **Model:** 3ATS **Amperage:** 2000 **Poles:** 3 pole w/solid neutral **Enclosure:** Nema 3R w/heater **Voltage:** 277/480 3 ph 4w **Type:** Service Entrance Rated w/100% rated breaker – delayed transition **SUSE Rated:** Yes **Control Panel:** 300G **Exerciser:** 7 day programmable **KAIC Rating:** ATS Standard **KAIC Cycle:** 3 **Quantity:** 1 **Misc Items:** seismically rated, energy reducing maintenance switch (ERMS), and surge suppressor on load and emergency

Proposal

Included:

Startup: 8 hrs. - 1 trip - 1 day
Maintenance Program: Available
Spare parts kit: No
Warranty Genset: 60 month
Warranty ATS: 24 months

Freight: Included to first destination
Site Load test: 100% available building load
Factory Test: 100% load at 0.8 pF
Owner training: Yes 1 hr. at time of startup

Not included:

Installation / Anchor Calculations:
Taxes / Permits of any kind / Any engineering

Any fuel or fuel piping
Offloading at jobsite:

Notes and clarifications:

Per EPP-1, generator stairways and access/maintenance platforms by others.

Terms:

100% of payment is required prior to startup and testing on the jobsite.
Additional trips to jobsite due to installation items beyond our control will be additional. A pre-startup check off list is required to be sent to WSECO project manager prior to startup date.
Payment terms are in accordance with WSECO Standard terms upon approved account
No retainer is allowed unless specifically agreed to in writing prior to order placement.
Cancellation charges minimum of 25% once released. No return on manual transfer switches
For complete terms and conditions please visit: https://www.westernstatescat.com/wp-content/uploads/2022/07/Sales-Agreement-Terms-and-Conditions-Equipment.pdf

Thank you for the opportunity to quote quality Caterpillar products and services. Please let me know how we can be of assistance.

Sincerely,

Andrew Erickson
Power System Sales
Meridian:
Office: 208-947-4596
Cell: 208-870-1665
andrew.erickson@wseco.com

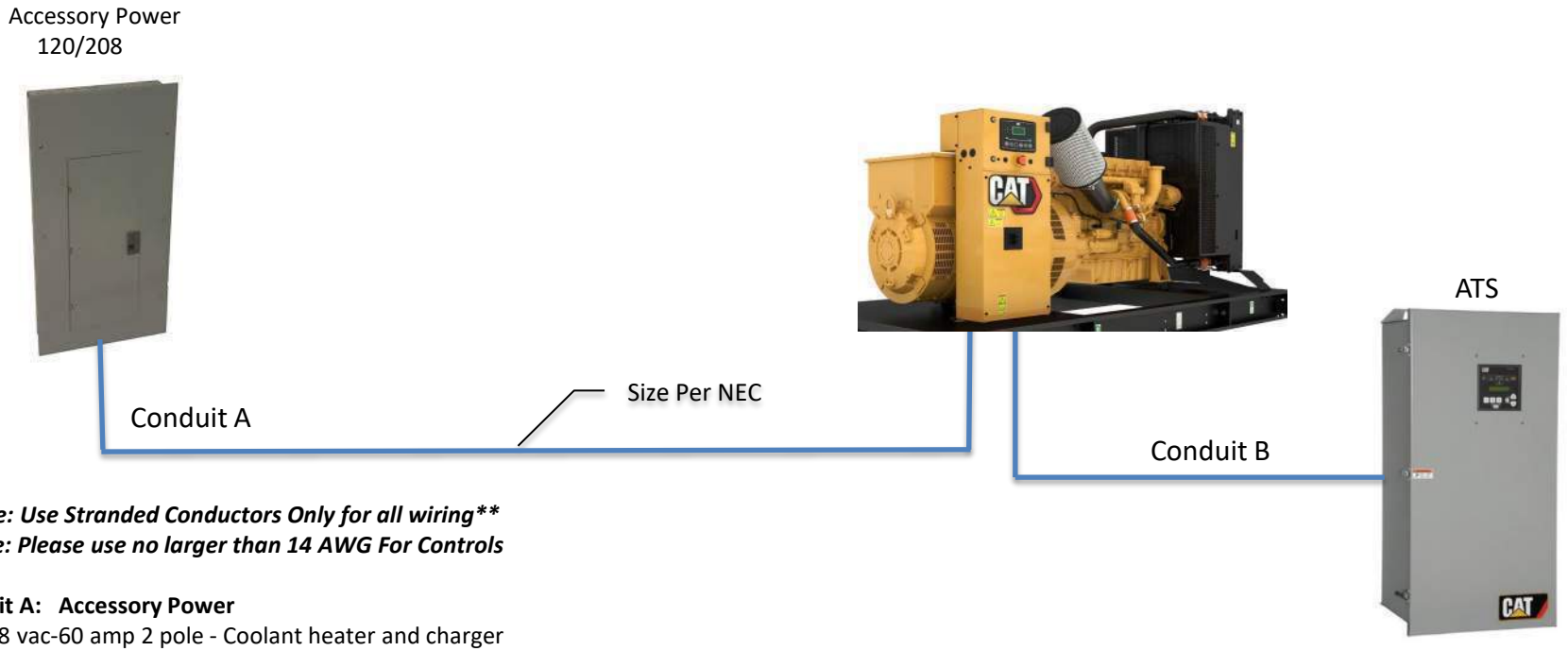
Accepted By:

_____
Signature:

_____
Printed Name:

_____
Company:

CTUIR/COU



***Note: Use Stranded Conductors Only for all wiring**
Note: Please use no larger than 14 AWG For Controls

Conduit A: Accessory Power
(1)- 208 vac-60 amp 2 pole - Coolant heater and charger

Conduit B: Generator Control
Six # 14 awg stranded
(1) pair for start circuit
(1) pair for ats on line
(1) pair for spare

Effective with sales to the first user on or after August 1, 2018

CATERPILLAR LIMITED WARRANTY

Industrial, Petroleum, Locomotive, and Agriculture Engine Products and Electric Power Generation Products

Worldwide

Caterpillar Inc. or any of its subsidiaries ("Caterpillar") warrants new and remanufactured engines and new and rebuild electric power generation products sold by it (including any products of other manufacturers packaged and sold by Caterpillar), to be free from defects in material and workmanship.

This warranty does not apply engines sold for use in on-highway vehicle or marine applications; engines in machines manufactured by or for Caterpillar; C175, 3500 and 3600 series engines used in locomotive applications; 3000 Family engines, C0.5 through C4.4 and ACERT™ (C6.6, C7, C7.1, C9, C9.3, C11, C13, C15, C18, C27, and C32) engines used in industrial, mobile agriculture and locomotive applications; or Cat® batteries; or Electric Power Generation Products manufactured or assembled in India. These products are covered by other Caterpillar warranties.

This warranty is subject to the following:

Warranty Period

- For industrial engines, engines in a petroleum applications or Petroleum Power Systems (excluding petroleum fire pump application), or engines in a Locomotive application, or Uninterruptible Power Supply (UPS) systems, the warranty period is 12 months after date of delivery to the first user.
- For engines used in petroleum fire pump and mobile agriculture applications the warranty period is 24 months after date of delivery to the first user.
- For controls only (EPIC), configurable and custom switchgear products, and automatic transfer switch products, the warranty period is 24 months after date of delivery to the first user.
- For new CG132, CG170 and CG260 series power generation products the warranty period is 24 months after date of delivery to first user, but not to exceed 36 months from shipment from the Caterpillar place of manufacture.
- For electric power generation products other than CG132, CG170 and CG260 series in prime or continuous applications the warranty period is 12 months. For standby applications the warranty period is 24 months/1000 hours. For emergency standby applications the warranty period is 24 months/400 hours. All terms begin after date of delivery to the first user.
- For Caterpillar rebuild electric power generation products the warranty period is 12 months, but not to exceed 24 months from shipment of rebuilt electric power generation product from Caterpillar.
- For all other applications the warranty period is 12 months after date of delivery to the first user.

Caterpillar Responsibilities

If a defect in material or workmanship is found during the warranty period, Caterpillar will, during normal working hours and at a place of business of a Cat dealer or other source approved by Caterpillar:

- Provide (at Caterpillar's choice) new, Remanufactured, or Caterpillar approved repaired parts or assembled components needed to correct the defect.

Note: New, remanufactured, or Caterpillar approved repaired parts or assembled components provided under the terms of this warranty are warranted for the remainder of the warranty period applicable to the product in which installed as if such parts were original components of that product. Items replaced under this warranty become the property of Caterpillar.

- Replace lubricating oil, filters, coolant, and other service items made unusable by the defect.
- Provide reasonable and customary labor needed to correct the defect, including labor to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems, if required.

For new 3114, 3116, and 3126 engines and, new and Caterpillar rebuild electric power generation products (which includes the following: any new products of other manufacturers packaged and sold by Caterpillar)

- Provide travel labor, up to four hours round trip, if in the opinion of Caterpillar, the product cannot reasonably be transported to a place of business of a Cat dealer or other source approved by Caterpillar (travel labor in excess of four hours round trip, and any meals, mileage, lodging, etc. is the user's responsibility).

For all other products:

- Provide reasonable travel expenses for authorized mechanics, including meals, mileage, and lodging, when Caterpillar chooses to make the repair on-site.

User Responsibilities

The user is responsible for:

- Providing proof of the delivery date to the first user.
- Labor costs, except as stated under "Caterpillar Responsibilities," including costs beyond those required to disconnect the product from and reconnect the product to its attached equipment, mounting, and support systems.
- Travel or transporting costs, except as stated under "Caterpillar Responsibilities."
- Premium or overtime labor costs.
- Parts shipping charges in excess of those that are usual and customary.
- Local taxes, if applicable.
- Costs to investigate complaints, unless the problem is caused by a defect in Caterpillar material or workmanship.
- Giving timely notice of a warrantable failure and promptly making the product available for repair.
- Performance of the required maintenance (including use of proper fuel, oil, lubricants, and coolant) and items replaced due to normal wear and tear.
- Allowing Caterpillar access to all electronically stored data.

Limitations

Caterpillar is not responsible for:

- Failures resulting from any use or installation that Caterpillar judges improper.
- Failures resulting from attachments, accessory items, and parts not sold or approved by Caterpillar.
- Failures resulting from abuse, neglect, and/or improper repair.
- Failures resulting from user's delay in making the product available after being notified of a potential product problem.
- Failures resulting from unauthorized repairs or adjustments, and unauthorized fuel setting changes.
- Damage to parts, fixtures, housings, attachments, and accessory items that are not part of the engine, Cat Selective Catalytic Reduction System or electric power generation product (including any products of other manufacturers packaged and sold by Caterpillar).
- Repair of components sold by Caterpillar that is warranted directly to the user by their respective manufacturer. Depending on type of application, certain exclusions may apply. Consult your Cat dealer for more information.

(Continued on reverse side…)

This warranty covers every major component of the products. Claims under this warranty should be submitted to a place of business of a Cat dealer or other source approved by Caterpillar. For further information concerning either the location to submit claims or Caterpillar as the issuer of this warranty, write Caterpillar Inc., 100 N. E. Adams St., Peoria, IL USA 61629.

Caterpillar's obligations under this Limited Warranty are subject to, and shall not apply in contravention of, the laws, rules, regulations, directives, ordinances, orders, or statutes of the United States, or of any other applicable jurisdiction, without recourse or liability with respect to Caterpillar.

A) For products operating outside of Australia, Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the Solomon Islands and Tahiti, the following is applicable:

NEITHER THE FOREGOING EXPRESS WARRANTY NOR ANY OTHER WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED, IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS THAT IS WARRANTED DIRECTLY TO THE USER BY ITS MANUFACTURER.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, EXCEPT CATERPILLAR EMISSION-RELATED COMPONENTS WARRANTIES FOR NEW ENGINES, WHERE APPLICABLE. REMEDIES UNDER THIS WARRANTY ARE LIMITED TO THE PROVISION OF MATERIAL AND SERVICES, AS SPECIFIED HEREIN.

CATERPILLAR IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES.

CATERPILLAR EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN RESPECT OF THE MANUFACTURE OR SUPPLY OF GOODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

IF OTHERWISE APPLICABLE, THE VIENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS EXCLUDED IN ITS ENTIRETY.

For personal or family use engines or electric power generation products, operating in the USA, its territories and possessions, some states do not allow limitations on how long an implied warranty may last nor allow the exclusion or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which vary by jurisdiction. To find the location of the nearest Cat dealer or other authorized repair facility, call (309) 675-1000. If you have questions concerning this warranty or its applications, call or write:

In USA and Canada: Caterpillar Inc, 100 N.E. Adams St., Peoria, IL USA 61629, Attention: Customer Service Manager, Telephone 1 (309) 675-1000, outside the USA and Canada: Contact your Cat dealer.

B) For products operating in Australia, Fiji, Nauru, New Caledonia, New Zealand, Papua New Guinea, the Solomon Islands and Tahiti, the following is applicable:

THIS WARRANTY IS IN ADDITION TO WARRANTIES AND CONDITIONS IMPLIED BY STATUTE AND OTHER STATUTORY RIGHTS AND OBLIGATIONS THAT BY ANY APPLICABLE LAW CANNOT BE EXCLUDED, RESTRICTED OR MODIFIED ("MANDATORY RIGHTS"). ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED (BY STATUTE OR OTHERWISE), ARE EXCLUDED. WITHOUT LIMITING THE FOREGOING PROVISIONS OF THIS PARAGRAPH, WHERE A PRODUCT IS SUPPLIED FOR BUSINESS PURPOSES, THE CONSUMER GUARANTEES UNDER THE CONSUMER GUARANTEES ACT 1993 (NZ) WILL NOT APPLY.

NEITHER THIS WARRANTY NOR ANY OTHER CONDITION OR WARRANTY BY CATERPILLAR, EXPRESS OR IMPLIED (SUBJECT ONLY TO THE MANDATORY RIGHTS), IS APPLICABLE TO ANY ITEM CATERPILLAR SELLS THAT IS WARRANTED DIRECTLY TO THE USER BY ITS MANUFACTURER.

IF THE MANDATORY RIGHTS MAKE CATERPILLAR LIABLE IN CONNECTION WITH SERVICES OR GOODS, THEN TO THE EXTENT PERMITTED UNDER THE MANDATORY RIGHTS, THAT LIABILITY SHALL BE LIMITED AT CATERPILLAR'S OPTION TO (a) IN THE CASE OF SERVICES, THE SUPPLY OF THE SERVICES AGAIN OR THE PAYMENT OF THE COST OF HAVING THE SERVICES SUPPLIED AGAIN AND (b) IN THE CASE OF GOODS, THE REPAIR OR REPLACEMENT OF THE GOODS, THE SUPPLY OF EQUIVALENT GOODS, THE PAYMENT OF THE COST OF SUCH REPAIR OR REPLACEMENT OR THE ACQUISITION OF EQUIVALENT GOODS.

CATERPILLAR EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN RESPECT OF THE MANUFACTURE OR SUPPLY OF GOODS OR THE PROVISION OF SERVICES RELATING TO THE GOODS.

CATERPILLAR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNLESS IMPOSED UNDER MANDATORY RIGHTS.

IF OTHERWISE APPLICABLE, THE VIENNA CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS IS EXCLUDED IN ITS ENTIRETY.

C) For products supplied in Australia:

IF THE PRODUCTS TO WHICH THIS WARRANTY APPLIES ARE:

- **I. PRODUCTS OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION; OR**
- **II. PRODUCTS THAT COST AUD 40,000 OR LESS,**

WHERE THOSE PRODUCTS WERE NOT ACQUIRED FOR THE PURPOSE OF RE-SUPPLY OR FOR THE PURPOSE OF USING THEM UP OR TRANSFORMING THEM IN THE COURSE OF PRODUCTION OR MANUFACTURE OR IN THE COURSE OF REPAIRING OTHER GOODS OR FIXTURES, THEN THIS SECTION C APPLIES.

THE FOLLOWING MANDATORY TEXT IS INCLUDED PURSUANT TO THE AUSTRALIAN CONSUMER LAW AND INCLUDES REFERENCES TO RIGHTS THE USER MAY HAVE AGAINST THE DIRECT SUPPLIER OF THE PRODUCTS: OUR GOODS COME WITH GUARANTEES THAT CANNOT BE EXCLUDED UNDER THE AUSTRALIAN CONSUMER LAW. YOU ARE ENTITLED TO A REPLACEMENT OR REFUND FOR A MAJOR FAILURE AND COMPENSATION FOR ANY OTHER REASONABLY FORESEEABLE LOSS OR DAMAGE. YOU ARE ALSO ENTITLED TO HAVE THE GOODS REPAIRED OR REPLACED IF THE GOODS FAIL TO BE OF ACCEPTABLE QUALITY AND THE FAILURE DOES NOT AMOUNT TO A MAJOR FAILURE. THE INCLUSION OF THIS TEXT DOES NOT CONSTITUTE ANY REPRESENTATION OR ACCEPTANCE BY CATERPILLAR OF LIABILITY TO THE USER OR ANY OTHER PERSON IN ADDITION TO THAT WHICH CATERPILLAR MAY HAVE UNDER THE AUSTRALIAN CONSUMER LAW.

TO THE EXTENT THE PRODUCTS FALL WITHIN THIS SECTION C BUT ARE NOT OF A KIND ORDINARILY ACQUIRED FOR PERSONAL, DOMESTIC OR HOUSEHOLD USE OR CONSUMPTION, CATERPILLAR LIMITS ITS LIABILITY TO THE EXTENT IT IS PERMITTED TO DO SO UNDER THE AUSTRALIAN CONSUMER LAW TO, AT ITS OPTION, THE REPAIR OR REPLACEMENT OF THE PRODUCTS, THE SUPPLY OF EQUIVALENT PRODUCTS, OR THE PAYMENT OF THE COST OF SUCH REPAIR OR REPLACEMENT OR THE ACQUISITION OF EQUIVALENT PRODUCTS.

THE WARRANTY SET OUT IN THIS DOCUMENT IS GIVEN BY CATERPILLAR INC. OR ANY OF ITS SUBSIDIARIES, 100 N. E. ADAMS ST, PEORIA, IL USA 61629, TELEPHONE 1 309 675 1000, THE USER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH MAKING A CLAIM UNDER THE WARRANTY SET OUT IN THIS DOCUMENT, EXCEPT AS EXPRESSLY STATED OTHERWISE IN THIS DOCUMENT, AND THE USER IS REFERRED TO THE BALANCE OF THE DOCUMENT TERMS CONCERNING CLAIM PROCEDURES, CATERPILLAR RESPONSIBILITIES AND USER RESPONSIBILITIES.

TO THE EXTENT PERMISSIBLE BY LAW, THE TERMS SET OUT IN THE REMAINDER OF THIS WARRANTY DOCUMENT (INCLUDING SECTION B) CONTINUE TO APPLY TO PRODUCTS TO WHICH THIS SECTION C APPLIES.

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CAT® PROTECTS YOUR INVESTMENT AT NO ADDITIONAL COST

5 YEAR GOLD EXTENDED SERVICE COVERAGE (ESC) **NOW INCLUDED** WITH YOUR CAT GC STANDBY GENERATOR SET PURCHASE*

*Applicable to diesel D40 GC - D1250 GC gensets only

Your operation depends on reliable power. That's why you trust Cat® generator sets. With Gold level ESC, you receive just the right coverage. ESC protects your investment and your peace of mind.

Gold level ESC is a reliable coverage from Caterpillar. It covers key engine components, major castings, turbochargers, fuel injectors and water pumps. It also offers Additional Allowances. Some exclusions apply.

COOLING SYSTEM	GOLD
Thermostat Housing	✓
Water Manifold Housing	✓
Jacket Water Precooler	✓
Jacket Water Pump	✓
FUEL SYSTEM	
Steel Fuel Lines	✓
Fuel Shutoff Solenoid	✓
Fuel Injectors	✓
LUBRICATION SYSTEM	
Pan, Pump Cooler	✓
ELECTRIC SYSTEM	
Control Module (ECM)	✓
Sensors: All Engine Sensors	✓
ALTERNATOR END	
Alternator, including Rotor Stator and Exciter	✓
Generator Controls	✓
Power Center	✓

AIR INDUCTION AND EXHAUST	GOLD
Exhaust Manifolds, Studs & Gaskets	✓
Inlet Air Heater Relay	✓
Intake Manifold	✓
Turbocharger(s)	✓
SHORT BLOCK	
Cylinder Block Casting	✓
Crankshaft	✓
Connecting Rod Assembly	✓
Piston, Wrist Pin, Retainer Clip & Piston Rings	✓
CYLINDER HEAD	
Cylinder Head	✓
Intake & Exhaust Valves	✓
Valve Mechanism	✓
Camshaft, Camshaft Bearings, Key, Gear	✓
FRONT & REAR COVERS	
Front Cover / Plate / Housing / Gears & Gaskets	✓
Vibration Damper	✓
Flywheel Housing & Gasket	✓

AFTERTREATMENT (FACTORY INSTALLED)	
Diesel Particulate Filter	✓
Selective Catalytic Reduction	✓

GOLD ESC ADDITIONAL ALLOWANCES

TRAVEL / MILEAGE LIMITATIONS	
Up to 7.5 liters	4 hr/200 mi
Over 7.5 liters up to 32 liters	8 hr/320 mi
EMERGENCY FREIGHT	
$500 USD	✓

Based on Engine Displacement in Liters.

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UPGRADING YOUR ESC

You may choose to upgrade to Platinum or Platinum Plus coverage level or extend to a maximum 120 month term. Work with your local Cat dealer to price and register the ESC extension and get the protection and peace of mind you deserve.

Platinum and Platinum Plus levels cover the as-shipped consist of the generator set from the factory and include the following Additional Allowances.

	TRAVEL / MILEAGE LIMITATIONS		RENTAL		CRANE & RIGGING	OVERTIME
Engine Displacement	Platinum	Platinum Plus	Platinum	Platinum Plus	Platinum Plus	Platinum Plus
Up to 7.5 liters	4 hr / 200 mi	10 hr / 500 mi	$5,000 USD	$10,000 USD	$1,000 USD	$3,000 USD
Over 7.5 liters up to 32 liters	8 hr / 320 mi	10 hr / 500 mi	$10,000 USD	$20,000 USD	$5,000 USD	$3,000 USD

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CATERPILLAR®

CAT® PROTECTS YOUR INVESTMENT AT NO ADDITIONAL COST

5 YEAR GOLD EXTENDED SERVICE COVERAGE (ESC) **NOW INCLUDED** WITH YOUR CAT GC STANDBY GENERATOR SET PURCHASE

Dates & Program Eligibility

What are the effective dates of the program?
The program is effective for new generator sets ordered in USA or Canada on or after April 5th, 2021 and will continue until further notice, subject to regular review.

What models are eligible for the program?
The following generator set models ordered with a Standby rating are eligible.

Cat Models: C4.4, C7.1, C9, C13, C15, C18, C18 Tier 4 Final, C27, C32 and Gas C18.
Cat GC Models: D40 GC, D50 GC, D60 GC, D80 GC, D100 GC, D125 GC, D150 GC, D175 GC, D200 GC, D250 GC, D300 GC, D350 GC, D400 GC, D450 GC, D500 GC, D550 GC, D600 GC, D800 GC, D1000 GC, D1250 GC.

Does the program include the C18 Tier 4F model?
Yes. In addition to Platinum ESC coverage, the program also covers after-treatment components (DPF-Diesel Particulate Filter & SCR-Selective Catalytic Reduction) for the C18 Tier 4 model with a Standby rating.

What models are NOT included in the program?
Gas generator sets (with exception of Gas C18), generator sets larger than C32, generator sets ordered with a Prime rating and XQ (rental) generator sets are all excluded from the program.

What level of ESC coverage will be applied?
Cat models receive 60 months/2,500 hours Platinum level ESC. Cat GC models receive 60 months/2,500 hours Gold level ESC.

How do I ensure I receive this coverage?
Coverage must be registered appropriately to the generator set End-User / Owner to enable timely and accurate processing in the event of a claim. If you would like to submit or update your information, please email us at CatESC@cat.com with the following: [Generator set Serial Number, Company Name, Contact Name, Address, Email, Phone].

Where can I learn more about ESC?
Please visit our website cat.com/EP-ESC-NA to learn more.

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ATTACHMENTS

ULCERT
UL 2200 LISTING

INCLUDES THE FOLLOWING:

ALTERNATOR
Alternator insulation system is UL Recognized (UL 1446). PMG and AREP alternators are available. Automatic voltage regulators are UL Recognized.

WIRE HARNESS
AC, DC, and power harnesses are made with UL Listed wire and UL Listed terminals.

CONTROL PANEL
Control panels are comprised of UL Listed and UL Recognized components. EMCP is UL Recognized.

CIRCUIT BREAKER
Output circuit breaker is 100% rated and UL Listed.

TESTING
All UL Listed sets are designed and rigorously tested in accordance with UL Standard for Safety, UL 2200.

LABELING
Labeling meets UL requirements.

MECHANICAL OPTIONS
Mechanical options do not require UL Listing and, therefore, are not affected. The exceptions to this are:

FUEL TANKS
If a fuel tank is ordered with the unit, it must be UL Listed. Two versions are available: 24 hour integral (FCUL2) and 24/48 hour sub-base (FSBT)

ENCLOSURES
Factory installed enclosures meet UL requirements. Weatherproof and sound attenuated versions are available.

ELECTRICAL OPTIONS
The table below shows electrical options that meet UL requirements:

EOS	Lube Oil Sump Heater
WCA1	Low Coolant Level Shutdown
WSS1	Low Coolant Temperature Alarm
AH1H	Anti-Condensation Heater
WHH	Coolant Heater
GOVES	Electronic Governor (Fully Adjustable)
FSS1	Critical Low Fuel Level Shutdown
FSS2	Low Fuel Level Alarm
FSSS	Critical High Fuel Alarm
PBCSUL	UL Listed Battery Charger
PBC10NU	NFPA Battery Charger, UL Listed

UL Listing is available on all diesel fuelled generator sets up to 17S kW at 60 Hz, 600 vac maximum.

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SPECIAL SEISMIC CERTIFICATION COMPLIANCE REPORT SUMMARY

2000877-CRS-001-R0

Manufacturer:	Caterpillar Inc.
Model Line:	C27/C32/3512/3516/C175 Generator Set
Product Type:	Generator Set
Issue Date:	October 9, 2020
Expiration Date:	December 31, 2025

Equipment Manufacturer:

Company:	Caterpillar Inc.
Address:	560 Rehoboth Rd. Griffin, GA 30224
Telephone:	(770) 233-5720
Website:	www.cat.com

Seismic Certification Parameters:

Building Code:	***IBC 2018***		
Certification Basis:	***Shake table testing with supplemental analysis***		
Test Criteria:	***ICC-ES AC156 (2018)***		
Seismic Level(s):	S_{DS} =	***Varies***	for z/h = 1.0 (rooftop installation)
	S_{DS} =	***Varies***	for z/h = 0.0 (ground level installation)
Importance Factor:	I_P =	***1.5***	Structural integrity and functional compliance verified following testing.
Mounting:	***Base mounted - isolated***		

Compliance Report Notes:

- Specific products included in this special seismic certification are outlined in 2000877-CR-001, issued by TRU Compliance, a division of Structural Integrity Associates, Inc. Detailed information relating to certification levels, construction details, options, and mounting arrangements are included therein.
- This compliance report is limited by, and necessarily dependent on, the construction of the product and the accuracy of the information provided by the Equipment Manufacturer. Therefore, this report is valid only for the components and systems as they were configured and manufactured at the time of testing or evaluation. Any alterations to the product or its components could result in a decrease in seismic performance and thus render the resultant conclusions void.
- Refer to 2000877-CR-001 for all requirements, limitations, and special conditions of approval.
- For more information, please contact the Equipment Manufacturer or the Seismic Certification Agency.
- This ISO 17065 Certification fulfills the requirements of the TRU Compliance Certification Standard for Seismic, Wind, and Physical Security Performance, Revision 4, dated October 2, 2019 plus the standards referenced above.

Seismic Certification Agency:

Company:	TRU Compliance, by Structural Integrity Associates, Inc.
Decision Maker:	Andy Coughlin, SE
License Number:	S6082 (California)
Address:	5215 Hellyer Ave., Suite 210 San Jose, CA 95138
Telephone:	844-TRU-0200
E-mail:	acoughlin@structint.com

Verify current listings at www.trucompliance.com/certification-database

Western States Equipment - Power Systems Service Department

Southern Territory Contact List

24/7 Service

Meridian **208-884-2312**

Twin Falls **208-735-2330**

Pocatello **208-235-6383**

Idaho Falls **208-552-3426**

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Tyrel Fredrickson	Pocatello	Office 208-235-6383	Mobile 208-540-1350

Cat® D1250 GC
Diesel Generator Sets



Image shown might not reflect actual configuration.

Engine	C32
Bore – mm (in)	145 (5.7)
Stroke – mm (in)	162 (6.4)
Displacement – L (in^3)	32.1 (1959)
Compression Ratio	14.0:1
Aspiration	TA
Fuel System	EUI
Governor Type	ADEM™ A4

Model	Standby 60 Hz ekW (kVA)	Emissions Performance
D1250 GC	1250 (1563)	U.S EPA Emergency Stationary Use only (Tier 2)

Standard Features

Cat® Diesel Engine
- Meets U.S. EPA Emergency Stationary Use only (Tier 2) emission standards
- Reliable performance proven in thousands of applications worldwide

Generator Set Package
- Meets NFPA 110 start time & block load requirements
- Conforms to ISO 8528-5 G3 load acceptance requirements
- Reliability is verified through prototype testing, which includes torsional vibration, fuel consumption, oil consumption, transient performance, and endurance testing

Alternators
- Superior motor starting capability minimizes the need for oversizing the generator
- Designed to match the performance and output characteristics of Cat diesel engines

Cooling System
- Cooling systems available to operate in ambient temperatures 50° C @ 0m
- Tested to ensure proper generator set cooling

GCCP Control Panels
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility

Warranty and Extended Service Coverage (ESC)
- 24 months/1000-hour warranty for standby ratings
- 5 yrs Gold Complimentary Extended Service Coverage

Worldwide Product Support
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries
- Your local Cat dealer provides extensive post-sale support, including maintenance and repair agreements

Financing
- Caterpillar offers an array of financial products to help you succeed through financial service excellence
- Options include loans, finance lease, operating lease, working capital, and revolving line of credit
- Contact your local Cat dealer for availability in your region

Standard and Optional Equipment

Engine

Air Cleaner
- ■ Single element
- ❑ Dual element

Starting
- ❑ Standard batteries
- ❑ Oversized batteries
- ■ Dual Electric Starters
- ■ Jacket water heater

Engine Attachments
- ❑ 6" Exhaust Flexible Fittings
- ❑ 6" Exhaust Flange Kits
- ❑ Radiator Duct Flange

Alternator

Output voltage
- ■ 480V
- ❑ 600V

Temperature Rise (over 40°C ambient)
- ■ 125°C
- ❑ 105°C

Winding type
- ■ Random wound

Excitation
- ❑ Internal excitation (IE)
- ■ Permanent magnet (PM)

Attachments
- ■ Anti-condensation heater

Power Termination

Type
- ■ Circuit breaker (Primary)
- ❑ 1200A ❑ 1600A ■ 2000A
- ❑ Circuit breaker (Auxiliary)
- ❑ 250A ❑ 400A
- ❑ 3-pole
- ❑ Manually operated

Trip Unit
- ❑ LSI ■ LSIG ❑ LSIG-P

Factory Enclosure
- ■ Sound attenuated
- ❑ Weatherproof

Attachments
- ❑ DC lighting package

Fuel Tank
- ■ Integrated 2100 gal (7950 L)
- ❑ Sub base 3000 gal (11356 L)
- ❑ Sub base 4200 gal (15876 L)

Control System

Controller
- ■ GCCP 1.2

Attachments
- ❑ Remote annunciator module
- ■ Expansion I/O module
- ■ 100A Load Center
- ■ 20A GFCI AC Receptacle
- ❑ Ground Fault Indication
- ■ Audible Alarm

Charging
- ■ Battery charger – 10A (Installed)
- ❑ Battery charger – 20A (Shipped loose)

Cat Connect

Connectivity
- ❑ Ethernet
- ❑ Cellular

Extended Service Options

Terms
- ❑ 3 year
- ❑ 4 year
- ■ 5 year

Coverage
- ❑ Silver
- ■ Gold

Certifications
- ■ UL 2200 Listed
- ❑ cUL CSA 22.2 No. 100-14
- ■ IBC seismic certification

Battery disconnect included

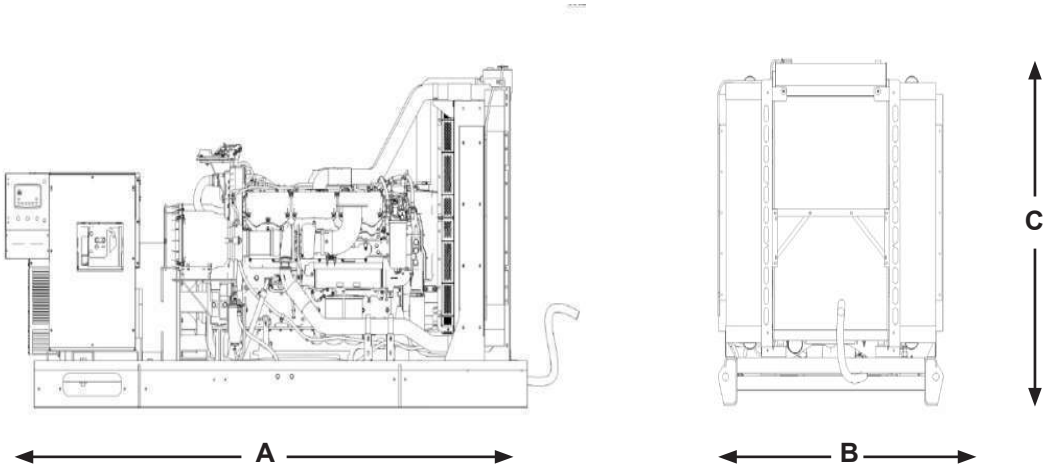
Note: Some options may not be available on all models. Certifications may not be available with all model configurations. Consult factory for availability.

Package Performance – D1250 GC

Performance	Standby	
Frequency	60 Hz	
Gen set power rating with fan	1250 kW	
Gen set power rating with fan @ 0.8 power factor	1563 kVA	
Fueling strategy	EPA ESE (Tier 2)	
Performance number	EM2324	
Fuel Consumption		
100% load with fan – L/hr (gal/hr)	330.9	(87.4)
75% load with fan – L/hr (gal/hr)	268.9	(71.0)
50% load with fan – L/hr (gal/hr)	181.1	(47.8)
25% load with fan – L/hr (gal/hr)	102.1	(27.0)
Cooling System		
Radiator air flow restriction (system) – kPa (in. water)	0.12	(0.48)
Radiator air flow – m^3/min (cfm)	1109	(39164)
Engine coolant capacity – L (gal)	55	(14.5)
Radiator coolant capacity – L (gal)	61	(16.1)
Total coolant capacity – L (gal)	116	(30.6)
Inlet Air		
Combustion air inlet flow rate – m^3/min (cfm)	118.0	(4168.3)
Exhaust System		
Exhaust stack gas temperature – °C (°F)	430.3	(806.6)
Exhaust gas flow rate – m^3/min (cfm)	283.4	(10005.8)
Exhaust system backpressure (maximum allowable) – kPa (in. water)	6.7	(27.0)
Heat Rejection		
Heat rejection to jacket water – kW (Btu/min)	403	(22908)
Heat rejection to exhaust (total) – kW (Btu/min)	1097	(62361)
Heat rejection to aftercooler – kW (Btu/min)	452	(25715)
Heat rejection to atmosphere from engine – kW (Btu/min)	222	(12620)
Heat rejection from alternator – kW (Btu/min)	58.9	(3350)
Emissions* (Nominal)		
NOx mg/Nm^3 (g/hp-h)	2416.9	(5.13)
CO mg/Nm^3 (g/hp-h)	53.0	(0.11)
HC mg/Nm^3 (g/hp-h)	21.6	(0.05)
PM mg/Nm^3 (g/hp-h)	5.1	(0.01)
Emissions* (Potential Site Variation)		
NOx mg/Nm^3 (g/hp-h)	2924.5	(6.20)
CO mg/Nm^3 (g/hp-h)	99.1	(0.21)
HC mg/Nm^3 (g/hp-h)	40.8	(0.10)
PM mg/Nm^3 (g/hp-h)	10.0	(0.02)

*mg/Nm^3 levels are corrected to 5% O_2. Contact your local Cat dealer for further information.

Weights and Dimensions



Model	Dim "A" mm (in)	Dim "B" mm (in)	Dim "C" mm (in)	Dry Weight kg (lb)
D1250 GC	4175 (164.3)	2090.5 (82.3)	2268 (89.3)	7156 (15776)

Note: For reference only. Do not use for installation design. Contact your local Cat dealer for precise weights and dimensions.

Ratings and Definitions

Standby

Output available with varying load for the duration of the interruption of the normal source power. Average power output is 70% of the standby power rating. Typical operation is 200 hours per year, with maximum expected usage of 500 hours per year.

Applicable Codes and Standards

CSA C22.2 No. 100-14, UL 142, UL 489, UL 869A, UL 2200, IBC 2018, ISO 3046, ISO 8528 and facilitates compliance to NFPA37, NFPA70, NFPA99 and NFPA110 codes.

Note: Codes may not be available in all model configurations. Please consult your local Cat dealer for availability.

Fuel Rates

Fuel rates are based on fuel oil of 35° API [16°C (60°F)] gravity having an LHV of 42,780 kJ/kg (18,390 Btu/lb) when used at 29°C (85°F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

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GCCP 1.2
Control Panel



Image shown may not reflect actual configuration.

GCCP 1.2 – Control Panel

GCCP 1.2 is an Auto Start Control Module suitable for a wide variety of diesel gen-set applications. Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs and remote PC.

Description

The controller is compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications & PLC functionality. The modules can be easily configured using a configuration suite PC software.

Full Range of Attachments

- Wide range of system expansion attachments, designed specifically to work with the GCCP controller
- Flexible packaging options for easy and cost effective installation

Benefits

- Hours counter provides accurate information for monitoring and maintenance periods
- User-friendly set-up and button layout for ease of use
- Multiple parameters are monitored & displayed simultaneously for full visibility
- The module can be configured to suit a wide range of applications for user flexibility
- PLC editor allows user configurable functions to meet user specific application requirements
- RS485 Communication port can be used for the Remote Monitoring Communication (Compatible with Cat PLG)

World Wide Product Support

- Cat dealers provide extensive pre and post sale support
- Cat dealers have over 1,600 dealer branch stores operating in 200 countries

Features

- 4-line back-lit LCD text display
- Multiple display languages
- Five-key menu navigation
- LCD alarm indication
- Customisable power-up text and images
- Data logging facility
- Internal PLC editor
- Protections disable feature
- Fully configurable via PC using USB & RS485 communication
- Front panel configuration with PIN protection
- Power save mode
- 3-phase generator sensing and protection
- Generator current and power monitoring (kW, kvar, kVA, pf) kW and kvar overload and reverse power alarms
- Over current protection
- Unbalanced load protection
- Breaker control via fascia buttons
- Fuel and start outputs configurable when using CAN Support for 0V to 10V & 4 mA to 20 mA sensors
- 8 Configurable digital inputs (3 available for Customer use)
- 8 Configurable digital outputs (5 available for Customer use)
- 4 Configurable analogue inputs (3 available for Customer use)
- CAN, MPU and alternator frequency speed sensing in one variant
- Real time clock
- Engine pre-heat and post-heat functions
- Engine run-time scheduler
- Engine idle control for starting & stopping
- Fuel usage monitor and low fuel level alarms
- 3 Configurable maintenance alarms
- MODBUS RTU & TCP support
- User configurable MODBUS pages

SPECIFICATIONS

DC SUPPLY

CONTINUOUS VOLTAGE RATING

8V to 35V continuous
5V for upto 1 minute

CRANKING DROPOUTS

Able to survive 0V for 100 mS, providing supply was at least 10V before dropout and supply recovers to 5V. This is achieved without the need for internal batteries.

LEDs and backlight will not be maintained during cranking

MAXIMUM OPERATING CURRENT

260 mA at 12V, 150 mA at 24V

MAXIMUM STANDBY CURRENT

145 mA at 12V, 85 mA at 24V

CHARGE FAIL/EXCITATION RANGE

0V to 35V

GENERATOR & MAINS (UTILITY) VOLTAGE RANGE

15V to 415 V AC (Ph to N)
26 V to 719 V AC (Ph to Ph)

MAGNETIC PICK-UP VOLTAGE RANGE

+/- 0.5 V to 70 V

FREQUENCY RANGE

10,000 Hz (max)

INPUTS

DIGITAL INPUTS A TO H

Negative switching

ANALOGUE INPUTS A TO D

Configurable as:

Negative switching digital input 0-10V sensor 4 mA to 20 mA Resistive Sensor

ANALOGUE INPUTS A TO C

Configurable as:

Negative switching digital input Resistive Sensor

OUTPUTS

OUTPUT A and B (FUEL & START)

15 A DC at supply voltage

AUXILIARY OUTPUTS C, D, E, F, G, H, I & J 2

A DC at supply voltage

DIMENSIONS

OVERALL

216 mm x 158 mm x 43 mm
8.5" x 6.2" x 1.5"

PANEL CUTOUT

184 mm x 137 mm
7.2" x 5.3"

MAXIMUM PANEL THICKNESS

8 mm
0.3"

OPERATING TEMPERATURE

-30°C to +70°C
-22°F to +158°F

STORAGE TEMPERATURE RANGE

-40°C to +85°C
-40°F to +185°F

STANDARDS

UL, cUL Listed
NFPA 70#
Electro-Magnetic Compatibility: BS EN 61000-6-2/6-4 Electrical Safety: BS EN 60950
Temperature: BS EN 60068-2-1, BS EN 60068-2-2
Vibration: BS EN 60068-2-6
Humidity: BS EN 60068-2-30, BS EN 60068-2-78 Shock: BS EN 60068-2-27
Degrees of protection provided by enclosures: BS EN 60529 Ingress Protection: IP65 – Front of module when installed into the control panel with the optional sealing gasket
Applicable codes and standards facilitate compliance to NFPA 70

GCCP 1.2 Control Panel
Electric Power

OPTIONAL MODULES

Remote annunciator



The Remote annunciator with an integral sounder is an output LED expansion module is designed to display a maximum of eight individual LED indications up to a maximum distance of 1 km (0.6 miles). The annunciator will consist of two modules to provide a 16 Channel Fault annunciation. The Panels are fitted with removable label cards which can be used to identify the standard NFPA alarms.

Key Features:

- Panel mount
- Vertical design
- In-built alarm
- Alarm mute button
- Max of 80 configurable LED's

Input Expansion Module

The Input Expansion module is used in conjunction with supported GCCP controllers to provide additional, flexible, input functionality. The module's ID switch is configurable from the module and the 10 inputs can be configured from within the 'host controller'. The inputs can be configured in a number of ways to connect to digital switches, resistive sensors, 0-10V DC signals or 4-20 mA signals.

Key Features:

- DIN rail & chassis mount
- Power on/link lost LED
- 1.2 km (0.75 Mile) working range
- Connect maximum of 4 x Input Modules to a single host controller
- Max of 40 configurable inputs



Output Expansion Module

The output relay expansion module for use with compatible GCCP control modules has been designed to extend a host module's output capabilities.
A maximum of 10 relays can be connected to an individual module at any one time.
All outputs are configurable via the host controller.

Key Features:

- Power On/Link Lost LED ID SWITCH
- 10 Expansion modules can be connected to 1 host controller at a time
- 8 Configurable relay contacts with LED indicators:
  - o 4 Normally Open (N/O)
  - o 4 Change Over (C/O)
- Terminal strip connection for quick and easy set-up



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Cat® GC Automatic Voltage Regulator

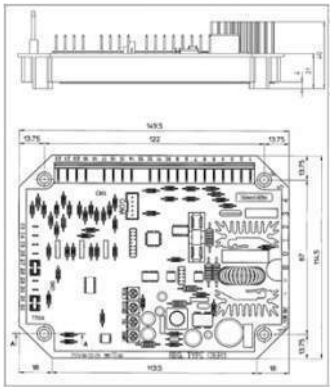


Image shown might not reflect actual configuration

DER1- Automatic Voltage Regulator

The DER1 is a voltage regulator for 50 or 60 Hz synchronous alternators Internally excited brushless type SR500 frame generators. The AVR circuitry includes under speed and overload protection.

Features

- All parameters on the AVR can be programmed using a USB connector and a computer or through potentiometers
- Genset output voltage can be altered by adjusting the onboard potentiometer “VOLT”
- Onboard overload setting can be altered by adjusting the onboard potentiometer “AMP” which allows the user to set the overload limit and has LED indication to show overload condition & Protection activated* (after time delay)
- “HZ” potentiometer adjusts the under speed protection with respect to the nominal speed value set by the 50/60 hz jumper
- “STAB” potentiometer adjusts the dynamic response of the alternator under transient response
- Remote control of voltage available with a range of 0Vdc to 2.5Vdc or -10Vdc to +10Vdc.

*flash rate varies in each protection activated!

Technical Specifications

Maximum current	5A (Continuous)
Forced excitation current for 1 minute	10A
Power Input (Aux winding or PMG)	Voltage: 40Vac to 270Vac
	Frequency: 12Hz to 72Hz
Sensing voltage	Range 1: 75Vac to 150Vac
	Range 2: 150Vac to 300Vac
Voltage Regulation (Steady state)	<±0.54%
Analog input (A1-A2)	0Vdc - 2.5V dc
	-10Vdc to +10Vdc
External Volts Adjustment	±10% with 100k ohm Pot
Operating temperature:	-25°C to +70°C
Dimensions (L x W x H)	149.5mm x 114.5mm x 40mm

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LEHE20369-00 (09/21)

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Enclosure



Image shown may not reflect actual configuration.

Enclosures
D800 GC – D1250 GC NA
C27 / C32

Sound Attenuated and Weather Protective

These sound attenuated and weather protective, factory installed enclosures are designed for safety and aesthetic value. Rugged construction provides weather protection and the ability to withstand exposure to the elements.

FEATURES

Robust/Highly Corrosion-Resistant Construction

- Environmentally friendly, polyester powder-baked paint in Caterpillar White
- Zinc plated and stainless steel fasteners
- 14-Gauge steel construction
- Flat roof with protection for water ingress from rain
- Critical grade internally mounted muffler/exhaust system
- Soft mounted isolators
- 75 dbA @ 7m for sound attenuated enclosures
- 100 mph wind loading
- Refer TMI for ambient capability data

Excellent Access

- Control panel mounted on RH side with an optional auxiliary box on the LH side of the package
- Large cable entry area for the ease of installation
- Left-hand or Right-hand bottom entry access to power cable bus or circuit breaker
- Multiple doors on both sides allow easy access to service points
- Hinged doors allow 180° opening rotation
- Lube oil and coolant drains piped to exterior of enclosure and terminated drain valves
- Radiator fill cover

Options

- ~~Weather protective enclosure available with same footprint~~
- ~~Interior DC lighting systems~~
- Caterpillar White paint (default)
- ~~100 (factory installed), 3000 and 4000 (shipped loose) gallon fuel tanks~~

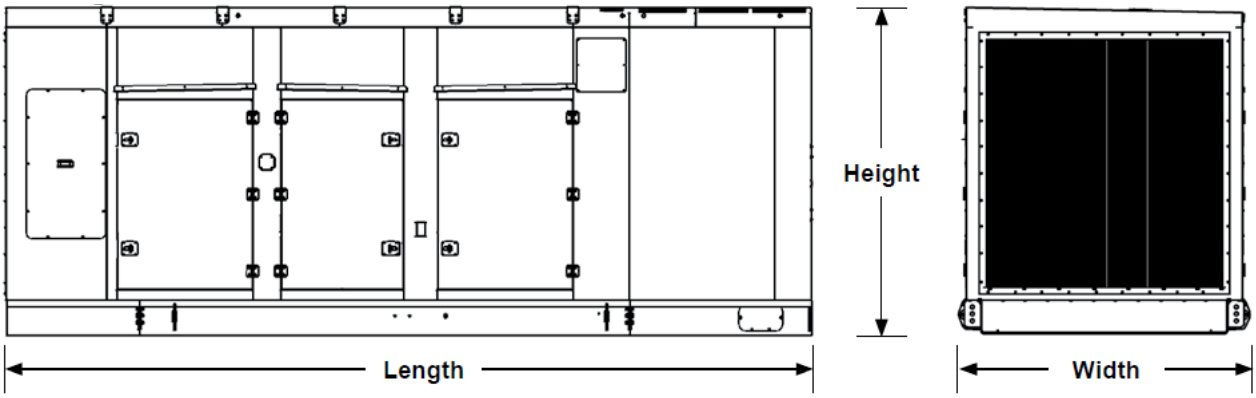
Security and Safety

- Lockable access doors with standard key use
- Cooling fan and battery charging alternator fully guarded
- Oil fill and battery can only be reached via lockable access
- External fuel connections
- Externally mounted emergency stop buttons
- Designed for spreader bar lifting to ensure safety

Certifications

- UL 2200 listed & cUL
- Seismic certification per applicable building codes: IBC 2021
- Tested and analysed in accordance with: ASCE 7-98, ASCE 7-02, ASCE 7-05, ICC-ES AC-156

Enclosure Weights and Dimensions



Sound Attenuated Enclosure Base Options*	Weight kgs (lbs)	Length mm (in)	Width mm (in)	Height mm (in)
With lifting base	2672 (5891)	6610 (260)	2342 (92.2)	2350 (92.5)
With 2100 gal integral tank base	4891 (10783)	7620 (300)	2350 (92.5)	3265 (128.5)
With 3000 gal tank with lifting base	5638 (12429)	7646 (301)	2471 (97)	3565 (140)
With 4200 gal tank with lifting base	6563 (14468)	7646 (301)	2471 (97)	3870 (152)

Weather Protective Enclosure Base Options*	Weight kgs (lbs)	Length mm (in)	Width mm (in)	Height mm (in)
With lifting base	2452 (5405)	6610 (260)	2342 (92.2)	2350 (92.5)
With 2100 gal integral tank base	4671 (10298)	7620 (300)	2350 (92.5)	3265 (128.5)
With 3000 gal tank with lifting base	5418 (11944)	7646 (301)	2471 (97)	3565 (140)
With 4200 gal tank with lifting base	6343 (13984)	7646 (301)	2471 (97)	3870 (152)

Note: For reference only – do not use for installation design. Please contact your dealer for exact weights and dimensions.
*Weight does not include package generator set weight.

Exhaust Back-Pressure Data

Generator Set Models	Enclosed Set L2 (75 dBA) kPa (allowable) at 100% Load
D800 GC	–
D1000 GC	–
D1250 GC	6.7

Generator Set Weights

Generator Set Weights**	Weight kgs (lbs)
C27 Open generator set	5813 (12815)
C32 Open generator set	6798 (14987)

**Dry Weight of heaviest configuration and without base rail weight (Does not include exhaust system weights).

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100 Amp Load Center



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100 Amp Load Center

Specifications	
Number of spaces	8
System voltage	120 / 240 VAC
Number of tandem circuit breakers	8
Phase	1 Ph
NEMA degree of protection	NEMA 1 indoor
Electrical connection	Lugs
Wiring configuration	3-wire
Material	Tin plated aluminum busbar
Enclosure material	Welded sheet steel
Cover finish	Gray baked enamel
Product certifications	CULus
Wire Size	AWG 4…AWG 1 (Aluminum / Copper)
Rated Current	100A
Max Short Circuit Rating	10 kA
Ground Connection	Grounding bar (factory installed)
Cover Type	Surface cover with door

Dimensions and Load Speci	12.7"x8.9"x3.8" OR ~13"X9"X4"
Height / Width / Depth	319 mm / 226 mm / 97 mm
GFCI	20A (120V)
Battery Charger	2.3A (240V)
Jacket Water Heater	25.4A (240V)
Alternator Heater	1.1A (240V)
Total Load	48.8A Max

L1 Load Specifications	
Battery Charger	2.3A (240V)
GFCI	20A (120V)
Jacket Water Heater	25.4A (240V)
Alternator Heater	1.1A (240V)
Total Load	48.8A Max

L2 Load Specifications	
Battery Charger	2.3A (240V)
Jacket Water Heater	25.4A (240V)
Alternator Heater	1.1A (240V)
Total Load	28.8A Max

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LEHE20365-00 (04/21)



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20A Tamper-Resistant, Weather-Resistant GFCI Receptacles

Features and Benefits

- Automatically tests the GFCI every time the reset button is pushed in. The GFCI will not reset if the GFCI circuit is not functioning properly.
- By blocking reset of the GFCI if protection has been compromised, SmartLockPRO reduces the possibility of end-users incorrectly assuming that a reset GFCI outlet is providing ground fault protection when it actually is not.
- A line-load reversal diagnostic feature is provided which prevents the GFCI from being reset and stops power from being fed to the GFCI receptacle face or through to downstream devices. A green LED indicator on the GFCI's face also illuminates to alert the installer to the line-load wiring reversal.

Weather-Resistant GFCIs

- Meet UL 498 requirements for weather-resistant receptacles.

Tamper-Resistant GFCIs

- Shutter mechanism inside the receptacle blocks access to the contacts unless a two-prong plug is inserted, helping ensure foreign objects will be locked out.

Product Features

- Grounding: GFCI ground fault
- Feature: Weather and tamper-resistant
- Amperage: 20 Amp
- Voltage: 125 Volt
- NEMA: 5-20R
- Trip Level: Class A, 5mA plus or minus 1mA
- Pole: 2
- Wire: 3
- Color: White

Standards and Certifications

- NEMA: WD-6
- ANSI: C-73
- UL498: File E13399
- CSA C22.2 No. 42: File LR-57811
- NOM: 057
- UL 943: File E48380

Receptacles contained in a weather resistant box and in-use cover.



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Attachments



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BATTERY CHARGER

The intelligent battery charger has been developed with safety, usability, optimised battery performance and maximum battery lifetimes in mind.

A comprehensive range of input and output protections ensures a continued safe charging environment also enabling the use of the charger as a power supply.

FEATURES

- Intelligent two, three and four stage charging profiles
- Configurable to suit most battery types (12V/24V)
- Adjustable current limit
- Can be used as a battery charger, power supply or both at the same time
- Automatic or Manual boost and storage charge functions to help maintain battery condition
- Digital Microprocessor Technology
- Temperature compensation for battery charging
- Low Output Ripple and superb line regulation
- Three LED Indicators
- AC input Under voltage
- AC input Over voltage
- Battery charger output Over voltage
- Battery charger output Over current
- Optional battery temperature compensation with over temperature protection
- Output short circuit and Inversion polarity with auto recovery
- Configurable charge termination
- UL1236 /UL1564 Compliant

Automatic Boost Mode
- Boosts and equalises cell charge improving battery performance and life

Power Save Mode
- Once the battery is fully charged the chargers switch to Eco-Power to save energy

Communication
- Can be integrated into external systems through MODBUS RTU using RS485
- Fully configurable via PC Software

BENEFITS

- Fully flexible to maximise the life of the battery
- Suitable for a wide range of battery types
- Switched mode design
- Minimum 86% efficiency throughout full operating range
- No external intervention for boost mode
- Multiple chargers can be linked together to provide larger current output
- Can be permanently connected to battery and mains (utility) supply. No need to disconnect through high load conditions.

SPECIFICATION

AC SUPPLY
VOLTAGE RANGE 90 V to 305 V (L-N)

FREQUENCY RANGE
48 Hz to 64 Hz (L-N)

DC OUTPUT RATING
10 A DC at 24 V DC

RIPPLE AND NOISE
<1%

EFFICIENCY
>86%

REGULATION LINE
<0.5%

LOAD
2%

TEMPERATURE SENSOR INPUT
PT1000

PROTECTIONS
Short Circuit
DC Over Voltage
DC Over Current
Reverse Polarity
Over Temperature
AC Under & Over Voltage

CHARGE FAILURE RELAY
3 A at 30 V DC volt free relay

DIMENSIONS OVERALL
70 mm x200 mm x 130 mm
2.7" x 7.9" x 5.1"

WEIGHT
0.75 kg

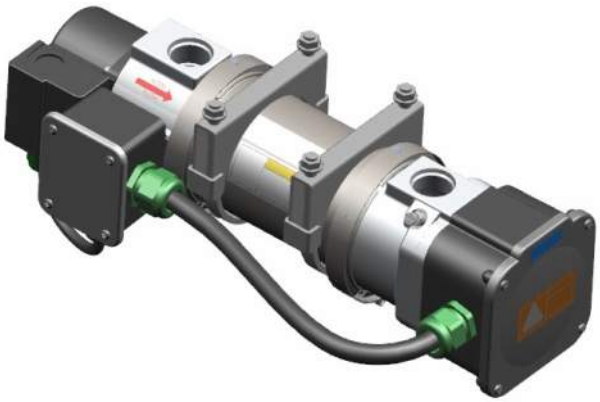
OPERATING TEMPERATURE RANGE
-30 °C to +80 °C
-22 °F to +176 °F

STORAGE TEMPERATURE RANGE
-30 °C to +80 °C
-22 °F to +176 °F

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Jacket Water Heater



Features

Factory Installed

- Complete with Hoses, Thermostat (Control and Hi-Limit) and Pump
- Base Frame mounting minimizes Engine induced vibration
- Temperature Controlled Pump operation
- Supplied with UL, C (UL) US and CE recognized components
- Control Thermostat is Factory preset to 49°C (120°F)

Heater Design Description

- Jacket Water Heater Package is designed to efficiently preheat the engine by circulating the heated coolant onto engine
- This design results in following benefits
- Increase life of Heater Hoses, Engine Seals and Heating Elements
- Improves Heat Transfer efficiency from Elements to Engine Coolant
- Uniform Engine temperature distribution
- Application of Thermostat with a reduced thermal differential
- Lower Customer utility costs and increased Heater reliability
- Heater's Control Thermostat set point is preset

Jacket Water Heater with Pump

C27 and C32

Caterpillar offers a factory installed Jacket Water Heater for improved Engine Cold-Starting capability

This Jacket Water Heater is a Thermostatically controlled Heater with an integrated pump, built in bleed screw and High Limit Thermostat that can be manually reset

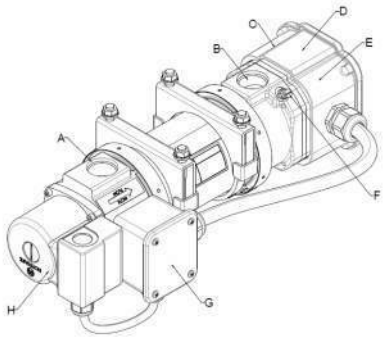
Forced circulation of the coolant delivers uniform heating throughout the entire engine, reduces wear from Cold spots and offers significant reduction of Electrical consumption

Heater Operation

A 34 L/pm (9 GPM) Pump is located at the Heater Inlet to push the coolant through the Heater
A Control Thermostat is located inside a Plastic Enclosure near the Inlet of Heater and responds to the temperature of coolant entering the tank
A High Limit Thermostat is located inside a Plastic Element Enclosure near the Outlet of Heater opens and cuts off supply to Heating Element, if tank attains 96°C (205°F). This Thermostat can be manual reset to close position.

Temperature Controlled Pump Operation – Pump runs only with Heating Elements.

Air release valve (Bleed Screw) provided to allow vent air from Heater, prior to energizing the Heater.



A. Suction Port (SAE Dash 16)

B. Discharge Port (SAE Dash 16)

C. Power in Wiring Entrance

D. Element Assembly

E. High-limit Thermostat with manual reset (in Element assembly)

F. Air Release Valve

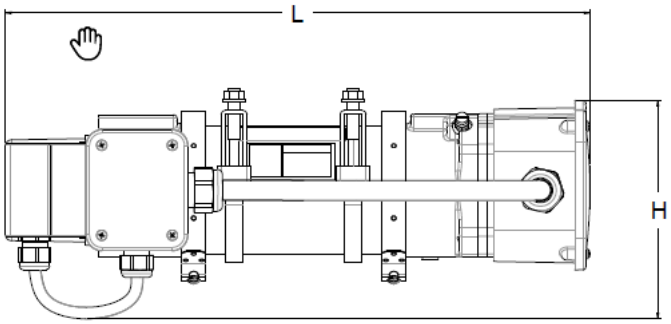
G. Control Thermostat (in enclosure)

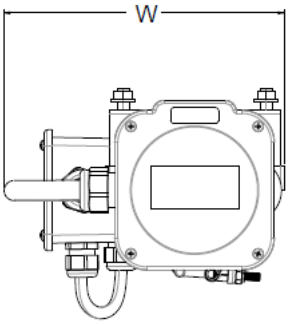
H. Pump/Motor

Jacket Water Heater

Specifications

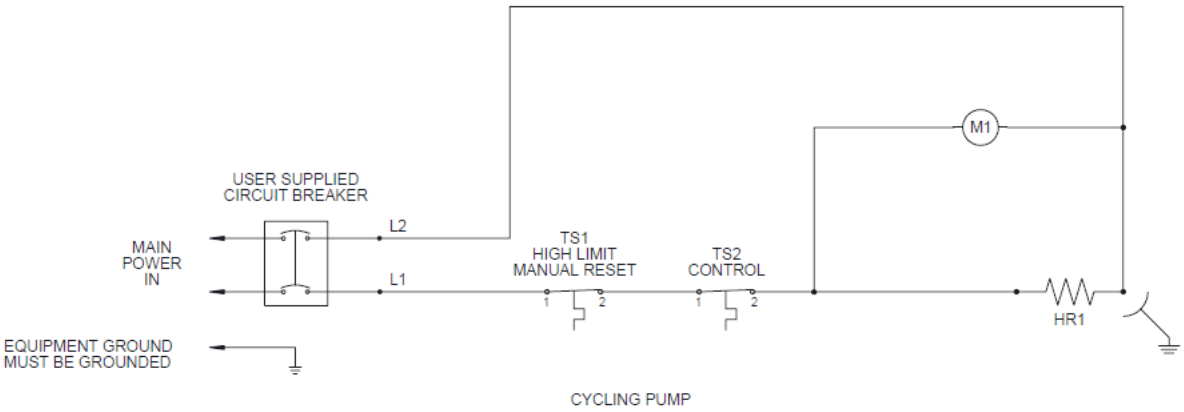
	Voltage	
	240	**220**
Heater Power	6kW	6kW
Frequency	60	50
Phase	Single	Single
Amps	25A	26A
Flow Rate	34 L/pm (9 GPM)	
Pump Rating	230 VAC 97W	230 VAC 70W
Control Thermostat (Set Point)	38°C – 49°C (100°F – 120°F)	
High Limit Thermostat (Set Point)	96°C (205°F), Manual Reset	
Length	466 mm (18.3")	
Width	216 mm (8.5")	
Height	183 mm (7.2")	
Weight	6.5 Kg	





Jacket Water Heater

Wiring Diagram



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LEHE20214-01 (02/24)

Cat® Batteries



Cat® Batteries—Greater Starting Power—Lower Maintenance—Longer Life

Cat® Premium High Output (PHO) batteries are used in all Caterpillar® Machines and Engine Gen-Sets. They are designed to meet stringent Caterpillar design specifications, which provide industry leading cold cranking amp (CCA) capability and maximum vibration resistance.

Maintenance Free or low maintenance designs are available in wet and dry configurations.

General Service Line batteries are available in Maintenance Free or low maintenance designs and in wet or dry configurations. Wide selections of BCI group sizes are available for automotive, light truck, bus, industrial, agricultural, marine, recreational and valve regulated (VRLA-AGM & Gel) applications.

CATERPILLAR®

Cat® General Service Batteries—Available Worldwide (cont.)

Wet Batteries Continued

BCI Group Size	Part No.	Cold Cranking Amps"	Reserve Capacity Minutes'	Volts	Amp Hr. Capacity @ 20 Hrs.	Construction	BCI Overall Dimensions Length In (mm)	Width In (mm)	Height In (mm)	Nominal Weight Wet Lb (kg)
Marine-Deep Cycle Capability										
24M	8C-3638	650	120	12	55	SC/MF/DT/~	10.8 (274)	6.8 (173)	9.4 (239)	40 (18)
27M	8C-3639	625	150	12	80	@/S/DT	12.5 (318)	6.8 (173)	9.4 (239)	49 (22)
Lawn & Garden										
U1	8C-3636	260	32	12	25	C/MF	7.8 (198)	5.1 (130)	7.3 (185)	16.5 (7
Golf Cart/Scissor & High Lifts										
GC-2	8C-3641	75 amps @ 80° F 115 mins.	–	6	215	@ OP	10.3 (262)	7.1 (180)	10.9 (277)	63 (29)
Dual Terminal Batteries										
24/24F/74	127-0824	930	130	12	63	SC/MF/DT	10.9 (277)	7.0 (178)	9.0 (229)	45 (20)
34/78	127-0826	875	120	12	66	SC/MF/DT	10.8 (274)	6.9 (175)	8.0 (203) !	41 (19)
75/86	250-0489	540	85	12	47	SC/MF/DT	9.7 (248)	7 (178)	8.1 (206) !	32 (15)
34/78	250-0486	690	100	12	60	ST/MF/DT	10.7 (273)	6.8 (175)	8 (203) !	39 (18)

Dry Batteries

BCI Group Acid to Fill Size	Part No.	Cold Cranking Amps"	Reserve Capacity Minutes'	Volts	Amp Hr. Capacity @ 20 Hrs.	Construction	BCI Overall Dimensions Length In (mm)	Width In (mm)	Height In (mm)	Nominal Weight Wet Lb (kg)	Nominal Dry Lb Qt (liter)
Truck/Agricultural/Industrial											
1	8T-9734	650	180	6	100	C/MF +	9.0 (229)	6.9 (175)	8.8 (224)	33.5 (15)	17.5 (8)	4.5 (4.3)
3D	8T-9730	1400	675	6	320	LA +	20.4 (518)	8.7 (221)	10.0 (254)	120 (54)	84 (38)	11.0 (10.4)
7D	8T-9731	950	350	12	156	LA +	15.7 (399)	7.0 (178)	9.1 (231)	59.5 (27)	34 (15)	7.5 (7.1)
24F	9X-1382	650	120	12	50	SC/MF +	10.6 (269)	6.8 (173)	9.0 (229)	40 (18)	26 (12)	6.0 (5.7
26	145-4517	540	80	12	48	SC/MF +	8.8 (224)	6.8 (173)	8.0 (203)	29.5 (13)	23 (10)	3.5 (3.3)
26R	145-4518	540	80	12	48	SC/MF +	8.8 (224)	6.8 (173)	8.0 (203)	29.5 (13)	23 (10)	3.5 (3.3)
27	3E-8925	675	120	12	55	SC/MF +	12.0 (305)	6.7 (170)	9.0 (229)	45.5 (21)	29.5 (13)	6.5 (6.2)
Automotive/Light Truck											
22F	9X-1384	425	65	12	32	SC/MF +	9.4 (239)	6.8 (173)	8.3 (211)	29.5 (13)	18 (8)	4.5 (4.3)
24	9X-1383	650	120	12	50	SC/MF +	10.2 (259)	6.8 (173)	9.0 (229)	40 (18)	26 (12)	6.0 (5.7)
Marine/Recreational											
8V	8C-3640	980	350	8	175	LA +	20.8 (528)	7.3 (185)	10.6 (269)	90 (41)	60 (27)	11.5 (10.9)

Construction Notes:
LA = Low Maintenance, Low Antimony Grids
LAC = Low Maintenance, Hybrid Construction
C = Calcium Lead Alloy Grid Design
MF = Maintenance Free
MFA= Maintenance Free, Calcium Grids, Accessible Vent Caps
ST= Silver (Ag) Calcium Alloy Heavy Duty Grids
SC= Silver (Ag) Calcium Alloy Grids-for resistance to high underhood temperatures
* = Side Terminals
S = Stud Terminals
DT=Dual Terminal
OP = Offset Post with Horizontal Hole Stainless Steel 5/16" Bolt & Hex Nut
" = For 30 seconds at 0° F (-18° C)
' = Minimum of 25 amp output at 80° F (27° C)
! For height with removable adapter, add 7/8" (22 mm)
@ = Deep Cycle-Antimony Grids
~ = Marine Starting
+ = Shipped Dry Only
# = Wing Nut for 8C-3638 & 8C-3639 is Part # 3B-0723

Gelled (GEL) Electrolyte, Marine/Recreational, Deep Cycle Capability

BCI Group Size	Part No.	Cold Cranking Amps"	Reserve Capacity Minutes'	Volts	Amp Hr. Capacity @20 Hrs.	Construction	BCI Overall Dimensions Length In (mm)	Width In (mm)	Height In (mm)	Nominal Weight Wet Lb (kg)
4D	152-8006	970	375	12	183	MF-G/VRLA	20.8 (528)	8.5 (216)	10 (254)	129.8 (59)
8D	152-7242	1150	475	12	225	MF-G/VRLA	20.8 (528)	11.1 (282)	10 (254)	160.8 (73)

Marine Cranking Amps (MCA) = cold cranking Amps divided by 0.8
MF-G/VRLA = Maintenance Free Gel Battery. Sealed, Valve-Regulated Lead Acid (VRLA) battery with gelled electrolyte.
Starting/Deep Cycle Marine or Recreational Use Battery. Could be used for Gen-Sets or UPS type applications requiring a sealed battery.
VRLA batteries use recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead acid battery.
They are non-spillable, never need watering and should never be opened.

" = For 30 seconds at 0° F (-18° C)
' = Minimum of 25 amp output at 80° F (27° C)

Important: Alternator and charger instructions:
For 12-volt Gel Batteries charge to 13.8 volts but no more than 14.1 volts at 68° F (20° C)

Absorbed Glass Mat (AGM) Batteries, Designed for High-rate Uninterruptible Power Supplies (UPS) or Standby Applications

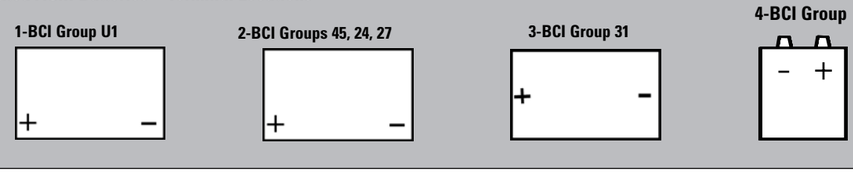
BCI Group Size	Part No.	Discharge Ratings: Power Watts per Cell For 15 mins. to 1.67 V.P.C. @ 77° F (25° C)	Discharge Rating in Amperes For 15 mins. to end voltage of 1.67 V.P.C. @ 77 ° F (25° C)	Amp Hour @ 20 hour rate to 1.75 volts per cell @ 77 ° F (25° C)	Normal Voltage	Construction	Terminal	BCI Overall Dimensions Length In (mm)	Width In (mm)	Terminal Height In (mm)	Container Height In (mm)	Nominal Weight Wet Lb (kg)
U1	250-0474	116	62	1.63	12	MF-AGM/VRLA	1	7.71 (196)	5.18 (132)	7.18 (182)	6.18 (157)	24 (11)
45	250-0475	156	84.3	2.75	12	MF-AGM/VRLA	2	8.84 (225)	5.31 (135)	8.7 (221)	8.14 (207)	38.5 (18)
24	250-0476	262	140	3.95	12	MF-AGM/VRLA	2	10.2 (259)	6.8 (173)	9.14 (232)	8.12 (206)	53 (24)
27	250-0477	304	165	4.61	12	MF-AGM/VRLA	2	12.72 (323)	6.8 (173)	8.68 (220)	8.12 (206)	63 (29)
31	250-0478	350	186	5.25	12	MF-AGM/VRLA	3	12.93 (329)	6.75 (171)	8.75 (222)	8.58 (218)	69 (31)
31(A)	250-0479	475	261	6.66	12	MF-AGM/VRLA	3	13.5 (342)	6.77 (172)	11.25 (286)	11.08 (281)	98 (45)
4D(H)	250-0483	624	338	9.91	12	MF-AGM/VRLA	4	21.73 (552)	8.82 (210)	9.34 (237)	8.74 (22)	129 (59)

MF-AGM/VRLA = Maintenance Free-Absorbed Glass Mat (AGM) Battery. Battery has Flame Arrestor and is low-pressure self sealing
Housed in flame-retardant polypropylene (rated 28 LOI) 12-Volt Monoblocks.
(A) = Battery is 2.5 in. (63.5 mm) taller and .57 in (13mm) longer than standard Group 31.
(H) = Battery has handles.
Sealed Valve-Regulated Lead Acid (VRLA) with electrolyte absorbed in separators consisting of a sponge-like mass of matted glass fibers.
Preferred for high-rate performance in uninterruptible power supply (UPS) or standby applications.
VPC = Volts per Cell.
WPC = Watts per Cell. Ratings conform to IEEE-485 Standards.
VRLA batteries use recombination reaction to prevent the escape of hydrogen and oxygen gases normally lost in a flooded lead. acid battery. They are non-spillable, never need watering and should never be opened.

UL Recognized Component

AGM batteries have a longer production lead time than regular lead-acid type batteries
Important: Alternator and charger instructions: for 12-volt AGM Batteries charge to 14.4 volts but no more than 14.6 volts at 68°F (20° C)

Valve Regulated AGM Batteries—Terminal Locations

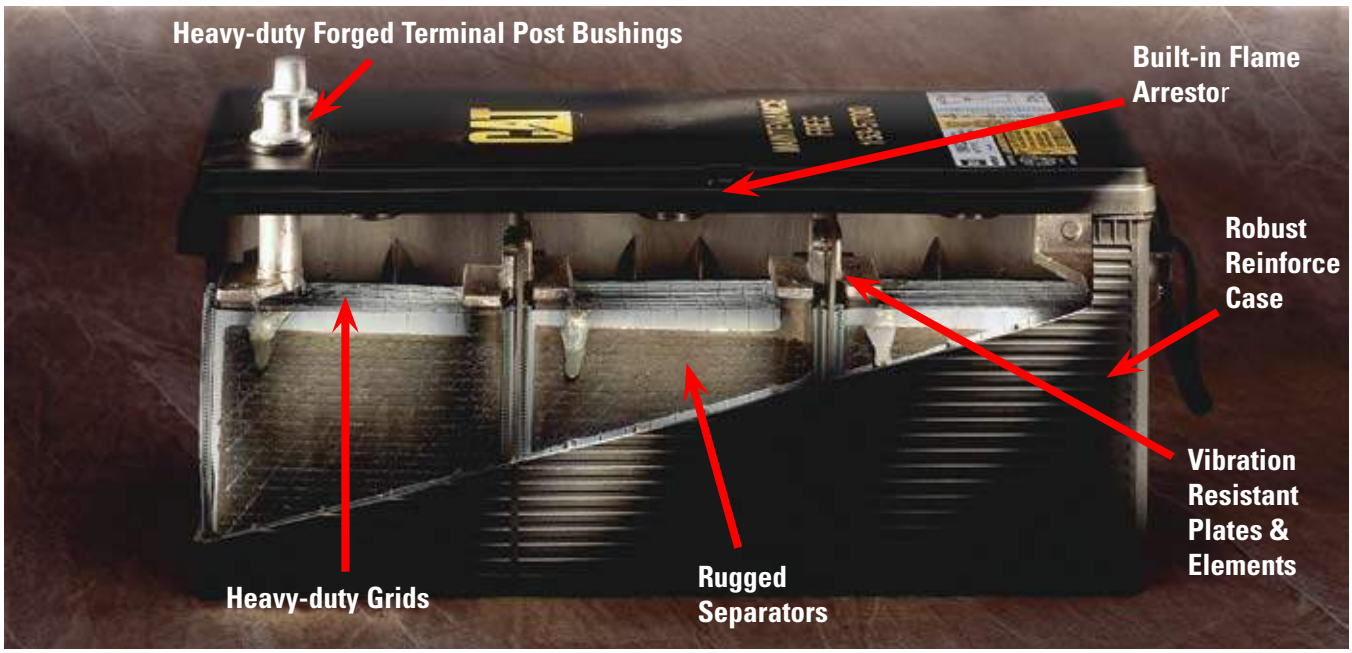


Terminals

1 = Lead terminal. L shaped. Terminals have square holes.
2 = Lead terminal with brass inserts. 1/4-20 x .25 Deep Female Thread.
3 = Lead terminal with brass inserts. Centerline terminals. 1/4-20 x .25 Deep Female Thread.
4 = End terminals with brass inserts. 1/4-20 (UNC) Female Thread. Ratings conform to IEEE-485 Standards.

VRLA batteries are a UL Recognized Component and are I.C.C.O., I.M.D.E., I.A.T.A., and D.O.T. Air Transportable Approved.

Cat® Batteries



Robust Components = Long Life + Reliable Starts

- Heavy-duty forged terminal post bushings provide maximum strength and resistance to acid seepage that causes corrosion and black posts. Thicker internal terminal posts provide lower electrical resistance and higher cold cranking amp output.
- Rugged microporous polyethylene envelope separators protect against "shorts" and vibration damage. Deep Cycle batteries utilize double insulated Glass mat separators for longer cycling life.
- Maintenance Free batteries utilize calcium lead alloy on both positive and negative plates that reduces gassing and water consumption. Automotive batteries have Silver (Ag) Calcium Alloy Grids for resistance to high underhood temperatures.
- Heavy-duty, full frame battery grids with no sharp edges. An optimum acid/paste combination provides better charge acceptance after a deep discharge.
- Positive and Negative plates are anchored to the container bottom and the cell element is locked at the top for maximum vibration resistance. Straps are thicker, heavier and cast (not welded) into the plates.
- Manifold vented cover with built-in Flame Arrestor…a safety feature that directs corrosive gases away from the battery and hold-downs.
- Robust reinforced case provides extra strength in all temperature extremes. Brickwork design on sides reduces chance of punctures and case flexing. Embossed part number and descriptors for easy serviceability.

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We offer you the right parts and service solutions, when and where you need them.

The Cat Dealer network of highly trained experts can help you maximize your equipment investment.



PEHJ0073-02
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CATERPILLAR®
TODAY'S WORK. TOMORROW'S WORLD.™

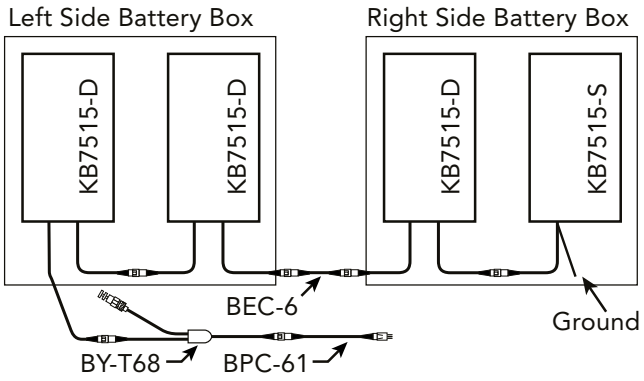
Battery Heating Pads



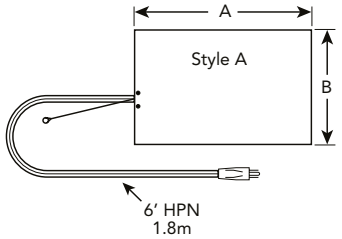
Battery heater not recommended for nickel cadmium batteries. When batteries are placed in an insulated battery box, a thermostat is recommended to sense battery box temperature to prevent overheating the battery.

Model Number	Volts	Watts	Amps	Nominal Dimensions A	Nominal Dimensions B	Battery Size	Style
KB5015	120	50	.42	12.75" (324mm)	8.25" (210mm)	4D	A
KB5015-S	120	50	.42	12.75" (324mm)	8.25" (210mm)	4D	B
KB5015-D	120	50	.42	12.75" (324mm)	8.25" (210mm)	4D	C
KB7515	120	75	.63	19.5" (495mm)	10.5" (267mm)	8D	A
KB7515-S	120	75	.63	19.5" (495mm)	10.5" (267mm)	8D	B
KB7515-D	120	75	.63	19.5" (495mm)	10.5" (267mm)	8D	C
KB7523	240	75	.31	19.5" (495mm)	10.5" (267mm)	8D	A
KB7523-S	240	75	.31	19.5" (495mm)	10.5" (267mm)	8D	B
KB7523-D	240	75	.31	19.5" (495mm)	10.5" (267mm)	8D	C

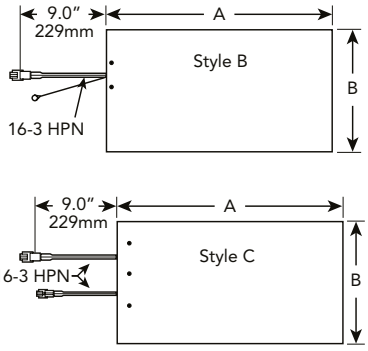
Typical Connection - 2 Batteries on Each Side of Vehicle



Standard Pad for Single Battery



Special Pads for Multiple Batteries



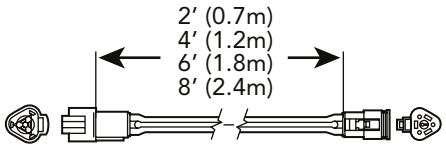
Accessories For Multiple Battery Heating

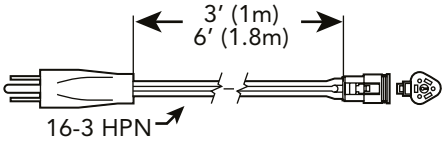
EXTENSION CORDS

Part Number	Length
BEC-2	2' (0.7m)
BEC-4	4' (1.2m)
BEC-6	6' (1.8m)
BEC-8	8' (2.4m)

POWER SUPPLY CORDS

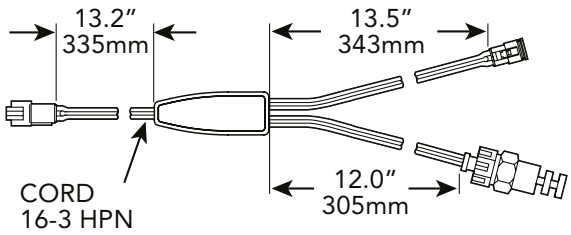
Part Number	Length	Volts
BPC-31	3' (1m)	120
BPC-32	3' (1m)	240
BPC-61	6' (1.8m)	120
BPC-62	6' (1.8m)	240





THERMOSTAT & "Y" CORD ASSEMBLY

Part Number	Temperature Control On	Temperature Control Off
BY-T68	60°F (16°C)	80°F (27°C)





Picture shown may not reflect actual configuration

Electric Starting Motor

for C27, C32, 3512, 3516, C175-16 and C175-20

U.S. Sourced

Electric Starting Motors are used for improved engine start capability.
Battery-powered electric motors utilize low voltage direct current and provide fast, convenient, pushbutton starting with lightweight, compact, engine-mounted components.

Design

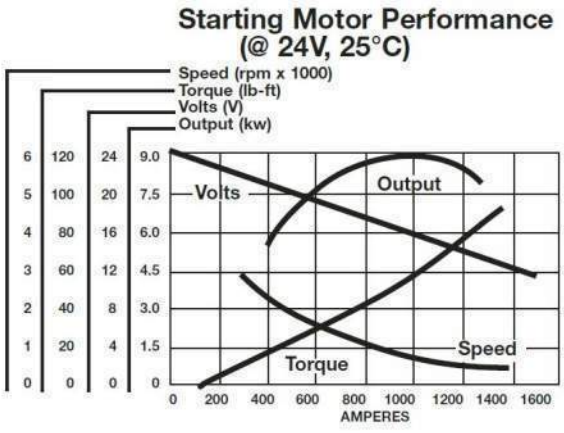
- Splash-proof and environmentally protected.
- Seamless one-piece solenoid case is sealed for corrosion protection.
- Positive-engagement shift mechanism assures pinion–to-ring gear engagement prior to cranking, minimizing milled ring gears and pinions.
- Epoxy impregnation and glass banding give starter armature exceptional rotation strength.
- Positive spring retention in the six wide, one-piece brushes gives uniform pressure and brush wear for extended service life.
- Extra-large brush leads are used to handle the high current experienced during the cranking of high-power diesel engines.
- Rotatable drive housing, with 12 positions, allows easy repositioning of the solenoid switch.
- Totally Enclosed Shift mechanism.
- Bearing Lubrication and Sealing: Three sintered-bronze bearing extra-large oil reservoirs.

Specifications

- System Voltage: 24 V
- Rotation: Clockwise
- Polarity: Insulated
- Mounting: SAE #3
- Pinion Data:
  - No Teeth/Pinion Blank: 11/12
  - Pitch: 6/8
- Output: 24V: 9.0 kW
- Weight: 34 kg (75 lbs)
- Operation temperature range
  - - 25°C to +121°C
- Pressure Angle: 20°
- Oil Sealed: ± 6 PSI
- Water Sealed: ± 6 PSI and 3500 PSI Pressure Wash

Option

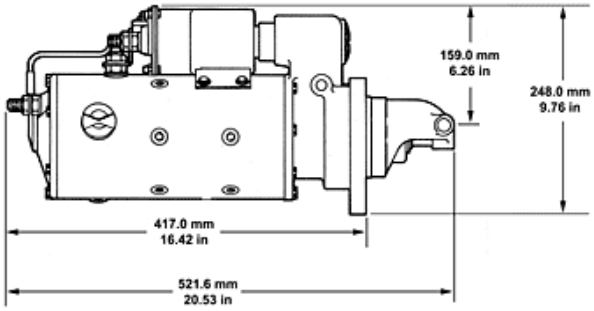
- Heavy-Duty Applications: Two or more units can be tandem-mounted for starting large engines.

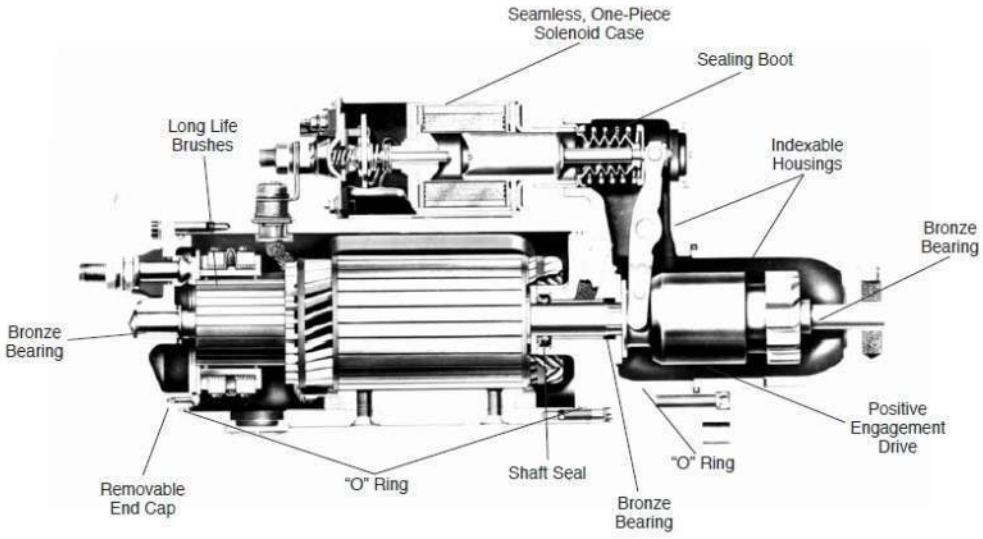


Available Options

Model	Single	Dual	Quadruple
C27		+	
C32		+	
3512	+	+	
3512B	+	+	
3512C	+	+	
3516		+	
3516B		+	
3516C		+	
C175-16		+	+
C175-20		+	+

Dimensions Drawing





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Picture shown may not reflect actual configuration

Air Cleaner - Open Element

3412

General Description

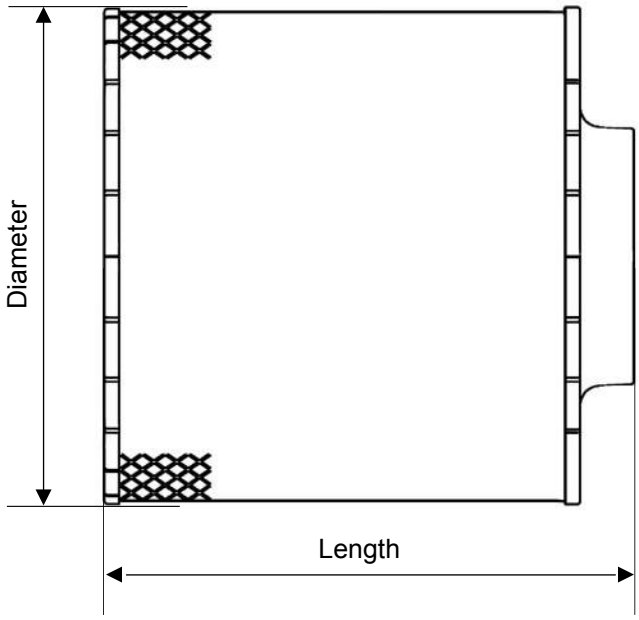
Air cleaners reduce contaminants flowing into the air intake system, provide a high level of engine protection from harmful contaminants, and help maintain optimal performance of the engine.

The open element air cleaner is a cost-effective alternative to heavy duty air cleaners in installations where protection is not required for the filter element.

Features

- Lightweight materials
- Completely disposable
- Easy to install, durable, and reliable
- Air cleaner housing and filter are one unit
- Designed to withstand severe intake pulsations
- Polyurethane end caps

General Dimension Drawing



Specification

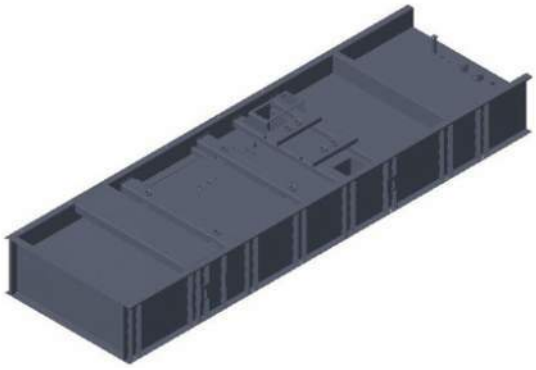
Cleaner
Length 339.3 mm (13.4”)
Diameter 317.5 mm (12.5”)
Weight 1.74 kg (3.83 Lbs.)

Overall Efficiency	99.9%
Effective Filtering Area (m^2)	8.08
Number of Convolutions	267±2
Depth of Convolutions	50.8

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Cat® GC
Fuel Tank Bases



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Fuel Tank Bases for D800 GC - D1250 GC

Dual Wall fuel tank bases offer an integrated fuel solution for your Cat GC diesel generator set.

Features

- UL 142 (US) and ULC S601 (Canada) Listed
- Facilitates compliance to NFPA 30, 70 and 110
- CSA C282-09 and B139-04 installation compliant
- Dual wall, secondary containment (minimum of 110%of primary tank capacity)
- Tank design provides capacity for thermal expansion of fuel
- Direct reading fuel level gauge
- Fuel supply dip tube is positioned so as not to pick up fuel sediment
- Fuel return and supply dip tubes are separated by an internal baffle to prevent recirculation of heated return fuel
- Fuel fill – 43 mm (1.7 in), lockable flip top cap
- Primary tank level detection switch in containment basin
- Primary and secondary tanks are leak tested at 20.7 kPa (3 psi) minimum
- Interior tank surfaces coated with a solvent-based thin-film rust preventative
- Heavy gauge steel gussets suitable for lifting package (2100 gal only)
- Gloss black polyester alkyd acrylic enamel exterior paint over epoxy based primer
- Primary tanks are equipped with customer Lockable 2" raised fuel fill with optional seven gallon spill containment
- Leak detection switch
- Port for access to containment tank
- Removable engine supply and return dip tubes
- Fittings for opt fuel levels or auxiliary fuel pump
- Excellent stub-up access beneath circuit breaker (within fuel tank)
- Emergency vents on primary and secondary tanks are sized in accordance with NFPA 30, external to enclosure.
- Optional installed fuel level indication at the generator set control panel.
- Optional seismic certification per applicable building codes: IBC 2021
- Tested and analyzed in accordance with: ASCE 7-98, ASCE 7-02, ASCE 7-05, ICC- ES AC-156
- Anchoring details are site specific, and are dependent on many factors such as generator set size, weight, and concrete strength. IBC Certification requires that the anchoring system used is reviewed and approved by a Professional Engineer.

Cat® GC Fuel Tank Bases

Standby Rating		Engine	Strategy	Run Time @ 100% Load (Hrs)		
ekW	kVA			2100 gal	3000 gal*	4200 gal*
1250	1562	C32	ESE (Tier 2)	24.3	34.8	48.7
1000	1250	C32	ESE (Tier 2)	29.4	42.0	58.7
800	1000	C27	ESE (Tier 2)	37.8	54.0	75.5

*Requires enclosure lifting base, and fuel tank is shipped loose. Not available with IBC certification.

LET'S DO THE WORK.™

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LEHE20309-00 (10/22)

Spill Containment Box



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7 Gallon Fuel Spill containment for 1000 or 2000 gallon fuel tanks for C27 and C32.

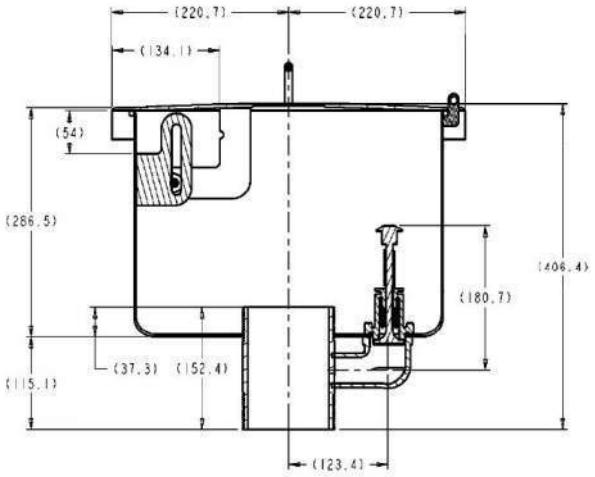
Durable spill containment box designed for containment of small spills during filling of an above ground storage tank.

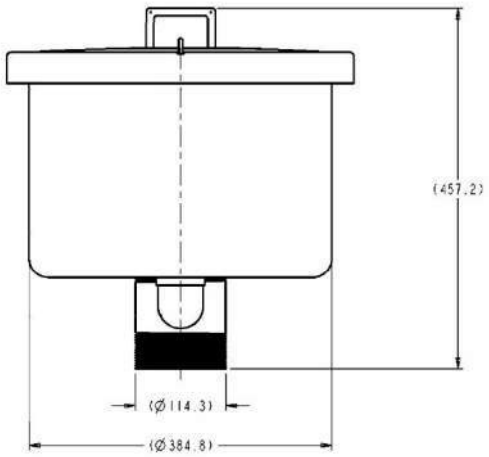
Features

- ULC listing
- The base and lid made of 12 gauge mild steel
- Nylon washers at contact points to prevent rust
- Spun construction minimizes leakage
- Weather deflecting lid
- Push drain
- Cover lock
- Offset drain style
- Rolled lip on base

Dimensions

- Height: 406.4mm (16")
- Height with handle: 457.2mm (18")
- Width: 441.3mm (17.4")
- Pipe diameter: 114.3 (4.5")
- Body diameter: 384.8 (15.14")





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Circuit Breakers



L Frame



P Frame



R Frame

Molded Case Circuit Breakers

C27 – C32 North America built packages (60 Hz)

L-Frame
250A-400A (UL)

P-Frame
1200A (UL)

R-Frame
1600-2000A (UL)

Features

Design Specifications:

- 100% rated breakers
- Moisture and fungus protection
- Clear indication of breaker status
- Reinforced insulation
- Shunt trip
- Auxiliary contacts
- Load side extension bars
- Maintenance-free operation
- Exceptional characteristics under short-circuit conditions
- Adjustable trip settings

L-Frame
UL 489
CSA 22.2 No 5
Federal Specification W-C-375B/GEN
NEMA AB1
NMX J-266 CCC
CE Marking

P-Frame & R-Frame
UL 489
CSA 22.2 No 5-02
Federal Specification W-C-375B/GEN
NEMA AB1
NMX J-266

Standard Features

Standards

- UL-CSA
  - o L-Frame
  - o P-Frame
  - o R-Frame

Shunt trip

- The shunt trip provides a means of tripping the circuit breaker electronically
- Shunt trip ratings
  - o Voltage: 24VDC
  - o Coil Burden (Holding/Inrush): 4.5/200 VA
  - o Power Consumption: 4.5 VA

Auxiliary contacts

The auxiliary contacts provide a means of remote circuit breaker position indication and consists of (1) Form C Contact (1 Normally open and 1 Normally closed contact) with the following current ratings:

6A @ 240-480 VAC, 50/60 Hz

Trip units

All circuit breakers come equipped with True RMS Current Sensing.

The trip units for each of the circuit breaker ratings sample the current waveform to provide true RMS protection through the 15th harmonic. This true RMS sensing gives accurate values for the magnitude of a nonsinusoidal waveform.

Therefore, the heating effects of harmonically distorted waveforms are accurately evaluated. The trip system comes equipped with a set of current transformers (CT's) to sense current, a trip unit to evaluate the current, and a tripping solenoid to trip the circuit breaker.

Additionally, each trip unit comes equipped with Active Thermal Imaging which is active 20 minutes before and after tripping.

Customer cable connections

Extension bus bars or mechanical lugs are provided for installation of load cables.

Cat® Part Number	Frame and Rating (Amps)	IEC/UL	No. Poles	Operation	Trip Unit	Circuit Breaker Characteristics	Options	Instantaneous Override (kA RMS) +/- 10%
611-4994	250A L-Frame MCCB	UL	3	MO	3.3S LSI	Table 3	1 Aux Contact, Shunt Trip	–
421-3235	400A L-Frame MCCB	UL	3	MO	3.3S LSI	Table 3	1 Aux Contact, Shunt Trip	–
421-3237	400A L-Frame MCCB	UL	3	MO	6.3A LSIG	Table 3	1 Aux Contact, Shunt Trip	–
244-9774	1200A P-Frame MCCB	UL	3	MO	5.0A LSI	Table 1	1 Aux Contact, Shunt Trip	24
244-9864	1600A R-Frame MCCB	UL	3	MO	5.0A LSI	Table 2	1 Aux Contact, Shunt Trip	57
244-9868	2000A R-Frame MCCB	UL	3	MO	5.0A LSI	Table 2	1 Aux Contact, Shunt Trip	57
244-9778	1200A P-Frame MCCB	UL	3	MO	6.0A LSIG	Table 1	1 Aux Contact, Shunt Trip	24
244-9865	1600A R-Frame MCCB	UL	3	MO	6.0A LSIG	Table 2	1 Aux Contact, Shunt Trip	57
244-9869	2000A R-Frame MCCB	UL	3	MO	6.0A LSIG	Table 2	1 Aux Contact, Shunt Trip	57
244-9790	1200A P-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 1	1 Aux Contact, Shunt Trip, Modbus	24
585-8063	1600A R-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 2	1 Aux Contact, Shunt Trip, Modbus	57
585-8064	2000A R-Frame MCCB	UL	3	MO	6.0P LSIG-P	Table 2	1 Aux Contact, Shunt Trip, Modbus	57

Note: Arc flash energy reduction maintenance mode switch kit shipped loose for 1200A breakers.

Circuit Breakers Characteristics

TABLE 1

Model			P-Frame
Number of Poles			3
Rated Current (Amps)			1200A (UL)
Voltage Rating (VAC)			600UL/ 690 IEC
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 60947-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

TABLE 2

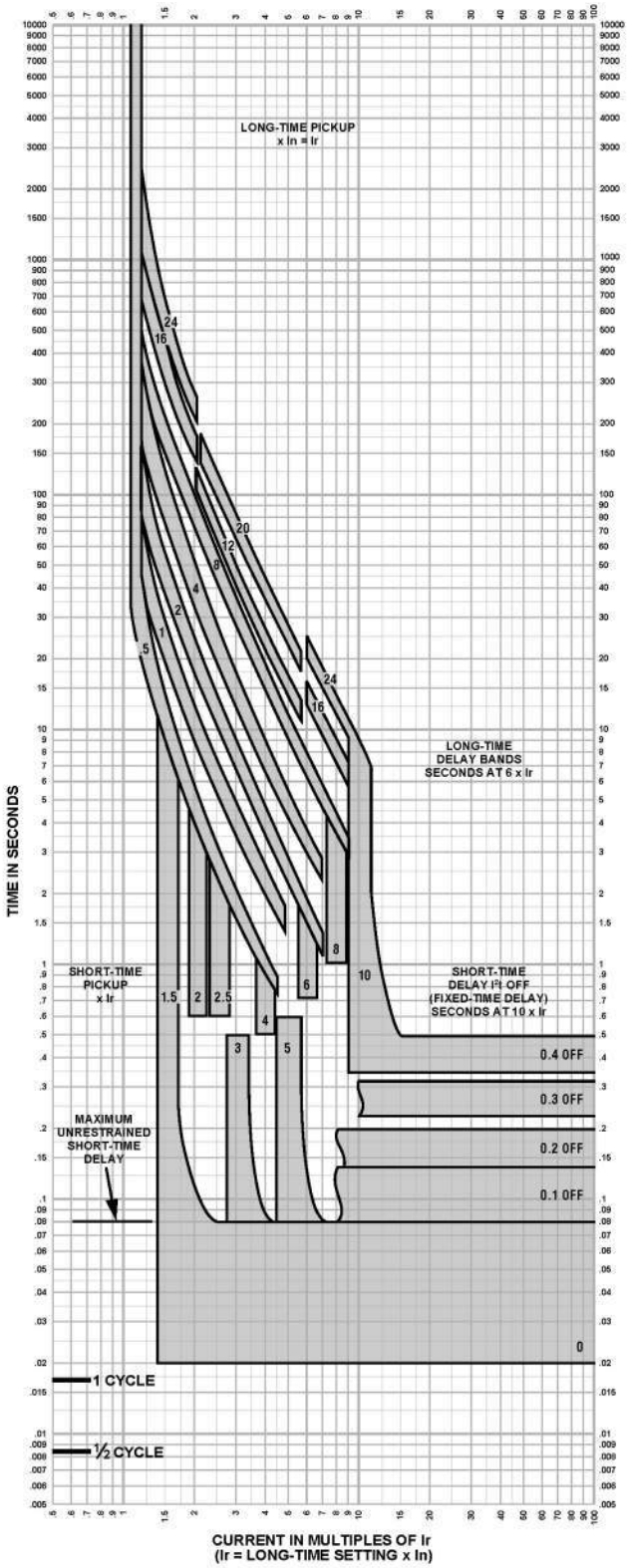
Model			R-Frame
Number of Poles			3
Rated Current (Amps)			1600A – 2000A (UL
Voltage Rating (VAC)			600UL/ 690 IEC
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 60947-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

TABLE 3

Model			L-Frame
Number of Poles			3
Rated Current (Amps)			250A – 400A (UL
Voltage Rating (VAC)			600UL/ 525 IEC
Interrupt Rating (UL/CSA) (60 Hz) – kA RMS		240V	65
		480V	35
		600V	18
IEC 647-2 Rating (50/60 Hz) – kA RMS	Icu	240V	50
		380/415V	35
	Ics	240V	25
		380/415V	20

P, R, NS-Frame Long-Short Trip Curve and NW-Frame Long-Short Trip Curve

CURRENT IN MULTIPLES OF Ir (Ir = Long-time setting x In)



Long-time Pickup and Delay Short-time Pickup and I²t OFF Delay

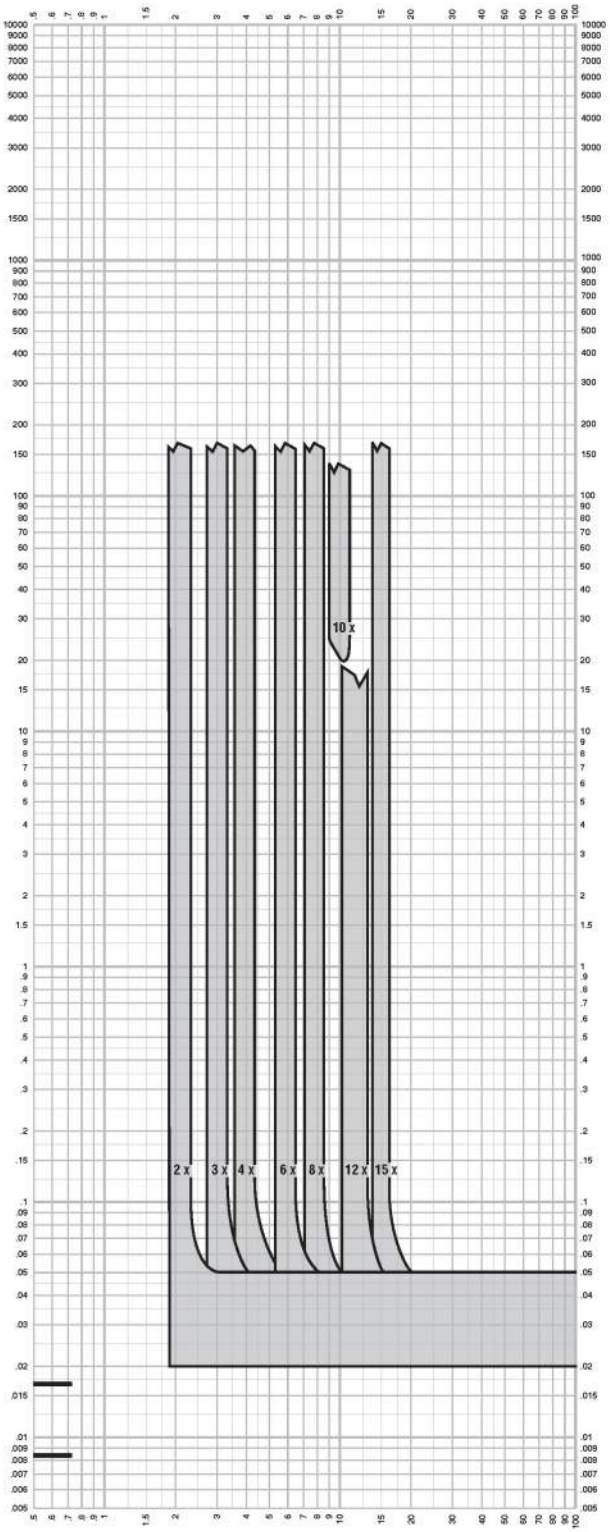
The time-current curve information is to be used for application and coordination purposes only. Curves apply from -30°C to +60°C ambient temperature.

Notes:

1. There is a thermal-imaging effect that can act to shorten the long-time delay. The thermalimaging effect comes into play if a current above the long-time delay pickup value exists for a time and then is cleared by the tripping of a downstream device or the circuit breaker itself. A subsequent overload will cause the circuit breaker to trip in a shorter time than normal. The amount of time delay reduction is inverse to the amount of time that has elapsed since the previous overload. Approximately 20 minutes is required between overloads to completely reset thermalimaging.
2. The end of the curve is determined by the interrupting rating of the circuit breaker.
3. With zone-selective interlocking on, short-time delay utilized and no restraining signal, the maximum unrestrained short-time delay time band applies regardless of the setting.
4. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
5. For a withstand circuit breaker, instantaneous can be turned OFF.
6. Overload indicator illuminates at 100%.

P, R, NS-Frame Instant Curve and NW-Frame Instant Trip Curve

MULTIPLES OF SENSOR RATING (In)



Instantaneous Pickup 2x–15x and OFF

The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30° to +60°C ambient temperature.

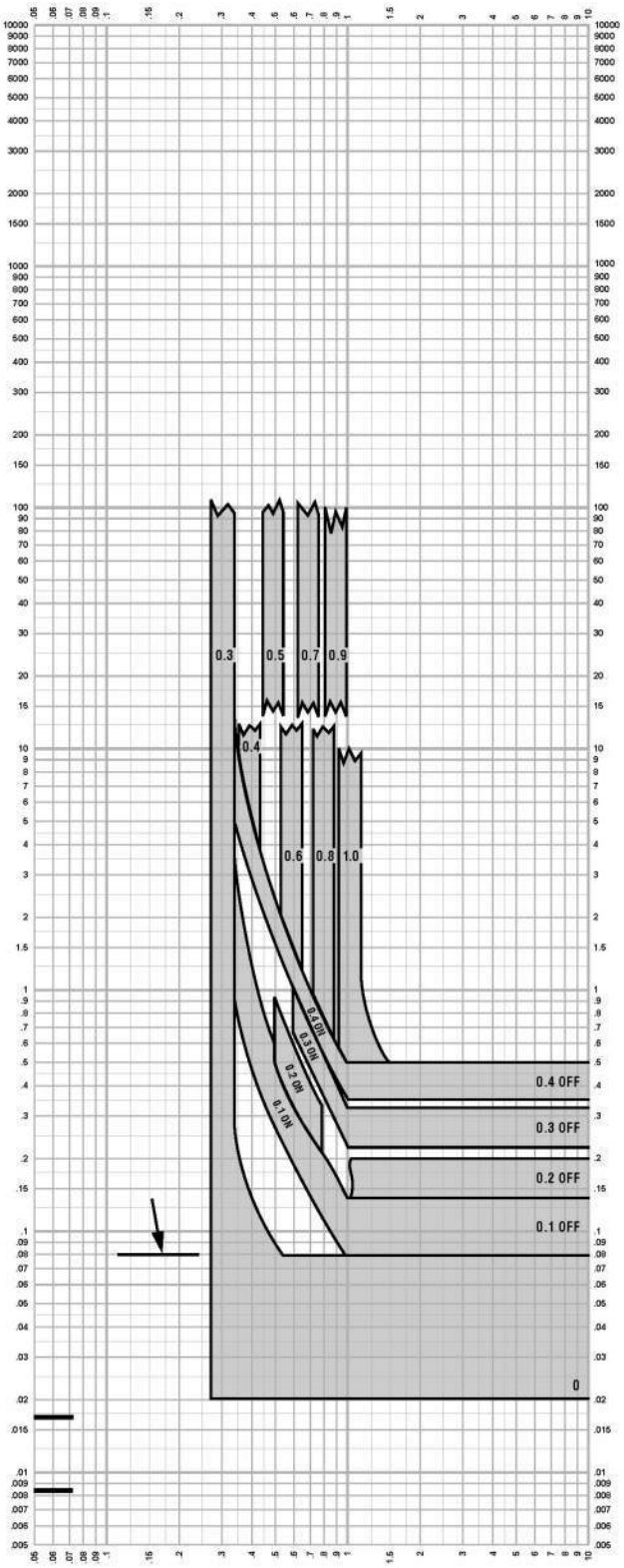
Notes:

1. The end of the curve is determined by the interrupting rating of the circuit breaker.
2. Total clearing times shown include the response times of the trip unit, the circuit breaker opening, and the extinction of the current.
3. The instantaneous region of the trip curve shows maximum total clearing times. Actual clearing times in this region can vary depending on the circuit breaker mechanism design and other factors. The actual clearing time can be considerably faster than indicated.

   Contact your local Sales Office for additional information.
4. For a withstand circuit breaker, instantaneous can be turned OFF. \

P, R, NS-Frame Ground Curve and NW-Frame Ground Fault Trip Curve

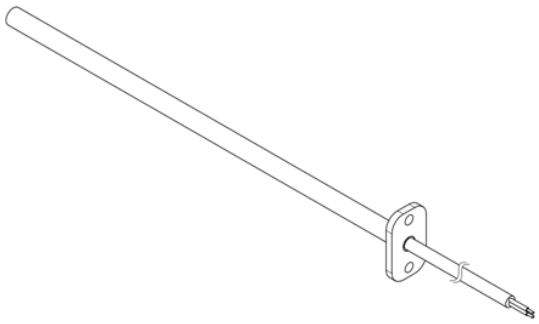
MULTIPLES OF SENSOR RATING (In)



Ground-fault I^2t OFF and ON In ≤ 400 A

The time-current curve information is to be used for application and coordination purposes only.

Curves apply from -30° to +60°C ambient temperature.



Picture shown may not reflect actual configuration

Generator Space Heater

for SR500 E3800 Frame Generators

General Description

Humidity is a natural enemy of generators and all electrical equipment.

Space heaters are designed to protect generator windings from abnormally high humidity conditions when the generator is idle. The heater maintains the air around the windings at a suitable temperature to prevent winding corrosion due to condensation.

Generator space heaters use electrical resistance and are located within the generator stator housing.

Space heaters are particularly recommended for generator sets located in a low ambient and/or high humidity environment. As a further benefit, space heaters provide an excellent method of drying out a generator after long transit or storage.

Because space heaters are required only during non-operative periods, they require availability of a power source separate from the generator set itself.

When the generator set is not running the heater automatically connects to the AC supply through a power relay mounted in the control panel. Upon receiving a start signal the AC supply is automatically disconnected by the power relay and automatically reconnected when the start signal is removed.

VOLTAGE (V)	POWER (W)
208	85
230	103
255	127
277	150

LET'S DO THE WORK.™

www.cat.com/electricpower
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Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.
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LEHE20379-00 (05/21)

Selected Model

Engine: C32	**Generator Frame:** E3875L4	**Genset Rating (kW):** 1250.0	**Line Voltage:** 480
Fuel: Diesel	**Generator Arrangement:** 6145658	**Genset Rating (kVA):** 1563.0	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 1880.0
Duty: STANDBY	**Connection:** PARALLEL STAR	**Application:** EPG	**Status:** Current

Version: 20239 /20239 /20239 /677642

Spec Information

Generator Specification

Frame: E3875L4 **Type:** SR500 **No. of Bearings:** 1
Winding Type: RANDOM WOUND **Flywheel:** 18.0
Connection: PARALLEL STAR **Housing:** 0
Phases: 3 **No. of Leads:** 12
Poles: 4
Sync Speed: 1800 **Generator Pitch:** 0.6667

Generator Efficiency

Per Unit Load	kW	Efficiency %
0.25	312.5	92.5
0.5	625.0	95.2
0.75	937.5	96.5
1.0	1250.0	96.4

Reactances	Per Unit	Ohms
SUBTRANSIENT - DIRECT AXIS X''_d	0.0726	0.0107
SUBTRANSIENT - QUADRATURE AXIS X''_q	0.1655	0.0244
TRANSIENT - SATURATED X'_d	0.1539	0.0227
SYNCHRONOUS - DIRECT AXIS X_d	3.9164	0.5775
SYNCHRONOUS - QUADRATURE AXIS X_q	1.5042	0.2218
NEGATIVE SEQUENCE X_2	0.1180	0.0174
ZERO SEQUENCE X_0	0.0407	0.0060

Time Constants	Seconds
OPEN CIRCUIT TRANSIENT - DIRECT AXIS T'_{d0}	8.9000
SHORT CIRCUIT TRANSIENT - DIRECT AXIS T'_d	0.2710
OPEN CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_{d0}	0.0384
SHORT CIRCUIT SUBSTRANSIENT - DIRECT AXIS T''_d	0.0180
ARMATURE SHORT CIRCUIT T_a	0.0260

Short Circuit Ratio: 0.3793	Stator Resistance = 0.006 Ohms	Field Resistance = 2.8 Ohms

Voltage Regulation

Voltage level adjustment: +/-	5.0%
Voltage regulation, steady state: +/-	0.5%
Voltage regulation with 3% speed change: +/-	0.5%
Waveform deviation line - line, no load: less than	2.0%
Telephone influence factor: less than	40

Generator Excitation

	No Load	Full Load, (rated) pf Series
Excitation voltage:	12.76 Volts	41.63 Volts
Excitation current	1.2 Amps	3.92 Amps

Selected Model

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Generator Mechanical Information

Center of Gravity

Dimension X	-750.0 mm	-29.5 IN.
Dimension Y	0.0 mm	0.0 IN.
Dimension Z	0.0 mm	0.0 IN.

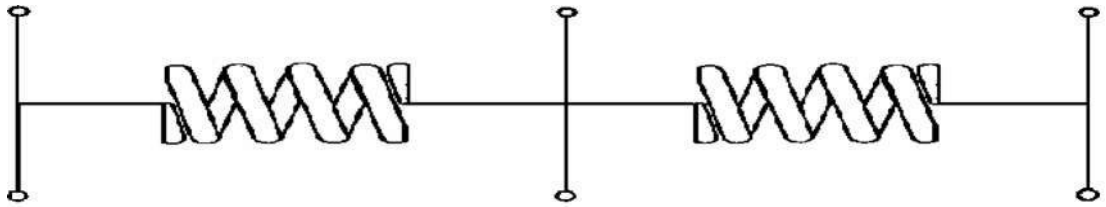
- "X" is measured from driven end of generator and parallel to rotor. Towards engine fan is positive. See General Information for details
- "Y" is measured vertically from rotor center line. Up is positive.
- "Z" is measured to left and right of rotor center line. To the right is positive.

Generator WT = 2700 kg * Rotor WT = 1026 kg * Stator WT = 1424 kg
5,952 LB 2,262 LB 3,139 LB

Rotor Balance = 0.016 mm deflection PTP

Overspeed Capacity = 125% of synchronous speed

Generator Torsional Data



J1 = Coupling and Fan | **J2 = Rotor** | **J3 = Exciter End**

Total J

215.3 LB IN. s^2

24.32 N m s^2

Selected Model

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Generator Cooling Requirements - Temperature - Insulation Data

Cooling Requirements:		**Temperature Data: (Ambient 40 ^{0}C)**	
Heat Dissipated:	46.8 kW	**Stator Rise:**	125.0 ^{0}C
Air Flow:	108.0 m^3/min	**Rotor Rise:**	125.0 ^{0}C

Insulation Class: H

Insulation Reg. as shipped: 100.0 MΩ minimum at 40 ^{0}C

Thermal Limits of Generator

Frequency:	60 Hz
Line to Line Voltage:	480 Volts
B BR 80/40	1248.0 kVA
F BR -105/40	1440.0 kVA
H BR - 125/40	1563.0 kVA
H PR - 150/40	1630.0 kVA

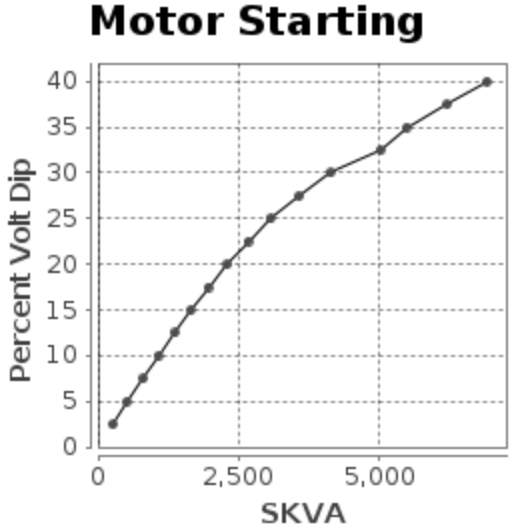
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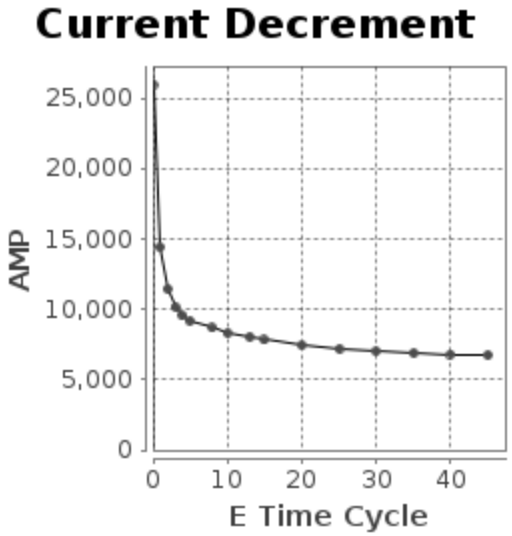
Starting Capability & Current Decrement
Motor Starting Capability (0.6 pf)

SKVA	Percent Volt Dip
269	2.5
519	5.0
807	7.5
1,071	10.0
1,368	12.5
1,652	15.0
1,964	17.5
2,304	20.0
2,669	22.5
3,067	25.0
3,580	27.5
4,132	30.0
5,023	32.5
5,491	35.0
6,209	37.5
6,919	40.0



Current Decrement Data

E Time Cycle	AMP
0.0	25,990
1.0	14,427
2.0	11,469
3.0	10,177
4.0	9,553
5.0	9,200
8.0	8,681
10.0	8,331
13.0	8,062
15.0	7,823
20.0	7,459
25.0	7,205
30.0	7,028
35.0	6,906
40.0	6,822
45.0	6,765



Instantaneous 3 Phase Fault Current: 25990 Amps **Instantaneous Line - Line Fault Current:** 22611 Amps

Instantaneous Line - Neutral Fault Current: 33786 Amps

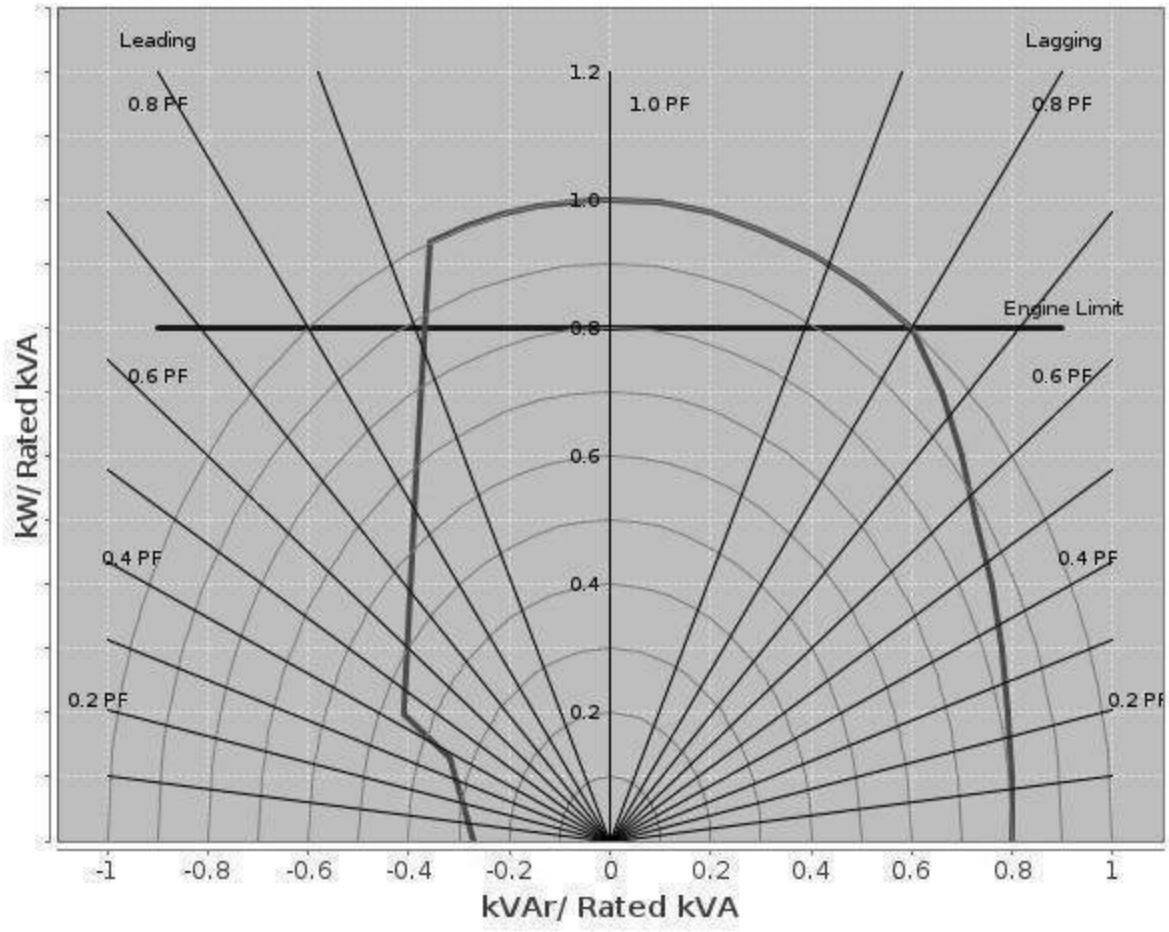
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Duty: STANDBY	**Connection:** PARALLEL STAR	**Application:** EPG	**Status:** Current

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Reactive Capability Curve

Operating Chart



Selected Model

Engine: C32	**Generator Frame:** E3875L4	**Genset Rating (kW):** 1250.0	**Line Voltage:** 480
Fuel: Diesel	**Generator Arrangement:** 6145658	**Genset Rating (kVA):** 1563.0	**Phase Voltage:** 277
Frequency: 60	**Excitation Type:** Permanent Magnet	**Pwr. Factor:** 0.8	**Rated Current:** 1880.0
Duty: STANDBY	**Connection:** PARALLEL STAR	**Application:** EPG	**Status:** Current

Version: 20239 /20239 /20239 /677642

General Information

DM7802
GENERATOR GENERAL INFORMATION

I. GENERATOR MOTOR STARTING CAPABILITY CURVES
A. THE MOTOR STARTING CURVES ARE REPRESENTATIVE OF THE DATA OBTAINED BY THE FOLLOWING PROCEDURE:
1. THE CATERPILLAR GENERATOR IS DRIVEN BY A SYNCHRONOUS DRIVER.
2. VARIOUS SIZE THREE PHASE INDUCTION MOTORS (NEMA CODE F) ARE STARTED ACROSS THE LINE LEADS OF THE UNLOADED GENERATOR.
3. THE RESULTING VOLTAGE DIPS ARE RECORDED WITH AN OSCILLOSCOPE.
4. MOTOR HORSEPOWER HAS BEEN CONVERTED TO STARTING KILOVOLT AMPERES (SKVA).
5. RECORDED VOLTAGE DIPS HAVE BEEN EXPRESSED AS A OF GENERATOR RATED VOLTAGE.

II. USE OF THE MOTOR STARTING CAPABILITY CURVES.
A. CALCULATE THE SKVA REQUIRED BY THE MOTOR FOR FULL VOLTAGE STARTING ACROSS THE LINE IF THE VALUE IS NOT LISTED ON THE MOTOR DATA PLATE.
1. MOTORS CONFORMING TO NEMA STANDARDS
MULTIPLY THE MOTOR HORSEPOWER BY THE NEMA SKVA/HP FIGURE. FOR NEMA CODE F,USE 5.3 SKVA/HP; FOR NEMA CODE G, USE 6.0 SKVA/HP.
2. ALL OTHER MOTORS:
MULTIPLY THE RATED VOLTAGE BY THE LOCKED ROTOR AMPERE AND BY 0.001732. (IF THE LOCKED ROTOR AMPERES ARE NOT LISTED, MULTIPLY THE FULL LOAD (RUNNING) AMPERES BY
B. USE THE ABOVE SKVA WITH THE MOTOR STARTING TABLE.
1. ACROSS LINE STARTING:
READ ACROSS THE ROW OF "ACROSS THE LINE STARTING SKVA
IF THE DESIRED VALUE OF SKVA IS NOT GIVEN, CALCULATE THE DIP BY FINDING THE PROPER SKVA INTERVAL AND INTERPOLATING AS FOLLOWS:
SKVA1 IS THE SKVA TABLE ENTRY JUST SMALLER THAN THE DESIRED SKVA, DIP1 IS THE DIP FOR SKVA2, AND SKVA2 IS THE SKVA TABLE ENTRY JUST GREATER THAN THE DESIRED SKVA. THE DIP (IN PERCENT) AT THE DESIRED SKVA IS:
DIP = DIP1 + (SKVA - SKVA1) * 2.5 /
(SKVA2 - SKVA1)
NOTE:VOLTAGE DIPS GREATER THAN 35% MAY CAUSE MAGNETIC CONTACTORS TO DROP OUT.

2. REDUCED VOLTAGE STARTING:
REFER TO THE FOLLOWING TABLE. MULTIPLY THE CALCULATE ACROSS LINE SKVA BY THE MULTIPLIER LISTED FOR THE SPECIFIC STARTING METHOD. APPLY THE RESULT TO THE STARTING TABLE AS IN II A, TO CALCULATE THE EXPECTED VOLTAGE DIP:

TYPE OF REDUCED VOLTAGE STARTING	MULTIPLY LINE SKVA BY
80% TAP	.80
65% TAP	.65
50% TAP	.50
45% TAP	.45
Wye start,delta run	.33

AUTOTRANSFORMER

80% TAP .68
65% TAP .46
50% TAP .29

NOTE: REDUCE VOLTAGE STARTING LOWERS THE MAXIMUM REQUIRED MOTOR skVA.

3. Part winding starting:
Most common is half-winding start, full-winding run. Multiply the full motor, accross line starting skVA by 0.6. Apply the result to the selected curve as in ii. A above. Read the expected voltage dip, for the required skVA.

III.DEFINITION:

A. GENERATOR TERMS

MODEL: Engine Sales model
ENG TYPE: DI = Direct Injection,
NA = Naturally aspirated, etc
HZ: Running frequency, hertz
RATING TYPE: PP, SB (prime power or standby)
KW: Base rating electrical kilowatts (ekW)
VOLTS: Rating terminal, line to line
GEN ARR: Cat generator arrangement part number
GEN FRAME: Generator frame size designation
CONN: Generator output connection
(star, wye, delta, ect.)
POLES: Number of pole pieces on rotor.
(eg. A 4 pole generator run at 1800)
RPM will produce 60 Hz alternating current. A 6 pole generator run at 1200 RPM will produce 60 Hz alternating current.)

B. GENERATOR TEMPERATURE RISE:

The indicated temperature rise indicated the NEMA limits for standby or prime power applications. These rises are used for calculating the losses and efficiencies and are not necessarily indicative of the actual temperature rise of a given machine.

C. CENTER OF GRAVITY

The specified center of gravity is for the generator only.
For single bearing, and two bearing close coupled generators, the cent er of gravity is measured from the generator/engine flywheel housing i nterface and from the centerline of the rotor shaft.

For two bearing, standalone generators, the center of gravity is measu red from the end of the rotor shaft and from the centerline of the rot or shaft.

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D. GENERATOR DECREMENT CURRENT CURVES

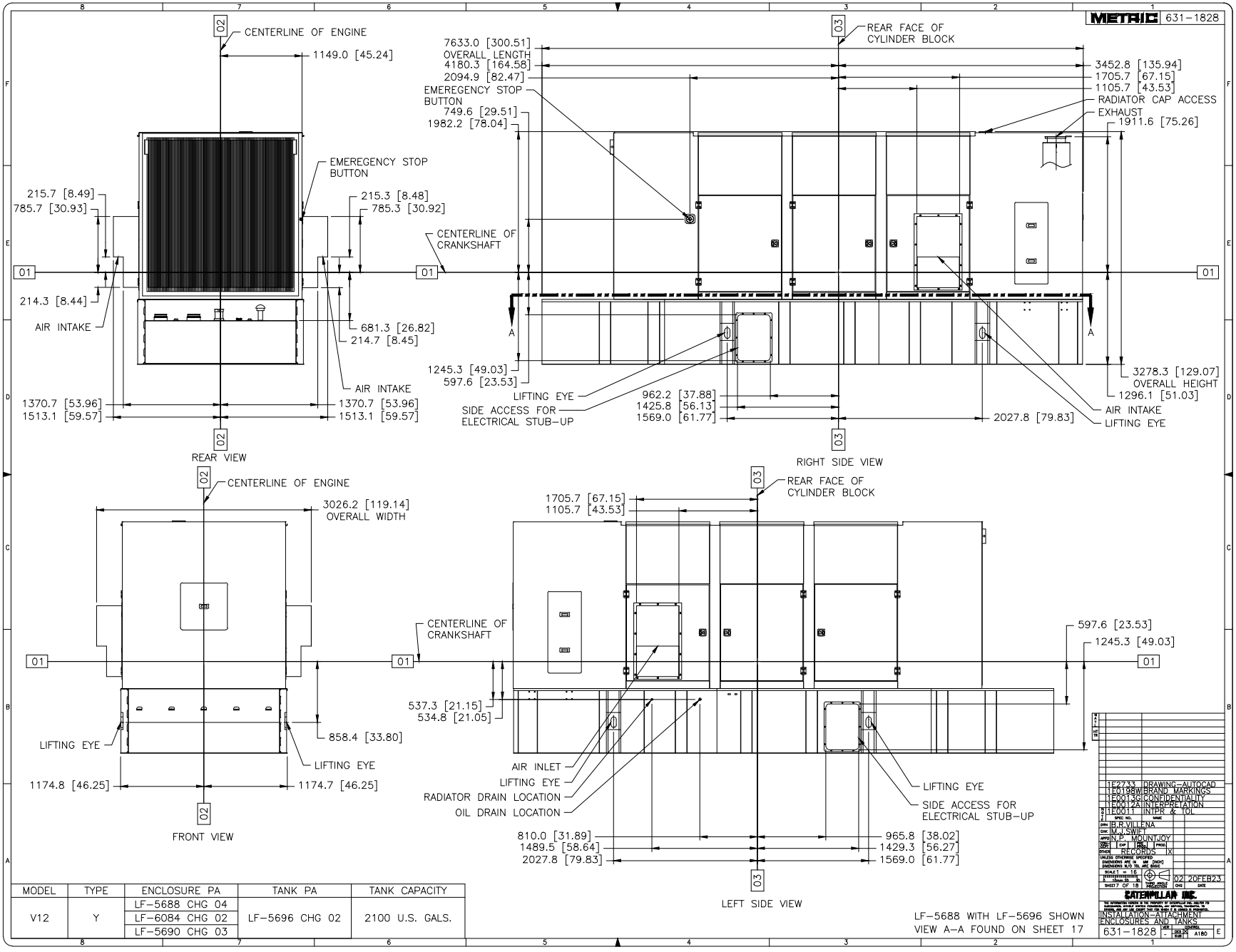
The generator decrement current curve gives the symmetrical current supplied by the generator for a three phase bolted fault at the generator terminals. Generators equipped with the series boost attachment or generators with PM excitation system will supply 300% of rated current for at least 10 seconds.

E. GENERATOR EFFICIENCY CURVES

The efficiency curve is representative of the overall generator efficiency over the normal range of the electrical load and at the specified parameters. This is not the overall engine generator set efficiency curve.

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METRIC 631-1828



MODEL	TYPE	ENCLOSURE PA	TANK PA	TANK CAPACITY
V12	Y	LF-5688 CHG 04	LF-5696 CHG 02	2100 U.S. GALS.
		LF-6084 CHG 02		
		LF-5690 CHG 03		

LF-5688 WITH LF-5696 SHOWN
VIEW A-A FOUND ON SHEET 17

1E2733 DRAWING-AUTOCAD
1E0198W BRAND MARKINGS
1E0013G CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 IN1PR & TOL

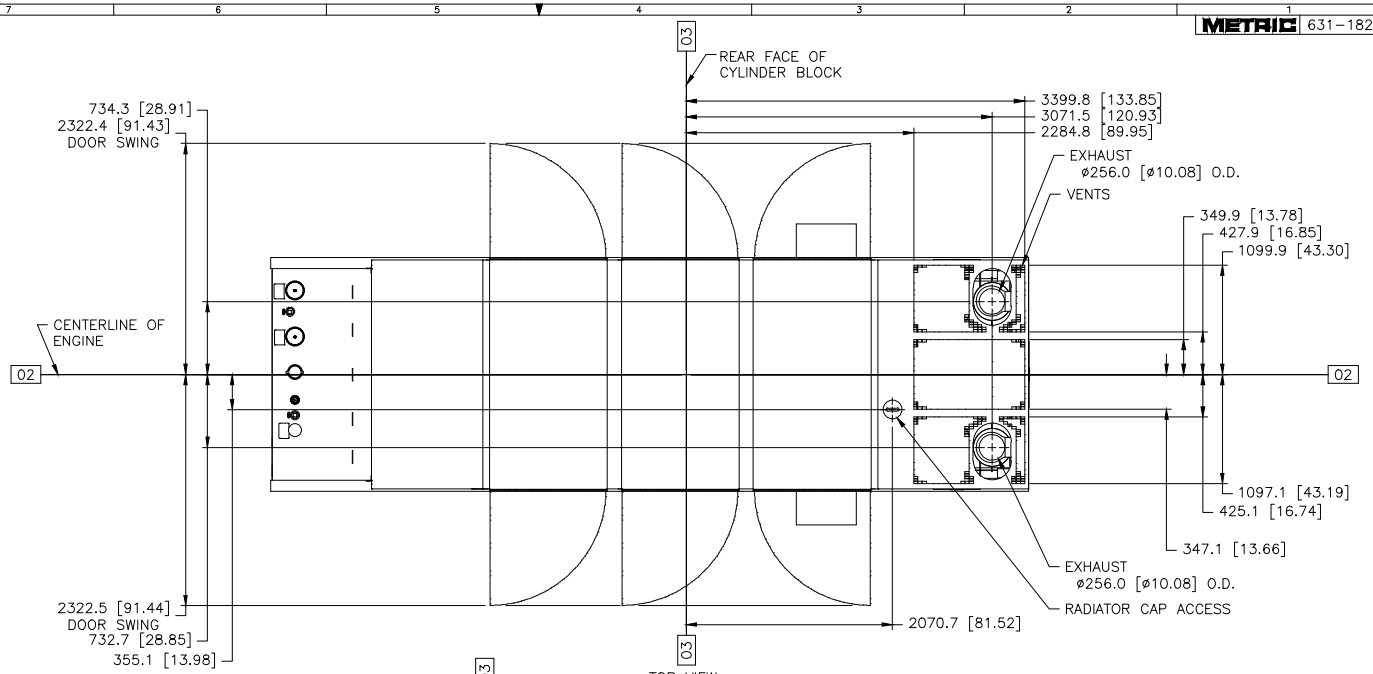
DRN	B.R.VILLENA		
CHK	M.J.SWIFT		
APVD	N.P. MOUNTJOY		
DATE	02 20FEB23		

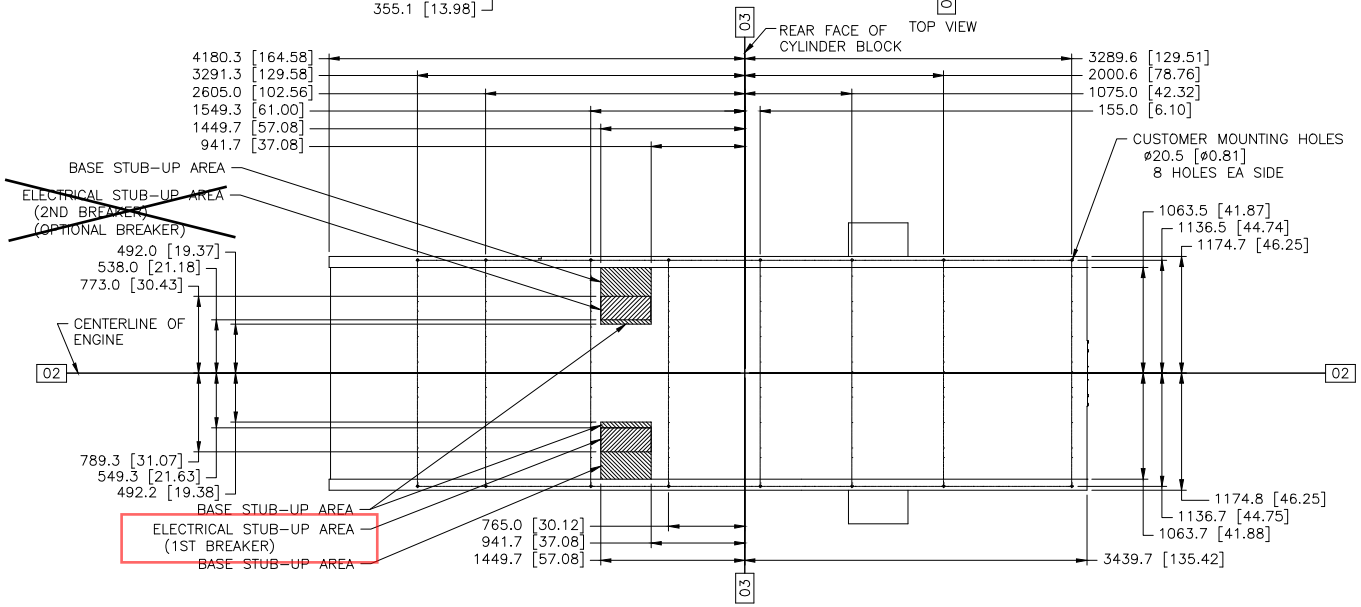
SCALE 1 = 16
SHEET 7 OF 18

CATERPILLAR INC.

INSTALLATION-ATTACHMENT
ENCLOSURES AND TANKS
631-1828 - E

METRIC 631-1828





LF-5688 WITH LF-5696 SHOWN

1E2733 DRAWING-AUTOCAD
1E0136W BRAND MARKINGS
1E0013G CONFIDENTIALITY
1E0012A INTERPRETATION
1E0011 IN!PR & TOL

DRN	B.R.VILLENA	
CHK	M.J.SWIFT	
APVD	N.P. MOUNTJOY	
STAGE	RECORDS	IX

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM [INCH] DIMENSIONS W/O TOL ARE BASIC
SCALE 1 : 16
SHEETS OF 18 — 02 20FEB23

CATERPILLAR INC.

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INSTALLATION-ATTACHMENT ENCLOSURES AND TANKS

631-1828 - A1B0 E

JOB NAME & QUOTATION NO: City of Umatilla - CTUIR & W6-728518-01

From	:	Erickson , Andrew	**Email**	:	Andrew.Erickson@wseco.com
Company	:	107581 - WESTERN STATES EQUIPMENT CO MERIDIAN ID	**Date**	:	01/06/2025

We are pleased to quote herewith our prices for the requested ASCO products. Quoted prices will be valid for 30 days from date of quotation.

ITEM DETAIL

#	Qty	ASCO Catalog No.	Description		
1	1	G3ADUSA32000NGXM,11BE,44G,73CC,119M,125A,134 (See Disclaimer 3)	300 Series, Automatic Service Entrance Delayed Transition Transfer Switch,3 Pole with Solid neutral, 480V, 2000A, Type 3R Secure Encl		

ATS Switch Model

ACCESSORY DESCRIPTIONS		
Series 300 : G3ADUSA32000NGXM,11BE,44G,73CC,119M,125A,134		
#	**Accessory Code**	**Description**
1	134	100% Rated Breaker
2	11BE	Adds the following features to the Group G controller: (1) Serial RS-485 Modbus Communications (2) Multi-Schedule Engine Exerciser (3) a 300 Entry Event Log and (4) a common alarm output function. When applied on 3-phase systems it also enables: (1) 3-Phase Emergency Source VLL sensing (2) Phase Rotation Monitoring (3) Emergency Source VLL Unbalance Monitoring.
3	44G	Strip heater w/ thermostat, wired to load terminals: 208-600 volts
4	73CC	100KA----SE XDSE Series surge suppressor, 100kA per mode. Connected to Normal and Emergency only 3 Phase 4 Wire Wye
5	119M	Energy Reducing Maintenance Switch (ERMS) ERMS lowers the instantaneous pickup setting, utilizes a faster acting instantaneous trip function, or activates an alternate set of trip settings on a breaker to provide reduced arc flash incident energy. To be used on service entrance rated switches containing Square D breakers with MicroLogic 5.0/6.0 P/H trip units Customer is responsible for all trip unit settings. Customer supplied 24VDC is required.
6	125A	Seismic

Notes:
Attached ASCO Terms and Conditions of Sale apply Terms_and_Conditions.pdf.

For additional information on ASCO or our products, please visit our Internet site at http://www.ascopower.com.
This quotation does not include applicable sales tax. If tax exempt, please provide a copy of your tax exemption certificate. Otherwise sales tax will be added.
This quotation supersedes any other discussions on quotations you may have received from ASCO pertaining to subject City of Umatilla - CTUIR.

We thank you for the opportunity to work with you on this project. For any clarifications, please feel free to contact us.

Disclaimers

1. This proposal is based on information supplied to ASCO which may or may not have been correct or complete. The customer is responsible for reviewing this proposal for compliance with the complete and final drawings and specifications.
2. Shipping & Handling charges are estimates only. Actual charges may vary based on final ship to address of item.
3. Type 3R enclosures provide a degree of protection against falling rain or snow, but may not be suitable for outdoor applications involving wind-blown rain or snow without a separate or supplemental shelter.

Limited Warranty

Series 150, 200, 300 and 4000 Power Transfer Switches

This Warranty is given ONLY to purchasers who buy for commercial or industrial use in the ordinary course of each purchaser's business.

General

ASCO Power Technologies, LP products and systems are in our opinion the finest available. We take pride in our products and are pleased that you have chosen them. Under certain circumstances we offer with our products the following Limited Guardian Warranty Against Defects in Material and Workmanship.

Please read your Guardian Warranty carefully. This Warranty sets forth our responsibilities in the unlikely event of defect and tells you how to obtain performance under this Warranty.

Call out for Group G controller

Limited Warranty Against Defects in Material and Workmans

Product Description	Series	Catalog Code
Automatic Transfer Switch	150, 200	1ATS, 2ATS
	300	3ATS, 3ADTS
	4000	4ATS, 4ADTS, 4ACTS
Non-Automatic Transfer Switch (Electrically Operated)	300	3NTS, 3NDTS
ASCO Lighting Control Panels	4000	4NTS, 4NDTS, 4NCTS
Manual Transfer Switch	300	3MTS, 3MTQ, 3MUQ, 3MPQ, 3MGQ, 3MGDQ, 3MTDQ
Service Entrance Transfer Switch (SEATS)	300	3AUS, 3ADUS, 3APS, 3ARS, 3MUS
Power Transfer Load Center (PTLC)	300	300L
Quick Connect Panels	300	3QCN, 3QCU, 3QCD
Electrically Operated Bypass Switch	4000	4ATE, 4NTE, 4ADTE, 4NDTE

Limited Warranty

ASCO warrants that the ATS will be free from defects in material and workmanship and will conform to ASCO's standard specifications for the ATS for a period of twenty four (24) months from date of product shipment from ASCO (the "Warranty Period"). This Limited Warranty does not extend to subsequent owners of the structure during the Warranty period.

Terms of Warranty

The foregoing Limited Warranty is conditioned upon user's compliance with the following:

1. The ASCO Power Transfer Switch is installed in accordance with ASCO specifications and state and local codes and standards by an electrician licensed in the state of installation.

2. The ASCO Power Transfer Switch is maintained in accordance with ASCO instructions and used under normal conditions for the purposes intended by ASCO.

All warranty field-related repairs, replacements or adjustments must be made by ASCO Services Inc. or its duly authorized representative.

Optional Available Extended Warranty

Optional extended warranty coverage may be purchased from ASCO for a specified fee at the time of the original sale. If purchased, Warranty period shall be extended up to an additional thirty - six (36) months beyond the standard twenty - four (24) months to provide up to five (5) year coverage applicable to the above referenced products, except for 3AUS, 3APS, and 3ARS products where the warranty period for the circuit breaker shall be limited to 24 months from date of shipment from ASCO. The length of optional extended coverage shall be reflected on the ASCO invoice and/or order acknowledgement document.

ASCO Power Technologies™

Warranty Extends To First Purchaser for Use, Non-Transferable

This Warranty is extended to the first person, firm, association, or corporation for whom the ASCO product specified herein is originally installed for use (the "user") in the fifty United States or Canada. This Warranty is not transferable or assignable without the prior written permission of ASCO.

Assignment of Warranties

ASCO assigns to user any warranties which are made by manufacturers and suppliers of components of, or accessories to, the ASCO product and which are assignable, but ASCO makes no representations as to the effectiveness or extent of such warranties, assumes no responsibility for any matters which may be warranted by such manufacturers or suppliers and extends no coverage under this Warranty to such components or accessories.

Drawings, Descriptions

ASCO warrants for the period and on the terms of the Warranty set forth herein that the ASCO product will conform to the descriptions contained in the certified drawings, if any, applicable thereto, to ASCO's final invoices, and to applicable ASCO product brochures and manuals current as of the date of product shipment ("descriptions"). ASCO does not control the use of any ASCO product. Accordingly, it is understood that the descriptions are not Warranties of performance and not Warranties of fitness for a particular purpose.

Warranty Claims Procedure

Within a reasonable time, but in no case to exceed thirty (30) days, after user's discovery of a defect, user shall contact ascopowerwarranty@ascopower.com. Subject to the limitations specified herein, an ASCO Services field service representative will repair the non-conforming ASCO product warranted hereunder, without charge for parts, labor, or travel expenses. Warranty coverage will apply only after ASCO's inspection discloses the claimed defect and shows no signs of treatment or use that would void the coverage of this Warranty . All defective products and component parts replaced under this Warranty become the property of ASCO.

Warranty Performance of Component Manufacturers

It is ASCO's practice, consistent with its desire to remedy Warranty defects in the most prompt and effective manner possible, to cooperate with and utilize the services of component manufacturers and their authorized representatives in the performance of work to correct defects in the product components. Accordingly, ASCO may utilize third parties in the performance of Warranty work, including repair or replacement hereunder, where, in ASCO's opinion, such work can be performed in less time, with less expense, or in closer proximity to the ASCO product.

Items Not Covered By Warranty

This Warranty does not cover damage or defect caused by misuse, improper application, wrong or inadequate electrical current or connection, negligence, inappropriate on site operating conditions, repair by non-ASCO designated personnel, accident in transit, tampering, alterations, a change in location or operating use, exposure to the elements, water, or other corrosive liquids or gases, acts of God, theft or installation contrary to ASCO's recommendations or specifications, or in any event if the ASCO serial number has been altered, defaced, or removed.

This Warranty does not cover shipping costs, installation costs, external circuit breaker resetting or maintenance or service items and further, except as may be provided herein, does not include labor costs or transportation charges arising from the replacement of the ASCO product or any part thereof or charges to remove or reinstall same at any premises of user.

Repair or replacement of a defective product or part thereof does not extend the original Warranty period.

The products listed in this Warranty are not for use in the control area or any reactor connected or safety applications or within the containment area of a nuclear facility or for integration into medical devices.

Limitations

This Warranty is in lieu of and excludes all other Warranties, express or implied, including merchantability and fitness for a particular purpose.

User's sole and exclusive remedy is repair or replacement of the ASCO product as set forth herein.

If user's remedy is deemed to fail of its essential purpose by a court of competent jurisdiction, ASCO's responsibility for property loss or damage shall not exceed the net product purchase price.

In no event shall ASCO assume any liability for indirect, special, incidental, consequential or exemplary damages of any kind whatsoever, including without limitation lost profits, business interruption or loss of data, whether any claim is based upon theories of contract, negligence, strict liability, tort, or otherwise.

Miscellaneous

No salesperson, employee, or agent of ASCO is authorized to add to or vary the terms of this Warranty. Warranty terms may be modified, if at all, only in writing signed by an ASCO officer.

ASCO obligations under this Warranty are conditioned upon ASCO timely receipt of full payment of the product purchase price and any other amounts due. ASCO reserves the right to supplement or change the terms of this Warranty in any subsequent warranty offering to user or others.

In the event that any provision of this Warranty should be or becomes invalid and/or unenforceable during the Warranty period, the remaining terms and provisions shall continue in full force and effect.

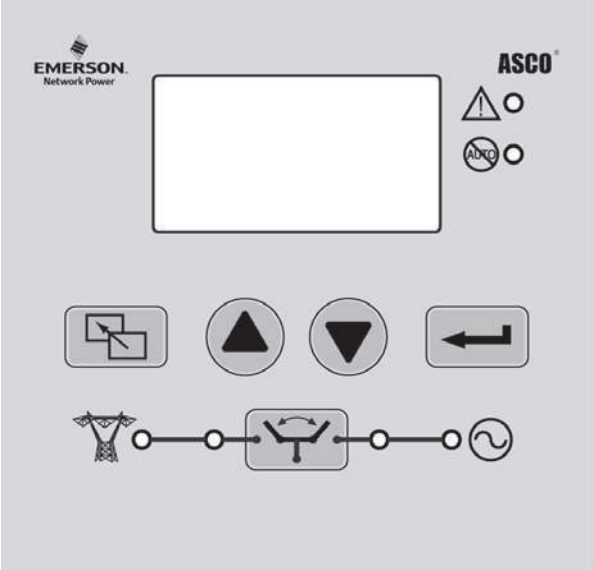
This Warranty shall be governed by, and construed under, the laws of the State of New Jersey, without reference to the conflict of laws principles thereof.

This Warranty represents the entire agreement between ASCO and user with respect to the subject matter herein and supersedes all prior or contemporaneous oral or written communications, representations, understandings, or agreements relating to this subject.

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User's Guide

ASCO® Group G Controller for Automatic & Non-Automatic Transfer Switches



⚠ DANGER

DANGER is used in this manual to warn of a hazard situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING is used in this manual to warn of a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION is used in this manual to warn of a hazardous situation which, if not avoided, could result in minor or moderate injury.

To avoid severe equipment damage, the engine-generator set must have automatic shutdown devices, and the electrical system must have protective devices.

Refer to the outline and wiring drawings provided with the transfer switch for all installation and connection details and accessories.

Refer to the manual provided with the transfer switch for installation, functional testing, and troubleshooting.

Table of Contents

OVERVIEW
Control Overview 1-1
Status Information 1-2
Source Acceptability 1-2
Screen Navigation 1-3
Sequence of Operation diagrams
3ATS 1-4
3ADTS 1-5
3NTS 1-6
3NDTS 1-7

SETTINGS
Settings Overview 2-1
Change a Setting, Password 2-1
Voltage and Frequency 2-2
Timers 2-3, 2-4
General 2-5, 2-6
Features 2-7, 2-8
Engine Exercisers 2-9, 2-10
View Event Log 2-11
View Statistics, View About 2-11

SCREEN MESSAGES
Screen Messages and their Meanings .. 3-1, 3-2
Control Messages and their Meanings 3-3

DESCRIPTION of OPERATION
3ATS 4-1
3ADTS 4-3
3NTS 4-5
3NDTS 4-7

ACCESSORIES
Acc. 11BE software bundle 5-1
Current, Relay, and UPS Modules 5-2
Load Shed – Optional Accessory 30 5-2

APPENDIX
Cover removal, DIP switches A-1
Voltage adjustment and other settings A-2
Logged Events A-3
Event Causes and Statistics Kept A-4

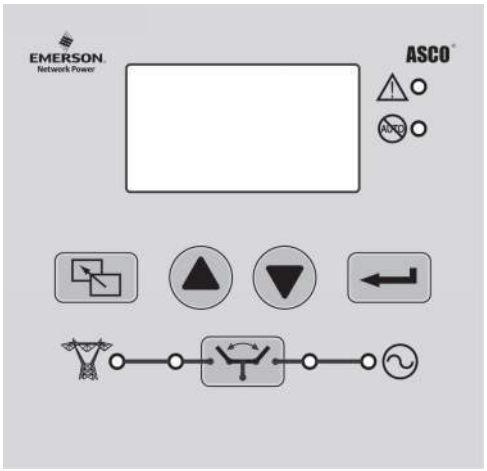
INDEX ..... back pages

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For sales or service call 800-800-2726 (ASCO)
www.ascopower.com

EMERSON Network Power

381333-400 A

The Group G Controller handles the sensing, timing, and control functions for Automatic and Non-Automtatic Transfer Switches (3ATS, 3ADTS, 3NTS, 3NDTS). This microprocessor-based controller includes a user interface. All monitoring and control functions can be done with the enclosure door closed for convenience and safety. Voltage pickup and dropout settings and time delay settings can be made through a system of menus.



User Interface

Control Overview

The user interface includes a graphic display, control buttons, and indicator lights. Five buttons allow access to all monitoring, control, and settings functions. Six lights show status indication of source acceptability, transfer switch position, and alerts. The screens are arranged in three levels. Access to some screens require entering a password (indicated by a closed padlock symbol).

Up-down arrows buttons

The up and down arrow buttons are used to navigate the settings. These buttons also increase and decrease a value to modify a parameter while in the settings level screens.

Enter/save settings button (see page 2-1 for *Are you sure?* screen)

The enter/save settings button moves from the status level to the Main Menu level and other levels. It also is used to select a parameter and to enter or save a new setting.

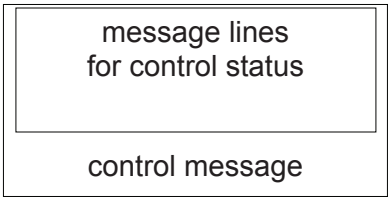
Escape button (see page 2-1 for *Are you sure?* screen)

The escape button ignores a change and returns to the previous status level.

Transfer button (see page 2-1 for *Are you sure?* screen)

The transfer button has several functions. Refer to the control message (bottom line) on the control status / home screen. A closed padlock symbol indicates that a password must be entered (see page 2-1).

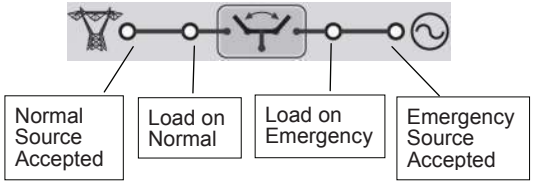
- transfer test function simulates a failure of the normal source.
- for a 3NTS and 3NDTS, press this button to transfer or retransfer the load.
- bypass timer function cancels an active time delay
- abort function cancels a pending operation (inphase transfer, for example)



See pages 3-1, 3-2, 3-3

Four transfer switch status lights (light is on when:)

- Normal source accepted (left light)
- Emergency source accepted (right light)
- Load on normal [transfer switch in normal position]
- Load on emergency [transfer switch in emergency position]



Alert light (light is on when:)

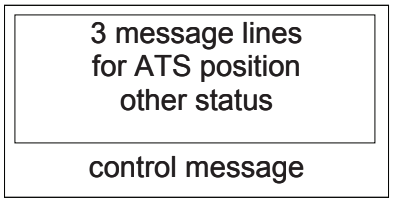
- Alert light. Read the display for more information. Any alarm condition turns on this light.

Not in automatic light (light is on when:)

- Not in automatic mode (manual); blinking indicates transfer inhibit.
  For 3NTS and 3NDTS this light is always on, indicating that it is a manual transfer switch.

Status Information

The controller provides the status of both power sources (normal and emergency) and the position of the transfer switch. Press the up and down arrow buttons. No password is required to navigate through these screens.



ATS Status Screen

The ATS status is the home screen. It shows the present status of the ATS including: transfer sequence status, and running timers, status of connected source, and position of ATS. A control message appears below the status messages. The control message instructs the user on what action is available.
All other screens automatically return to the ATS Status screen (home screen) after five minutes of inactivity.

Metering Screen

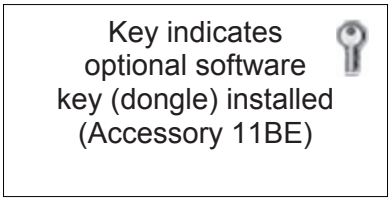
One of several metering screens is provided (a factory setting). It shows the rms voltage and frequency readings of the power sources. If the current sensing option is provided, the load current is also displayed.

Alarm Screen

Active alarm message appear or *no active alarms*. A control message appears below the alarm message. If an active alarm must be acknowledged, the screen stays on until you press enter. Some alarms are self clearing.

Controller Screen

Controller information, name, location, present date and time appears. If an optional software key (dongle) is plugged into the controller, a key symbol is shown in upper right corner of this screen. Accessory 11BE is described on page 5-1.



Source Acceptability

(Feature 1C time delay is described on page 2-3.)

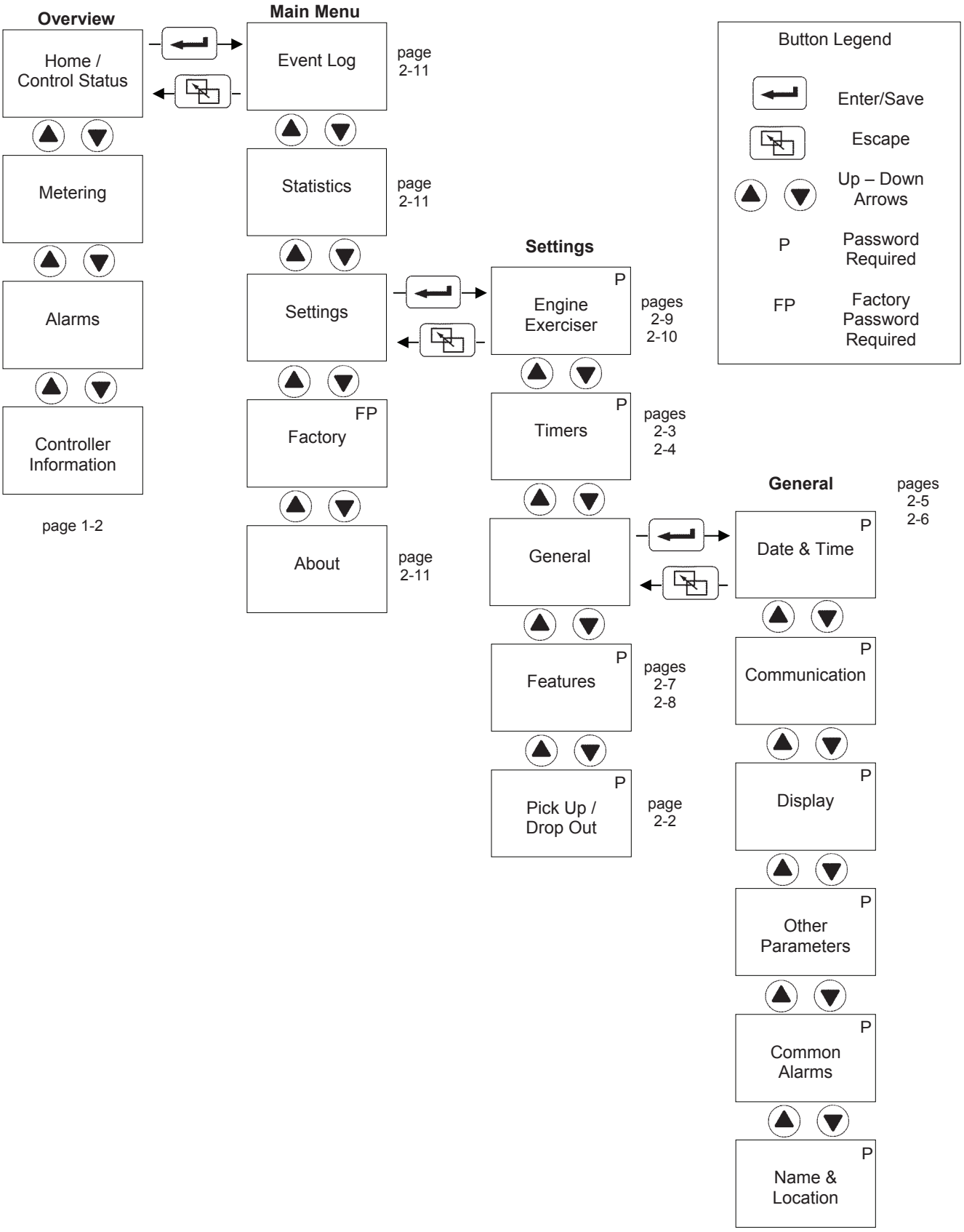
The controller considers a source unacceptable if any of these conditions are true:

- Any phase voltage of the source is less than the voltage dropout setting for more than the Feature 1C setting.
- Any phase voltage is greater than voltage trip setting for more than 3 seconds.
- Frequency of the source is less than the frequency dropout setting for more than Feature 1C setting.
- Frequency is greater than over-frequency trip setting for more than 3 seconds.

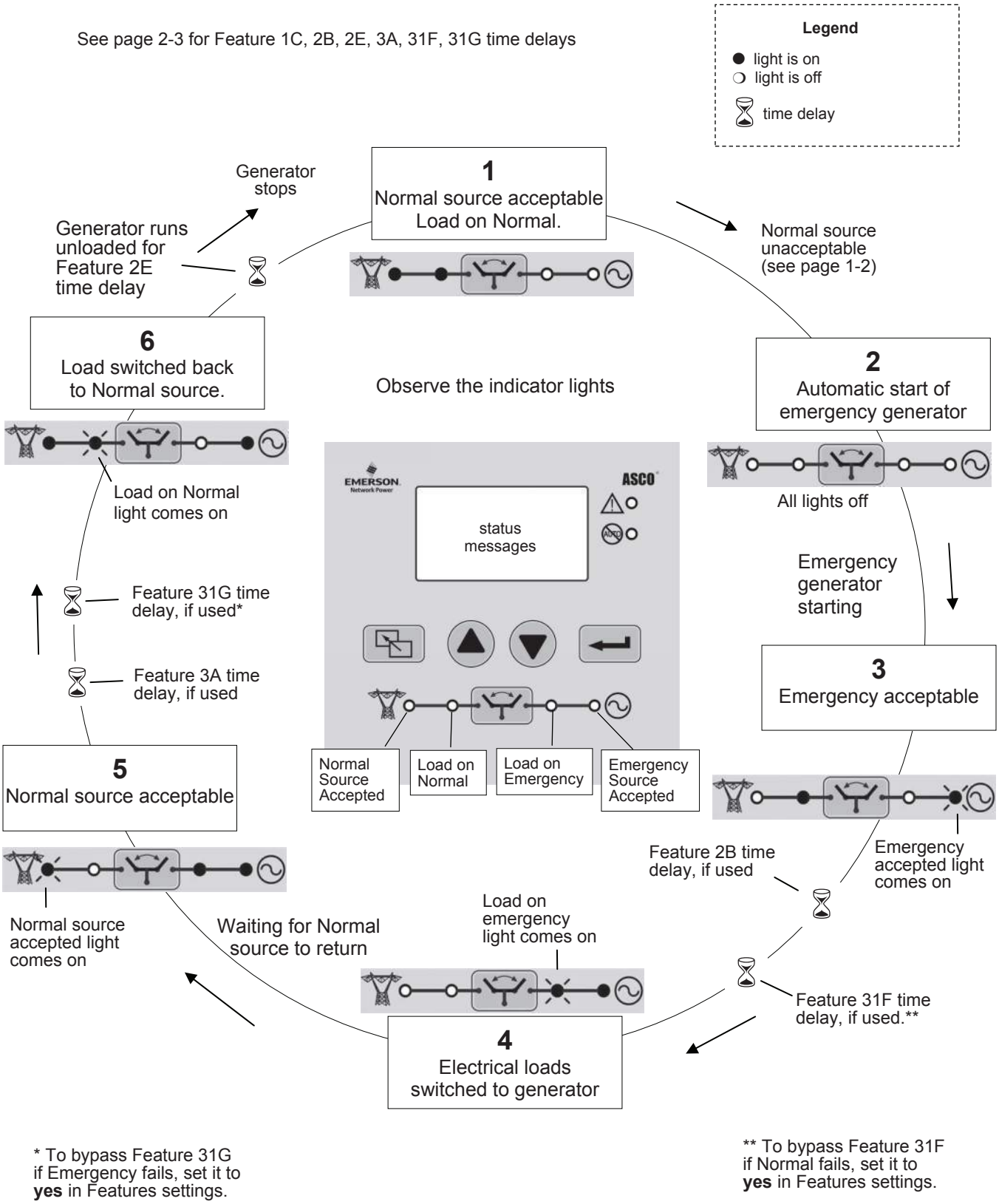
The controller considers a source acceptable again when all these conditions are true:

- Each phase voltage is greater than the voltage pickup setting.
- Each phase voltage is less than over-voltage trip setting by more than 2% of nominal.
- The frequency of the source is greater than the frequency pickup setting.
- Frequency is less than the over-frequency trip setting by more than 2% of nominal.

Screen Navigation

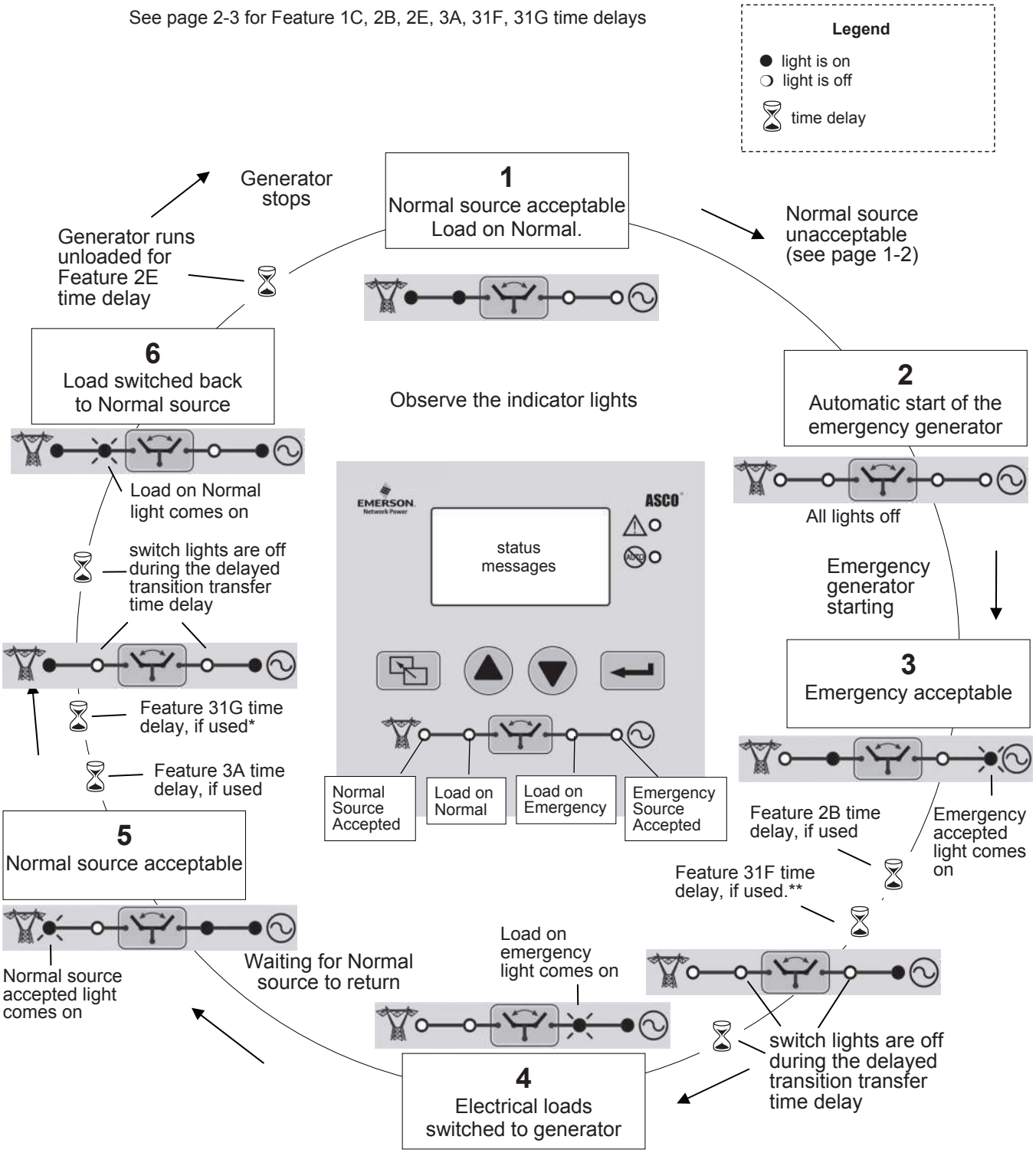


3ATS Sequence of Operation – Normal Source Failure



3ADTS Sequence of Operation – Normal Source Failure

See page 2-3 for Feature 1C, 2B, 2E, 3A, 31F, 31G time delays

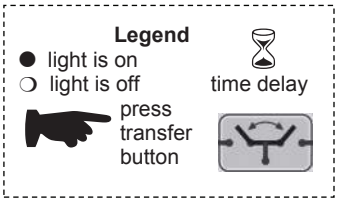


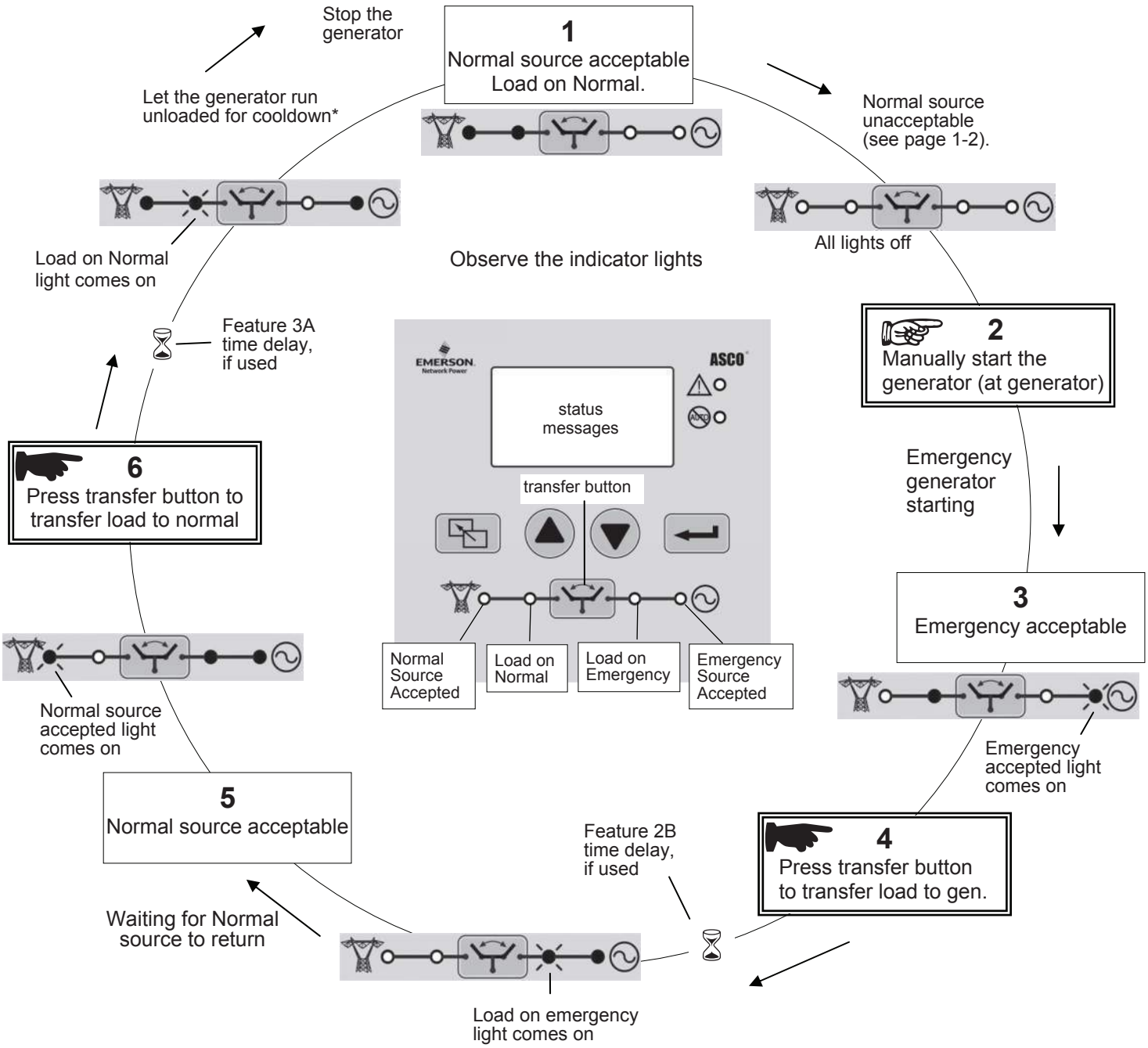
*To bypass Feature 31G if Emergency fails, set it to **yes** in Features settings.

To bypass Feature 31F if Normal fails, set it to **yes in Features settings.

3NTS Sequence of Operation – Normal Source Failure

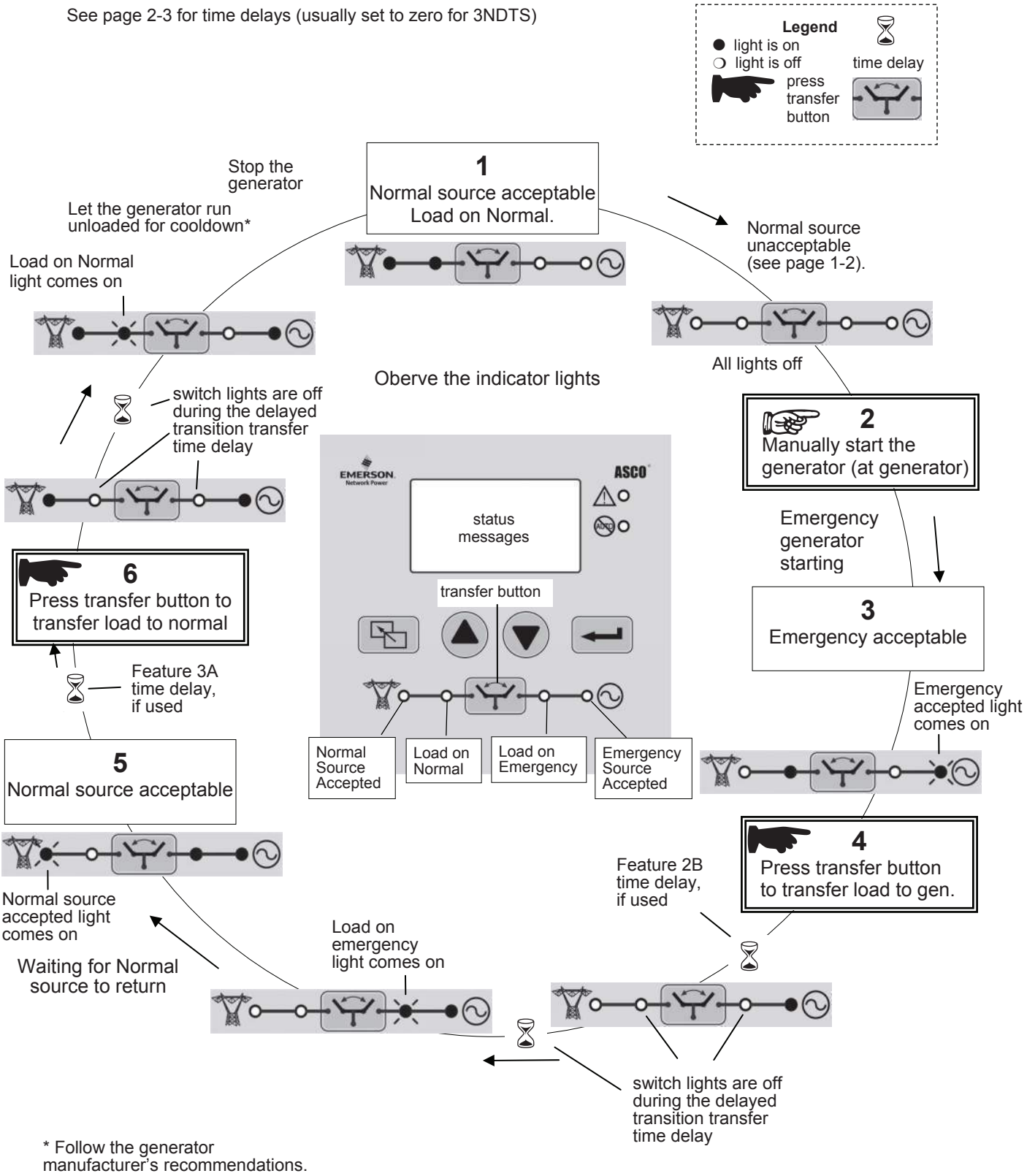
See page 2-3 for time delays (usually set to zero for 3NTS)





* Follow the generator manufacturer's recommendations.

3NDTS Sequence of Operation – Normal Source Failure



* Follow the generator manufacturer's recommendations.

Settings Overview (Main Menu ⇨ Settings)

NOTICE

Any indiscriminate change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to an inadequate source.

The settings can be displayed and changed from the user interface. Some settings may required a password.

1. On the ATS Status screen, press the enter/save button to display to the **Main Menu** screen.
2. On the **Main Menu** screen, press the up or down arrow buttons to select **Settings**, then press the enter/save button.
3. On the **Settings** screen, press the up or down arrow buttons to select a parameter, then press the enter/save button.

Change a Setting

To change a setting in the controller:

1. Navigate to the settings screen that you want to change.
2. Press the enter/save settings button to start the first field blinking. If required, enter the password.
3. Press the up and down arrow buttons to change the flashing digit(s) or word, and press the enter/save settings button to move to the next field.
4. Repeat step 3 until all the fields have been entered.

NOTE If a field is blinking, information must be entered. The escape button will end the editing session.

Password The default password is 1111 (see pages 2-5, 2-6).

If **Enter Password** displays, you must enter the correct password first.

Use the up and down arrow buttons to change the flashing digit of the password. Press the enter/save settings button to move to the next digit (left to right). The password is accepted when all four digits have been entered correctly and the enter/save settings button is pressed.

If *Login Error Invalid Password* displays, press the enter/save settings button to reenter the password.

You can now change the settings on the selected screen.

NOTE Once the password is entered, it will stay unlocked for 5 minutes so that you do not have to keep entering it. To save time, plan to make all your settings at one time.

If no password is desired, set the password to 0000. This password unlocks the controller so that anyone can change the settings and transfer the load without entering a password. Instead, the *Are you sure?* screen appears.

Are you sure?

Once the correct password is entered, the controller stays unlocked for 5 minutes. During that time period if you press the transfer button, the ***Are You Sure?*** screen appears (instead of *Enter Password*). You can:

- press the enter/save button to confirm (commit) load transfer, or
- press the escape button to cancel the load transfer operation.

Voltage and Frequency Settings (Main Menu ⇨ Settings ⇨ Pick Up / Drop Out)

Unless otherwise specified on the order, the voltage and frequency settings are set at the factory to the default values. If a setting must be changed follow the procedure below. Some settings may require a password.

NOTICE

Any indiscriminate change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to an inadequate source.

Description	Settings	Default Setting % of nominal	Adjustment Range increments of 1%	Display Screen (see below)
Normal Source Voltage	Dropout	85%	70 to 98%	N Volt DO
	Pickup	90%	85 to 100%	N Volt PU
	Over Voltage Trip*	off	off, 102 to 115%	N Volt OV
Emergency Source Voltage	Dropout	75%	70 to 98%	E Volt DO
	Pickup	90%	85 to 100	E Volt PU
	Over Voltage Trip*	off	off, 102 to 115%	E Volt OV
Normal Source Frequency	Dropout	85%	85 to 98%	N Freq DO
	Pickup	86%	86 to 100%	N Freq PU
	Over Frequency Trip*	off	off, 101 to 110%	N Freq OF
Emergency Source Frequency	Dropout	85%	85 to 98%	E Freq DO
	Pickup	95%	86 to 100%	E Freq PU
	Over Frequency Trip*	off	off, 101 to 110%	E Freq OF

* The Over Voltage and Over Frequency reset is fixed at 2% below the trip setting.

The voltage and frequency settings can be displayed and changed from the user interface. See the table above. Some settings may require a password.

1. On the **Main Menu** press the up or down arrow buttons to select **Settings**, then press the enter/save button to move to the ***Settings*** level of menus.
2. Press the up and down arrow buttons to highlight **Pickup / Dropout**, then press the enter/save settings button to move to the *PU/DO* display.
3. Then you can press the up and down arrow buttons to highlight the voltage and frequency settings screens. An overview explanation of the settings is listed below.

Description	Explanation
Normal Source Voltage	This screen shows dropout, pickup, and over-voltage trip settings for the normal source. They are in percentage of the nominal voltage and volts rms.
Emergency Source Voltage	This screen shows dropout, pickup, and over-voltage trip settings for the emergency source. They are in percentage of the nominal voltage and volts rms.
Normal Source Frequency	This screen shows dropout, pickup, and over-frequency trip settings for the normal source. They are in percentage of the nominal frequency and Hz.
Emergency Source Frequency	This screen shows dropout, pickup, and over-frequency trip settings for the emergency source. They are in percentage of the nominal frequency and Hz.

Timer Settings (Main Menu ⇨ Settings ⇨ Timers)

Unless otherwise specified on the order, the timer (time delay) settings are set at the factory to the default values. If a setting must be changed, carefully follow the procedure on the next page. Some settings may require a password.

NOTICE

Any indiscriminate change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to an inadequate source.

Feature	Timer	Default Setting	Adjustment Range 1 sec. increments	Display Screen (see next page)
1C ①	override momentary Normal source outages	3 seconds	0 to 6 sec see NOTICE below	**N Fail (1C)**
1F	override momentary Emergency source outages	4 seconds	0 to 6 sec see NOTICE below	**E Fail (1F)**
2B	transfer to Emergency (if Normal fails)	0	0 to 60 min 59 sec	**N ➡ E N Fail (2B)**
	transfer to Emergency (if just a test)	0	0 to 60 min 59 sec	**N ➡ E Test (2B)**
2E	engine cooldown	5 minutes	0 to 60 min 59 sec	**Cool Down (2E)**
3A	Retransfer to Normal (if Normal fails)	30 minutes	0 to 60 min 59 sec	**E ➡ N N Fail (3A)**
	Retransfer to Normal (if just a test) ⑦	30 seconds	0 to 9 hours 59 min 59 sec	**E ➡ N Test (3A)**
31F ②	Normal to Emergency pre-transfer signal	0	0 to 5 min 59 sec	**N ➡ E PreX (31F)**
31G ③	Emergency to Normal pre-transfer signal	0	0 to 5 min 59 sec	**E ➡ N PreX (31G)**
31M	Normal to Emergency post-transfer signal	0	0 to 5 min 59 sec	**N ➡ E PosX (31M)**
31N	Emergency to Normal post-transfer signal	0	0 to 5 min 59 sec	**E ➡ N PosX (31N)**
Inphase ④	inphase transfer	1.5 seconds	0 to 3 sec	**In-Phase**
Load ⑤ ⑥ disconnect	delay transition transfer	3 seconds	0 to 5 min 59 sec	**LD Disconnect**
Fail accept maximum	failure to accept Emergency source alarm	3 seconds	0 to 6 sec see NOTICE below	**E Accept Fail**

① Standard adjustment up to 6 seconds (total power outage). See *NOTICE* below.
② To bypass Feature 31F if the Normal source fails, set bypass to **yes** in Features settings (page 2-7).
③ To bypass Feature 31G if the Emergency source fails, set bypass to **yes** in Features settings (page 2-7).
④ This timer appears only on the display for a 3ATS or 3NTS. Allows time for generator to stabilize before initiating inphase transfer.
⑤ This timer appears only on the display for a 3ADTS or 3NDTS.
⑥ To bypass load disconnect timer on source failures, set bypass to **yes** in Feature settings (page 2-7).
⑦ This timer is disabled on 3NTS and 3NDTS.

NOTICE

Feature 1C, 1F, and Fail accept maximum timers can be extended to 0 to 60 min 59 sec if an external 24 V dc power supply is included and the *External Battery* check box is selected (*General Settings*, *Other Parameters*, page 2-5). Accessory 1UP is available (page 5-2) if longer than 6 seconds is required.

Timer Settings continued (Main Menu ⇨ Settings ⇨ Timers)

The timer (time delay) settings can be displayed and changed from the user interface. See the table on the previous page. Some settings may require a password.

1. On the **Main Menu** press the up and down arrow buttons to highlight **Settings**, then press the enter/save button to move to the ***Settings*** menus.
2. Press the up and down arrow buttons to highlight **Timers**, then press the enter/save settings button to move to the list of timers.
3. Then you can press the up and down arrow buttons to highlight the timer settings displays. An overview explanation of the settings is listed below.

Display Screen	Explanation
N Fail (1C)	Momentary Normal source failure timer. It can be bypassed by pressing the transfer / bypass button.
E Fail (1F)	Momentary Emergency source failure timer.
N ➡ E N Fail (2B)	Normal to Emergency transfer timer (when normal source fails). It can be bypassed by pressing the transfer / bypass button.
N ➡ E Test (2B)	Normal to Emergency transfer timer (when transfer button is pressed).
Cool Down (2E)	Engine cool down timer does not run if the load was not transferred. It cannot be bypassed.
E ➡ N N Fail (3A)	Emergency to Normal retransfer timer (when normal source fails). It can be bypassed by pressing the transfer / bypass button.
E ➡ N Test (3A)	Emergency to Normal retransfer timer (when transfer button is pressed).
N ➡ E PreX (31F)	Normal to Emergency pre-transfer signal timer for external equipment. When this timer is running, the transfer can be aborted by pressing the transfer / bypass button. If the in-phase feature is enabled, load transfer is prevented until the condition is met. To bypass Feature 31F if the Normal source fails, set bypass to yes in the Feature settings.
E ➡ N PreX (31G)	Emergency to Normal pre-transfer signal timer for external equipment. If the in-phase feature is enabled, load transfer is prevented until the condition is met. To bypass Feature 31G if the Emergency source fails, set bypass to yes in the Feature settings.
N ➡ E PosX (31M)	Normal to Emergency post-transfer signal timer for external equipment.
E ➡ N PosX (31N)	Emergency to Normal post-transfer signal timer for external equipment.
In-Phase	In-phase timer precedes inphase transfers, if provided. Not available for 3ADTS, 3NDTS.
LD Disconnect	Load disconnect timer only for 3ADTS, 3NDTS delayed-transition transfer switch. The load is not connected to either source.
E Accept Fail	Failure to accept the Emergency source alarm timer turns on alert light when alarm expires

General Settings (Main Menu ⇨ Settings ⇨ General)

Unless otherwise specified on the order, the general settings are set at the factory to the default values.

Parameter	Sub Level	Default Setting	Adjustment Range	Display Screen (see next page)
Date & Time	Time	hh:mm:ss	01-23:00 - 59:00-59	hh:mm:ss
	Date	day mm/dd/yy	01-12 / 01-31 / 00-99	day mm/dd/yy
	Format	US	US ISO EU	mm/dd/yy yy/mm/dd dd/mm/yy
	Daylight Savings Time	Off	Off Apr/Oct Mar/Nov	Off Apr/Oct Mar/Nov
Communication – RS485 Port (optional Accessory 11BE)	Baud Rate	9600	115200 57600 38400 19200 9600 Off	115200 57600 38400 19200 9600 Off
	Device Address (Dev Addr)	1	1 - 247	1 - 247
	Protocol	AscoBusII	AscoBusII AscoBusI Modbus	AscoBusII AscoBusI Modbus
	Emulate Grp1 ①	no	yes ☑ or no ☐	☑ or ☐
Display	Language	English	English Korean Chinese Turkish Russian German Italian Portuguese French Canadian French Spanish	English Korean Chinese Turkish Russian German Italian Portuguese French CAN French Spanish
	Contrast	15	1 to 20	1 to 20
	Backlight	On	On, Off, 1 to 59	On, Off, 1 to 59
	Volt Label	Vab/bc/ca	Vab/bc/ca Uab/bc/ca Uuv/vw/wu	Vab/bc/ca Uab/bc/ca Uuv/vw/wu
	Source 1/2 ②	no	yes ☑ or no ☐	☑ or ☐
Other Parameters	Password	1111	a-z, A-Z, 0-9, 4 characters	* * * *
	External Battery	no	yes ☑ or no ☐	☑ or ☐
	Current Sensing (accessory)	Off	Off, 1CT, 2CT, 3CT	Off, 1CT, 2CT, 3CT
	CT Ratio	400:5	50 - 4000:5	50 - 4000:5
	Clear Events (accessory)			
Common Alarms ④	Loss E when on E	no	yes ☑ or no ☐	☑ or ☐
	E accept Fail	no	yes ☑ or no ☐	☑ or ☐
	Load Disconnected ③	no	yes ☑ or no ☐	☑ or ☐
Name & Location	Name		a-z, A-Z, 0-9, space, 20 char	
	Location		a-z, A-Z, 0-9, space, 20 char	

① When *Emulate Grp1* box is checked, baud rate is 9600 and protocol is AscoBusII.
② *Source 1/2* only available for English language.
③ *Load Disconnected* appears only on the display for a 3ADTS, 3NDTS.
④ The alert light also turns on for common alarms.

General Settings continued (Main Menu ⇨ Settings ⇨ General)

The general settings can be displayed and changed from the user interface. See the table on the previous page. If a setting must be changed follow the procedure below. Some settings may require a password.

1. From the **Main Menu** press the up and down arrow buttons to highlight **Settings**, then press the enter/save button to move to the ***Settings*** menus.
2. Press the up and down arrow buttons to highlight **General**, then press the enter/save settings button to move to the list of general settings.
3. Then you can press the up and down arrow buttons to highlight the general settings displays. An overview explanation of the settings is listed below.

Parameter	Explanation	
Date & Time	This screen allows the user to change the time, date, date format, and daylight savings time.	
Communication (Accessory 11BE)	If optional Accessory 11BE was ordered, this screen allows the user to configure the RS485 communication port. The baud rate can be set off, 9600 – 115200. The address can be set 1 to 247. See the Appendix for setting DIP switches S7 and S8. S7 sets the terminating resistor; S8 sets 2 wire or 4 wire.	
Display	This screen selects the language for messages (English is the default language). Screen contrast can be set. Three voltage phase labels can be set. Source 1/2 (S1/S2) can be set instead of Normal and Emergency (N/E).	
Other Parameters	This screen allows the user to change the password (default password is 1111). There is a setting for an external battery (if connected) for Feature 1C or 1F extended time range. If the optional current sensing module is installed, current sensing should be set for single phase or three phase. The current transformer (CT) ratio should be set for the ampere size of the transfer switch (refer to the label on the CT used). **See current transformer WARNING below.** All events can be cleared from the controller, if desired.	
Common Alarms	This screen shows selected alarm conditions. If enabled, the alarm condition will turn on the alert indicator and deenergize the configured common alarm output relays (OP1, OP2, OP3) for external monitoring.	
	Loss E when on E	Loss of emergency when connected to Emergency.
	E Accept Fail	Expiration of failure to accept timer (failure to acquire emergency source)
	Load Disconnect	For 3ADTS and 3NDTS only.
Name & Location	This screen allows the user to enter a name and location of the Transfer Switch (maximum 20 alphanumeric characters each). If communication is used, the name and location is exported (for ASCO bus II protocol name has an 8 character limit). The name & location parameter is not available (disabled) if English language is not selected.	

⚠ WARNING

Never leave an open secondary circuit of a current transformer. Dangerous voltage can cause shocks, burns, and/or death. When disconnected always install a shorting jumper between the current transformer terminals.

Features Settings (Main Menu ⇨ Settings ⇨ Features)

Unless otherwise specified on the order, the features settings are set at the factory to the default values. If a setting must be changed follow the procedure on the next page. Some settings may require a password.

NOTICE

Any indiscriminate change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to an inadequate source.

Feature	Default Setting	Adjustment Range	Display Screen (see next page)
Bypass Normal to Emergency transfer Feature 31 upon Normal source failure	no	yes ☑ or no ☐	**BP N ➡ E F31 N Fail**
Bypass Emergency to Normal transfer Feature 31 upon Emergency source failure	no	yes ☑ or no ☐	**BP E ➡ N F31 E Fail**
Bypass delayed-transition transfer upon a source failure ①	no	yes ☑ or no ☐	**BP DTTS Src Fail**
Commit to transfer	no	yes ☑ or no ☐	**Commit Transfer**
Inphase monitor enable ②	no	yes ☑ or no ☐	**In Phase On**
Load Shed Inphase enable ②	no	yes ☑ or no ☐	**Load Shed In Phase**
Fail Accept Timer	no	yes ☑ or no ☐	**Fail Accept Timer**
External Feature 6B	no	yes ☑ or no ☐	**Ext. Feature 6B**
External Feature 17 ③	no	yes ☑ or no ☐	**Ext. Feature 17**
Controller Output contact OP1 (select one)	yes	yes ☑ or no ☐	Feature 31
	no	yes ☑ or no ☐	Common Alarm ④
	no	yes ☑ or no ☐	NR2
	no	yes ☑ or no ☐	Not In Auto
Relay Expansion Module ④ ⑤ Output contact OP2 (select one)	no	yes ☑ or no ☐	Feature 31
	yes	yes ☑ or no ☐	Common Alarm
	no	yes ☑ or no ☐	NR2
	no	yes ☑ or no ☐	Not In Auto
	no	yes ☑ or no ☐	1G
Relay Expansion Module ④ ⑤ Output contact OP3 (select one)	no	yes ☑ or no ☐	Feature 31
	no	yes ☑ or no ☐	Common Alarm
	no	yes ☑ or no ☐	NR2
	yes	yes ☑ or no ☐	Not In Auto
Manual DTTS ⑥ Load Disconnect Recovery Mode	no	yes ☑ or no ☐	Manual
	yes	yes ☑ or no ☐	Auto

① This feature appears only on the display for a 3ADTS.
② This feature appears only on the display for a 3ATS.
③ This feature appears only on the display for a 3ATS or 3ADTS, not on a 3NTS or 3NDTS.
④ The Controller Output contact OP1 can be set to operate with a Common Alarm only if Accessory 11BE is ordered. See page 5-1.
⑤ The Relay Expansion Module is optional Accessory 18RX for 3ATS and 3NTS. It is included with a 3ADTS and 3NDTS. See page 5-2.
⑥ This feature appears only on the display for a 3NDTS.

Features Settings continued (Main Menu ⇨ Settings ⇨ Features)

The features settings can be displayed and changed from the user interface. See the table on the previous page. Some settings may require a password.

1. From the **Main Menu** press the up and down arrow buttons to highlight **Settings**, then press the enter/save button to move to the ***Settings*** menus.
2. Press the up and down arrow buttons to highlight **Features**, then press the enter/save settings button to move to the list of features.
3. Then you can press the up and down arrow buttons to highlight the feature settings displays. An overview explanation of the settings is listed below.

Display Screen	Explanation
BP N ➡ E F31 N Fail	This display shows the setting for bypass Normal to Emergency transfer Feature 31 if the Normal source fails. If set to yes, there is no delay.
BP E ➡ N F31 E Fail	This display shows the setting for bypass Emergency to Normal transfer Feature 31 if the Emergency source fails. If set to yes, there is no delay.
BP DTTS Src Fail	This display appears only for 3ADTS. It shows the setting for bypassing delayed-transition transfer upon a source failure. If set to yes, there is no delay.
Commit Transfer	This setting affects the transfer sequence as follows: Enabled (yes) - If Normal fails the controller continues transfer sequence to emergency even if Normal returns before Emergency becomes acceptable. Disabled (no) - If Normal fails, the controller cancels the transfer sequence to emergency if Normal returns before Emergency becomes acceptable.
In Phase On	This display appears only for 3ATS, 3NTS. It shows the status of in-phase monitor. If it is on, load transfer is delayed until sources are in phase.
Load Shed In Phase	This display appears only for 3ATS. It shows the status of in-phase monitor for load shed. If it is on, load transfer is delayed until sources are in phase.
Fail Accept Timer	This display shows the failure to accept Emergency source timer setting. If set to yes, the alert light will turn on after this timer runs out.
Ext. Feature 6B	This display shows the setting for external Feature 6B (override switch to manually bypass time delay on retransfer to normal source).
Ext. Feature 17	This display shows the setting for external Feature 17 (remote contact which opens to signal ATS to transfer to emergency).
Output OP1, OP2, OP3	This display shows the settings for output contacts OP1, OP2, and OP3. OP1 is in the Group G controller. OP2 and OP3 are in the Relay Expansion Module. This module is included in 3DTS and 3NDTS; it is an optional accessory on 3ATS and 3NTS. Feature 1G is available on OP2. See page 5-2.
Manual DTTS Load Disconnect Recovery Mode	This display only appears for 3NDTS. It shows the setting for load disconnect recovery. It is normally set to Auto.

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Engine Exercisers (Main Menu ⇨ Settings ⇨ Engine Exerciser)

These timers periodically exercise the emergency engine-generator. They can be set to exercise with or without load transfer, or they can be completely disabled. The engine-generator should be exercised under load once a week for a minimum time period of 20 minutes, or follow the recommendations of the engine-generator set manufacturer.

Unless otherwise specified on the order, the engine exerciser settings are set at the factory to the default values. If a setting must be changed follow the procedure on the next page. Some settings may require a password.

NOTICE

Any indiscriminate change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to an inadequate source.

Standard Exerciser

The standard built-in exerciser provides a once a week (or two week) 20 minute exercise period.

Exercise Parameter	Default Setting	Adjustment Range	Display Screen (see next page)
Enable	no	no ☐ or yes ☑	Enable ☐
With load	no	no ☐ or yes ☑	With Load ☐
Interval	weekly	Weekly or Bi-Weekly	Interval Weekly
Start day	Sun	Sun, Mon, Tue, Wed, Thu, Fri, Sat	Day of Week Sun
Start time	00:00	0 to 23 h, 0 to 59 m (hh:mm)	Time 00:00
Duration	20	not adjustable	

Programmable Exerciser (part of optional Accessory 11BE)

The programmable exerciser provides seven programmable exercise periods. They can be set for once a week (all), alternate weeks (1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th} week), and each with an adjustable start and exercise period.

Exercise Parameter	Default Setting	Adjustment Range	Display Screen (see next page)
Program number	1	1 to 7	Program No 1
Enable	no ☐	no ☐ or yes ☑	Enable ☐
With load	no ☐	no ☐ or yes ☑	With Load ☐
Interval / Start week	All	All, Alt (alternate), 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}	Start Week All
Start day	Sun	Sun, Mon, Tue, Wed, Thu, Fri, Sat	Day of Week Sun
Start time	00:00	0 to 23 h, 0 to 59 m (hh:mm)	Time 00:00
Duration	00:00	0 to 23 h, 0 to 59 m (hh:mm)	Duration 00:00

Engine Exercisers continued (Main Menu ⇨ Settings ⇨ Engine Exerciser)

The engine exerciser settings can be displayed and changed from the user interface. See the table on the previous page. Some settings may require a password.

1. From the **Main Menu** press the up and down arrow buttons to highlight **Settings**, then press the enter/save button to move to the ***Settings*** menus.
2. Press the up and down arrow buttons to highlight **Engine Exerciser**, then press the enter/save settings button to move to the *Engine Exerciser* screen.
3. Then you can press the up and down arrow buttons to highlight the engine exerciser settings displays. An overview explanation of the settings is listed below.

Exercise Parameter	Explanation
Program number (Accessory 11BE)	Up to seven independent engine exercise routines can be set. Each routine functions in the same manner. Six parameters need to be configured for each routine (Program No 1, 2, 3, 4, 5, 6, 7 – not all have to be used)
Enable	Enable (turn on) or disable (turn off) the exercise routine. ☑ Enables the exerciser. ☐ Disables the exerciser.
With load	Exercise with or without load transfer. ☑ The load will be transferred to Emergency. ☐ No load transfer. The load will not be transferred to Emergency.
Interval (standard exerciser)	Exercise week: Weekly or Bi-weekly.
Start week (Accessory 11BE exerciser)	Exercise week: All, Alternate, 1st, 2nd, 3rd, 4th, or 5th week
Start day	Exercise day: Sun, Mon, Tue, Wed, Thu, Fri, Sat
Start time	Exercise start time: hh:mm 0-23 hour 0-59 minute
Duration (standard exerciser)	Exercise run time (length of time) that the generator will run. 20 minutes (not adjustable).
Duration (Accessory 11BE exerciser)	Exercise run time (length of time) that the generator will run. hh:mm 0-23 hour 0-59 minute

View Event Log Accessory 11BE, page 5-1 (Main Menu ⇨ Event Log)

Event Log is used to view events; use the up and down buttons to navigate the event list.

If optional Accessory 11BE was ordered, the controller event log can be viewed from the user interface.

1. From the **Main Menu** screen press the up and down arrow buttons to highlight **Event Log**, then press the enter/save button to move to the ***Event Log***.

2 Press the up and down arrow buttons to scroll through the **Event Log**.

Logged Events

The display shows the last 300 events. Each event displays shows the event number (1 is the most recent, 300 is the oldest), the time and date of the event, the event type, and the cause or reason (if applicable) under the event type.

Refer to **Appendix A-3** for a list of the event types recorded.

Refer to **Appendix A-4** for a list of the event causes.

View Statistics (Main Menu ⇨ Statistics)

Statistics is used to view transfer switch (TS) history and statistics.

The statistics log can be viewed from the user interface.

1. From the **Main Menu** display press the up and down arrow buttons to highlight **Statistics**, then press the enter/save button to view the list.

2 Press the up and down arrow buttons to scroll through the **Statistics**.

Refer to **Appendix A-4** for a list of the statistics kept.

View About (Main Menu ⇨ About)

About is used to view controller information; use the up and down buttons to navigate the *About* list.

The *About* screen can be viewed from the user interface.

1. From the **Main Menu** screen press the up and down arrow buttons to highlight **About**, then press the enter/save button to view the ***About*** screen.

2 Press the up and down arrow buttons to scroll through the **About** screens.

About screens

The display shows the nominal voltage and frequency, the transfer switch ampere size, the type of transfer switch, the transfer switch name, location, the software version, bootloader version, and the serial number.

Screen Messages and their Meanings

The following messages (in alphabetical order) can appear on the controller display:

Screen Message	Meaning or Explanation	Refer to Pages
Access denied Option not installed Press the escape key to cancel.	If optional Accessory 11BE was not ordered, this message displays if Acc. 11BE features are selected. Press escape key to return to previous screen.	1-1
Are you sure?	This may appear when you press the transfer button.	2-1, 3-3
Emergency ➔ Normal Timer	The emergency to normal load transfer time delay (Feature 3A) is running. The time remaining is shown.	2-3, 2-4
Engine Exerciser / With Load	The engine exerciser is running the engine-generator set with load (transfer switch transfers load to generator).	2-9, 2-10
Engine Exerciser / Without Load	The engine exerciser is running the engine-generator set without load (the transfer switch does not transfer the load to the generator).	2-9, 2-10
Engine Cooldown Timer	The engine-generator set unloaded cooldown time delay (Feature 2E) is running. The time remaining is shown.	2-3, 2-4
Fail Acquire E	Controller is unable to accept the emergency source within the time specified.	2-5, 2-6
Invalid Password	An incorrect password has been entered.	2-1
Load Disconnect	The load is disconnected. (3ADTS, 3NDTS)	
Load Disconnect Timer	The load disconnect time delay is running. The time remaining is shown. (3ADTS, 3NDTS)	2-3, 2-4
Load on Emergency	The load is connected to the emergency source.	
Load on Normal	The load is connected to the normal source.	
Load Shed / From Emergency	Load shed from emergency, Acc. 30. (3ATS, 3ADTS)	5-2
Load Shed / From Normal	Load shed from normal, Acc. 30. (3ATS, 3ADTS)	5-2
Loss E When on E	The emergency source has failed with the load connected to emergency.	2-5, 2-6
Manual Transfer	In the manual transfer mode.	
Manual Transfer Enabled	The transfer switch is in the manual mode.	
No Active Alarms	There are no active alarms.	1-2
Normal ➔ Emergency Timer	The normal to emergency load transfer time delay (Feature 2B) is running. The time remaining is shown.	2-3, 2-4
Normal Fail Timer	The normal source failure time delay (Feature 1C) is running. The time remaining is shown.	2-3 2-4
Normal Failed / Under Voltage	The normal source is not acceptable.	3-1
Normal OK	The normal source is accepted.	3-1
Post Transfer Timer	The post-transfer time delay (Feature 31M or 31N) is running. The time remaining is shown.	2-3, 2-4
Pre Transfer Timer	The pre-transfer time delay (Feature 31F or 31G) is running. The time remaining is shown.	2-3, 2-4
Sources Not Acceptable	The controller has powered up and has recognized an error condition (both sources are not accepted).	See HELP in INDEX
Switch Position Unknown	The controller has powered up and has recognized an error condition (cannot determine switch position).	See HELP in INDEX
Test Mode / Test Circuit 5	Occurs briefly during a transfer test.	Installation Manual
Test Mode / Test Circuit 17	Test circuit Feature 17 is active (remote test).	page 2-7, 2-8
Time to Run	The engine exerciser time remaining is shown.	
Transfer ➔ Emergency Inhibited	Load transfer to emergency source is inhibited.	

Screen Messages and their Meanings (continued)

The following messages (in alphabetical order) can appear on the controller display:

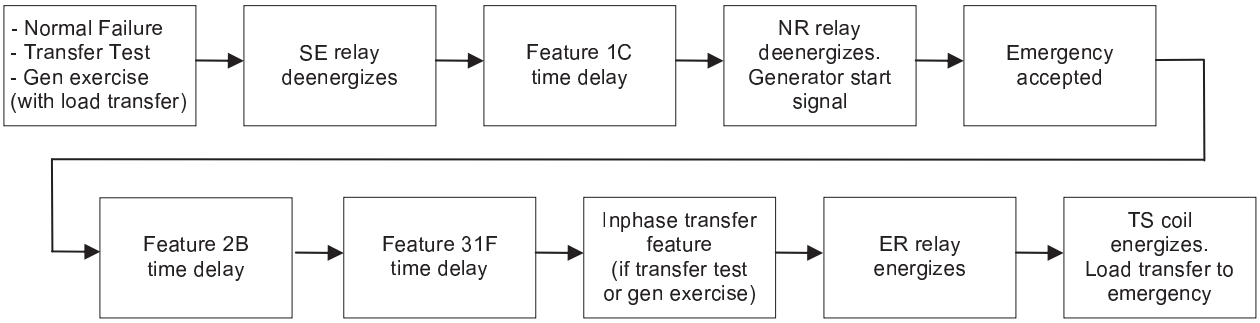
Screen Message	Meaning or Explanation	Refer to Pages
Transfer ➔ Normal Inhibited	Load transfer to normal source is inhibited.	
Waiting for Emergency Acceptable	The controller is waiting for the emergency source to become acceptable so that it can continue in the transfer sequence.	3-1
Waiting for In-Phase	The controller is waiting for the sources to come in phase so that it can make an in phase load transfer. The phase angle and frequency difference are also displayed. This message will be displayed until the sources come in phase. (3ATS, 3NTS)	3-1
Waiting for In-Phase Timer	The in-phase transfer timer in running. (3ATS,3NTS)	2-3, 2-4
Waiting for Retransfer	The controller is waiting for the transfer button to be pressed. (3NTS, 3NDTS)	1-6, 1-7, 4-6, 4-8

Control Messages and their Meanings

The following control messages (in alphabetical order) can appear on the controller display:

Control Message	Meaning or Explanation	Refer to Pages
Enter Password	A password is required to proceed further in the change process. Enter the correct password to continue or press the escape button.	1-1, 1-3, 2-1
Press  Abort Transfer	Press the transfer button to stop an impending load transfer when any of these screens appear: • normal OK, waiting for in-phase timer • normal failed, waiting for in-phase & in-phase timer • test mode & load shed pre transfer timer • engine exerciser with load pre transfer timer	
Press  Bypass Timer	Press the transfer button to cancel a running time delay when any of these screens appear: • normal OK, emergency ➔ normal timer • normal failed, normal fail timer • normal failed, normal ➔ emergency timer • normal failed, emergency ➔ normal timer • engine exerciser time to run timer • test mode & load shed, normal ➔ emergency timer • test mode & load shed, emergency ➔ normal timer	
Press  Re-Transfer	Press the transfer button to retransfer the load to normal when any of these screens appear: • normal failed, waiting for re-transfer • manual transfer, waiting for re-transfer	
Press  Test Transfer (3ATS, 3ADTS)	Press the transfer button to perform a test load transfer when any of these screens appear: • normal OK, load on normal, waiting for retransfer signal, engine cooldown timer • load shed, load on normal, normal ➔ emergency timer, engine cooldown timer	Transfer Switch Installation Manual
Press  Transfer (3NTS, 3NDTS)	Press the transfer button to perform a test load transfer when any of these screens appear: • normal OK, load on normal, waiting for retransfer signal, engine cooldown timer • load shed, load on normal, normal ➔ emergency timer, engine cooldown timer	Transfer Switch Installation Manual
Press  to acknowledge alarms	The display freezes if an active alarm needs to be acknowledged. Note it, then press the enter button.	1-2
Press  to Test (3ATS, 3ADTS)	Press the transfer button to confirm load transfer.	1-2
Press  to Transfer (3NTS, 3NDTS)	Press the transfer button to confirm load transfer.	1-2
Press  to Cancel	Press the escape button to return to previous screen.	1-1, 1-3, 2-1

Open-Transition Automatic Transfer (3ATS)



Load Transfer to Emergency

The sequence for load transfer to the emergency source begins automatically when the controller detects a normal source failure, a transfer test signal (either local or remote), a remote transfer to emergency signal, or a generator exercise (with load transfer).

Normal Source Failure. The Normal source is considered unacceptable when any one of four voltage or frequency conditions occur (see page 1-2).

Transfer Test Signal. The test transfer signal can be from the transfer button, the engine-generator exerciser, or via the optional serial port (Accessory 11BE).

The controller begins the load transfer sequence by de-energizing the SE relay and starting the Feature 1C time delay. Feature 1C time delay on engine starting prevents nuisance starting of the engine-generator set and load transfer to emergency due to momentary failures of the normal source. If the normal source is restored (voltage returns above the dropout point) while Feature 1C time delay is running, the SE relay is re-energized and the transfer sequence is terminated. (For transfer test the Feature 1C time delay is bypassed.)

Engine Start Signal. When the Feature 1C time delay ends, the controller de-energizes the NR relay which signals the engine-generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine-generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

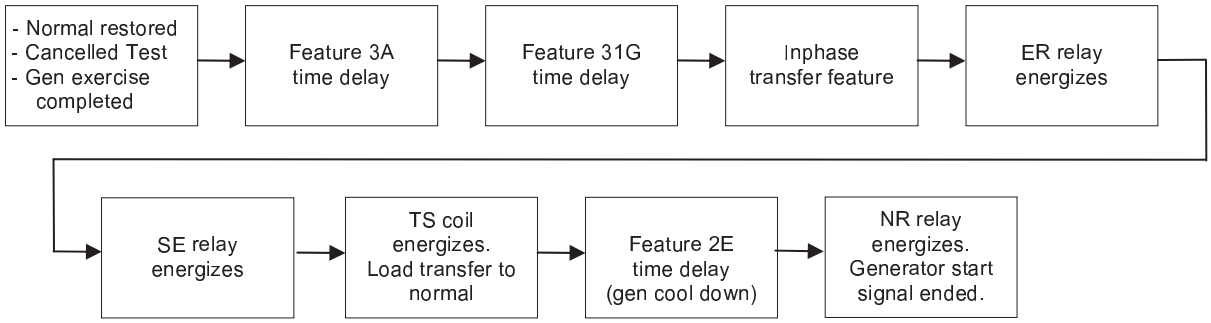
When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31 output will be active while the time delay runs. Also, if the inphase transfer feature (for motor loads) is enabled, the controller will inhibit transfer until the sources are in phase.

Load Transfer. To transfer the load to the emergency source the controller energizes ER relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. Transfer switch is now supplying the load from emergency source. Feature 1F time delay ignores a momentary voltage drop of the emergency source when load is added to the generator.

If enabled, Feature 31M time delay will run after the transfer and the Feature 31 output will be active while the time delay runs.

Open-Transition Automatic Transfer (3ATS) continued



Load Retransfer to Normal

The sequence for load retransfer to the normal source begins automatically when the controller detects a restored normal source, a cancelled transfer test signal (local or remote), a cancelled remote transfer to emergency signal, or a completed generator exercise (with load transfer).

Normal Source Restoration. The Normal source is considered acceptable again when all four voltage and frequency conditions occur (see page 1-2).

Cancel Transfer Test. Removal of the test transfer signal can be by pressing the transfer button again, ending a remote test, complete engine-generator exercise period, or via the optional serial port (Accessory 11BE).

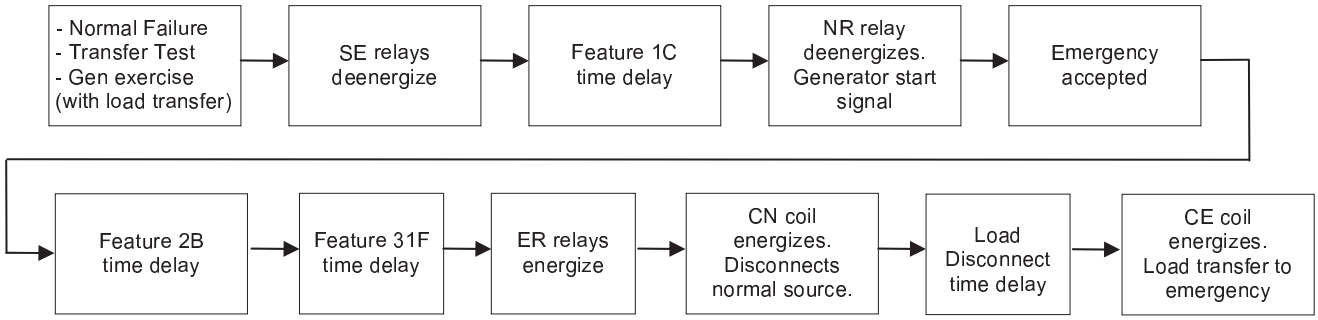
The controller begins the load retransfer sequence by starting the Feature 3A time delay. Feature 3A time delay on retransfer to normal allows the normal source to stabilize. If the normal source fails while the Feature 3A time delay is running, the controller waits for the normal source again to become acceptable and restarts the Feature 3A time delay. If the emergency source fails while Feature 3A is running, the controller bypasses the time delay for immediate load transfer. To bypass Feature 3A time delay press the transfer button (bypass timer).

At the conclusion of the Feature 3A time delay, the controller is ready to transfer the load to normal. If enabled, Feature 31G time delay will run prior to retransfer and the Feature 31 output will be active while the time delay runs. Also, if the inphase transfer feature is enabled, the controller will prevent transfer until the sources are in phase.

Load Retransfer. To retransfer the load to the normal source the controller de-energizes ER relay and energizes SE relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. The transfer switch is now supplying the load from the normal source again.

Engine Cooldown and Stop. After load retransfer to the normal source, the controller starts Feature 2E time delay. Feature 2E time delay provides an unloaded cooldown running period for the engine-generator. At the end of the time delay, the controller energizes the NR relay and the engine-generator is signaled to shutdown.

Delayed-Transition Automatic Transfer (3ADTS)



Load Transfer to Emergency

The sequence for load transfer to the emergency source begins automatically when the controller detects a normal source failure, a transfer test signal (either local or remote), a remote transfer to emergency signal, or a generator exercise (with load transfer).

Normal Source Failure. The Normal source is considered unacceptable when any one of four voltage or frequency conditions occur (see page 1-2).

Transfer Test Signal. The test transfer signal can be from the transfer button, the engine-generator exerciser, or via the optional serial port (Accessory 11BE). The controller begins the load transfer sequence by de-energizing the SE relays and starting the Feature 1C time delay. Feature 1C time delay on engine starting prevents nuisance starting of the engine-generator set and load transfer to emergency due to momentary failures of the normal source. If the normal source is restored (voltage returns above the dropout point) while Feature 1C time delay is running, the SE relays is re-energized and the transfer sequence is terminated. (For transfer test the Feature 1C time delay is bypassed.)

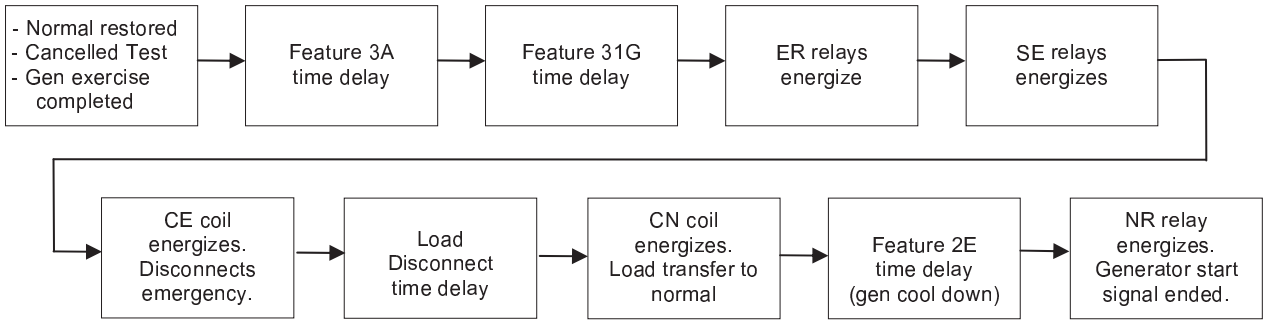
Engine Start Signal. When the Feature 1C time delay ends, the controller de-energizes the NR relay which signals the engine-generator to start. The controller monitors the emergency source, waiting for it to become acceptable. Usually about 10 seconds elapse from dropout of the NR relay to acceptance of the emergency source. This interval occurs because the engine-generator must crank, start, and run up to nominal pickup points. If the emergency source is available immediately, the controller will accept it as soon as the NR relay drops out.

When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31 output will be active while the time delay runs.

Load Transfer. To transfer the load to the emergency source in a delayed-transition mode the controller energizes the ER relays. The transfer switch CN coil energizes and opens the CN transfer switch main contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends, the controller energizes the ER relays. The transfer switch CE coil energizes and closes the CE transfer switch main contacts. Transfer switch is now supplying the load from emergency source. Feature 1F time delay ignores a momentary voltage drop of the emergency source when load is added to the generator.

Delayed-Transition Automatic Transfer (3ADTS) continued



Load Retransfer to Normal

The sequence for load retransfer to the normal source begins automatically when the controller detects a restored normal source or a cancelled transfer test signal (local or remote), a cancelled remote transfer to emergency signal, or a completed generator exercise (with load transfer).

Normal Source Restoration. The Normal source is considered acceptable again when all four voltage and frequency conditions occur (see page 1-2).

Cancel Transfer Test. Removal of the test transfer signal can be by pressing the transfer button again, ending a remote test, complete engine-generator exercise period, or via the optional serial port (Accessory 11BE).

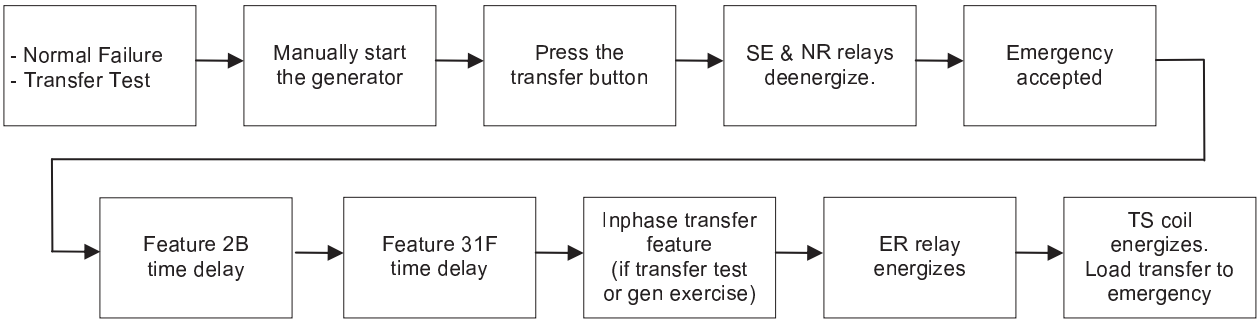
The controller begins the load retransfer sequence by starting the Feature 3A time delay. Feature 3A time delay on retransfer to normal allows the normal source to stabilize. If the normal source fails while the Feature 3A time delay is running, the controller waits for the normal source again to become acceptable and restarts the Feature 3A time delay. If the emergency source fails while Feature 3A is running, the controller bypasses the time delay for immediate load transfer. To bypass Feature 3A time delay press the transfer test button (bypass timer).

At the conclusion of the Feature 3A time delay, the controller is ready to transfer the load to normal. If enabled, Feature 31G time delay will run prior to retransfer and the Feature 31 output will be active while the time delay runs.

Load Retransfer. To retransfer the load to the normal source in a delayed-transition mode the controller de-energizes the ER and ER2 relay and energizes the SE2 relay. The transfer switch CE coil energizes and opens the CE transfer switch main contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends the controller energizes the SE relay. The transfer switch CN coil energizes and closes the CN transfer switch main contacts. The transfer switch is now supplying the load from the normal source again.

Engine Cooldown and Stop. After load retransfer to the normal source, the controller starts Feature 2E time delay. Feature 2E time delay provides an unloaded cooldown running period for the engine-generator. At the end of the time delay, the controller energizes the NR relay and the engine-generator is signaled to shutdown.

Open-Transition Non-Automatic Transfer (3NTS)



Load Transfer to Emergency

The transfer switch does not transfer the electrical load automatically. The generator is not started automatically. The sequence for load transfer to the emergency source begins when the controller detects a normal source failure, emergency source available, and a transfer test signal (either local or remote), a remote transfer to emergency signal.

Normal Source Failure. The Normal source is considered unacceptable when any one of four voltage or frequency conditions occur (see page 1-2).

Manually Start the Generator. If the Normal source has failed or to perform a transfer test, manually start the engine-generator first.

Transfer Test Signal. The test transfer signal can be from the transfer button or via the optional serial port (Accessory 11BE). The controller de-energizes the SE relay and NR relay. The controller monitors the emergency source, waiting for it to become acceptable.

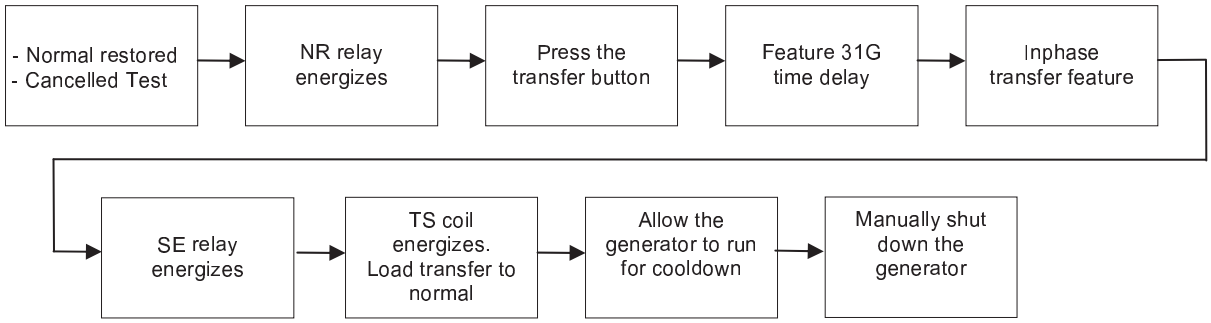
When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31 output will be active while the time delay runs. Also, if the inphase transfer feature (for motor loads) is enabled, the controller will prevent transfer until the sources are in phase.

Load Transfer. To transfer the load to the emergency source the controller energizes ER relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. Transfer switch is now supplying the load from emergency source.

If enabled, Feature 31M time delay will run after the transfer and the Feature 31 output will be active while the time delay runs.

Open-Transition Non-Automatic Transfer (3NTS) continued



Load Retransfer to Normal

The transfer switch does not retransfer the electrical load automatically. The generator is not stopped automatically. The sequence for load retransfer to the normal source begins when the transfer button is pressed again. A password may need to be entered first.

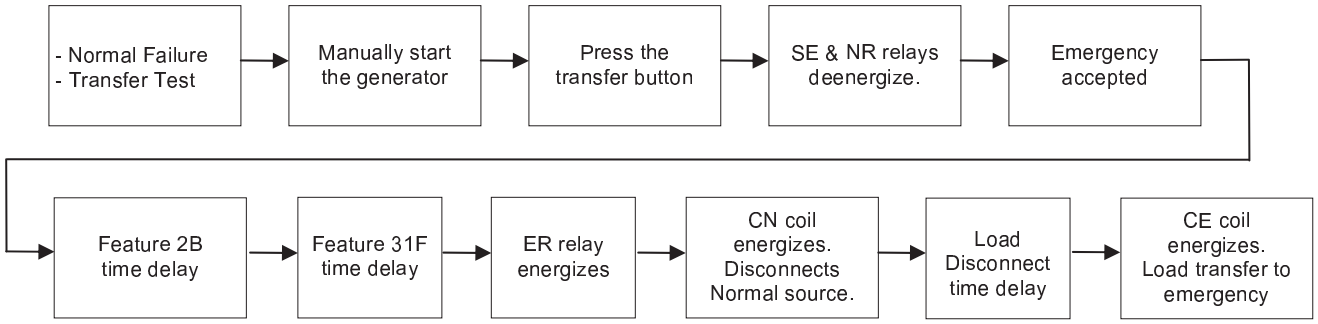
Normal Source Restoration. The Normal source is considered acceptable again when all four voltage and frequency conditions occur (see page 1-2).

Transfer Test Signal. The test transfer signal can be from the transfer button or via the optional serial port (Accessory 11BE). The controller monitors the normal source, waiting for it to become acceptable. The controller energizes the NR relay. The controller is ready to transfer the load to normal. If enabled, Feature 31G time delay will run prior to retransfer and the Feature 31 output will be active while the time delay runs. Also, if the inphase transfer feature is enabled, the controller will prevent transfer until the sources are in phase.

Load Retransfer. To retransfer the load to the normal source the controller de-energizes ER relay and energizes SE relay. The transfer switch TS coil energizes, and all transfer switch contacts (mains, controls, auxiliaries) reverse position. The transfer switch is now supplying the load from the normal source again.

Engine Cooldown and Stop. After load retransfer to the normal source, allow the generator to run for a cool down period. Then manually shut down the engine-generator.

Delayed-Transition Non-Automatic Transfer (3NDTS)



Load Transfer to Emergency

The transfer switch does not transfer the electrical load automatically. The generator is not started automatically. The sequence for load transfer to the emergency source begins when the controller detects a normal source failure, emergency source available, and a transfer test signal (either local or remote), a remote transfer to emergency signal.

Normal Source Failure. The Normal source is considered unacceptable when any one of four voltage or frequency conditions occur (see page 1-2).

Manually Start the Generator. If the Normal source has failed or to perform a transfer test, manually start the engine-generator first.

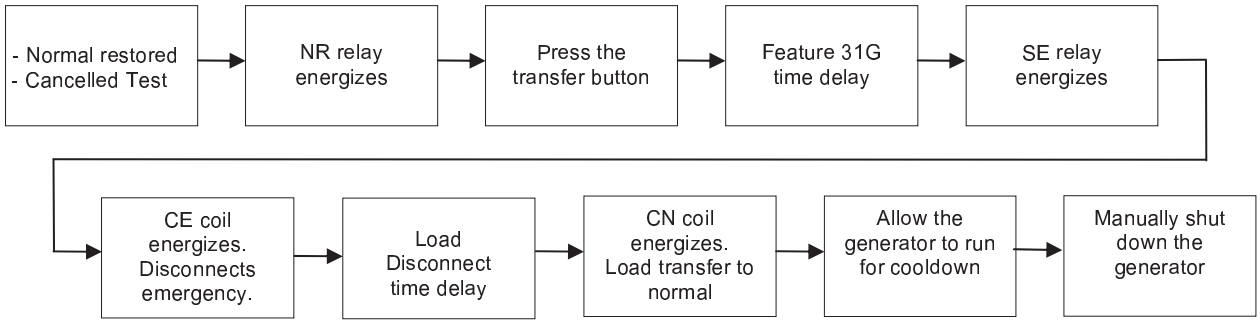
Transfer Test Signal. The test transfer signal can be from the transfer button or via the optional serial port (Accessory 11BE). The controller de-energizes the SE relay and NR relay. The controller monitors the emergency source, waiting for it to become acceptable.

When the emergency source becomes acceptable, the controller starts the Feature 2B time delay on transfer to emergency (if desired). Feature 2B time delay allows the emergency source to stabilize before load transfer. If the emergency source fails while Feature 2B time delay is running, the controller again waits for the emergency source to become acceptable again and restarts Feature 2B.

At the conclusion of the Feature 2B time delay, the controller is ready to transfer the load to emergency. If enabled, Feature 31F time delay will run prior to transfer and the Feature 31 output will be active while the time delay runs.

Load Transfer. To transfer the load to the emergency source in a delayed-transition mode the controller energizes ER relay. The transfer switch CN coil energizes and opens the CN transfer switch main contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends, the controller energizes the ER relay. The transfer switch CE coil energizes and closes the CE transfer switch main contacts. Transfer switch is now supplying the load from emergency source.

Delayed-Transition Non-Automatic Transfer (3NDTS) continued



Load Retransfer to Normal

The transfer switch does not retransfer the electrical load automatically. The generator is not stopped automatically. The sequence for load retransfer to the normal source begins when the transfer button is pressed again. A password may need to be entered first.

Normal Source Restoration. The Normal source is considered acceptable again when all four voltage and frequency conditions occur (see page 1-2).

Transfer Test Signal. The test transfer signal can be from the transfer button or via the optional serial port (Accessory 11BE). The controller monitors the normal source, waiting for it to become acceptable. The controller energizes the NR relay. The controller is ready to transfer the load to normal. If enabled, Feature 31G time delay will run prior to retransfer and the Feature 31 output will be active while the time delay runs.

Load Retransfer. To retransfer the load to the normal source in a delayed-transition mode the controller de-energizes ER and ER2 relays and energizes the SE2 relay. The transfer switch CE coil energizes and opens the CE transfer switch main contacts. The load is disconnected from both sources. The load disconnect time delay starts. When this time delay ends the controller energizes the SE relay. The transfer switch CN coil energizes and closes the CN transfer switch main contacts. The transfer switch is now supplying the load from the normal source again.

Engine Cooldown and Stop. After load retransfer to the normal source, allow the generator to run for a cool down period. Then manually shut down the engine-generator.

Optional Accessories

Several optional accessories are available for the Group G Controller. They can be factory installed or most can be ordered later as an accessory kit.

⚠ WARNING

Deenergize both Normal and Emergency power sources before installing an accessory kit.

Four-Function Software Bundle

(Accessory 11BE or Kit 935147)

If optional Accessory 11BE software was ordered, the controller is factory configured with four additional functions: communication, programmable exerciser, event log, common alarm output contact option OP1 (in the controller). The controller has additional screens for these four functions.

Communication. Under the *General* settings, a screen allows the user to configure *Communication* (RS485 port). The baud rate can be set off, 9600 – 115200. The address can be set 1 to 247. See the Appendix for setting DIP switches S7 and S8. S7 sets the terminating resistor; S8 sets 2 wire or 4 wire. See pages 1-3 and 2-5.

Programmable Exerciser. Under the *Engine Exerciser* settings, a screen allows the user to configure the optional exerciser. This exerciser provides seven programmable exercise periods. They can be set for once a week (all), alternate weeks (1st, 2nd, 3rd, 4th, 5th week), and each with an adjustable start and exercise period. See pages 1-3, 2-9, and 2-10.

Event Log. Under the *Event Log* main menu, a screen allows the user to view events. Use the up and down keys to navigate the event list (last 300 events). See pages 1-3, 2-11, Appendix A-3 (event types), and Appendix A-4 (event causes).

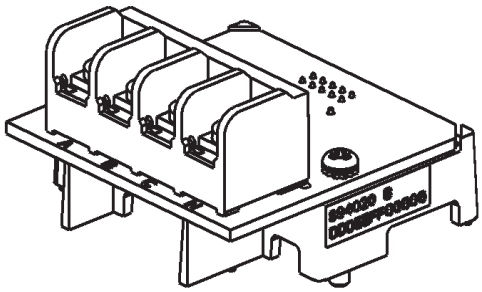
Common Alarm. Under the *General* settings, a screen allows the user to configure *Common Alarms*. Output OP1 contact (in the controller) can be configured to operate when a common alarm occurs. Refer to the wiring diagram provided with the transfer switch for connections and rating of the OP1 contact. See pages 1-3, 2-7, and 2-8 for settings (*Settings*, *Features*).

5140 Quad-Ethernet Module

(Accessory 72EE or Kit 948551)

This accessory provides a 10/100 Mbit Ethernet interface to the transfer switch. It includes embedded web pages and access to Modbus registers for monitoring and control. It is mounted on a DIN rail.

Current Sensing Module
(Accessory 23GA – 1 phase, 23GB – 3 phase, or Kit 935150)

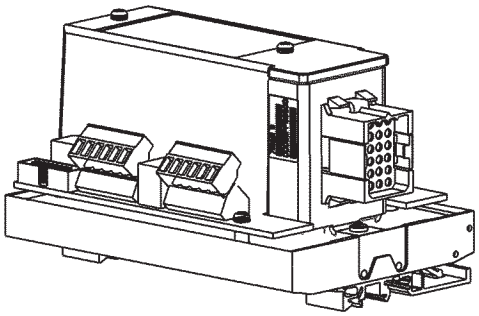


This accessory is a current sensing module that is mounted on the controller (lower part). The customer-supplied current transformer(s) attach to the load cables of the transfer switch. With this accessory installed the controller measures and displays the load current (1 phase, 3 phase, or off). This accessory is not available when a Power Meter is provided. See pages 1-3, 2-5, and 2-6 for settings (*Other Parameters*).

⚠ WARNING

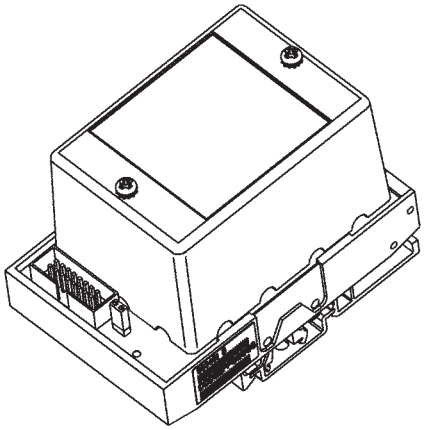
Never leave an open secondary circuit of a current transformer. Dangerous voltage can cause shocks, burns, and/or death. When disconnected always install a shorting jumper between the current transformer terminals.

Relay Expansion Module (Included on 3ADTS & 3NDTS)
(Optional Accessory 18RX for 3ATS & 3NTS or Kit 935148)



This accessory consists of a relay module mounted on a DIN rail. The module interfaces with the controller for dual-operator transfer switches (3ADTS & 3NDTS). It also provides some commonly used accessory relays (18B, 18G, etc.). Output OP2 and OP3 contacts can be configured for common alarms. See pages 1-3, 2-7, and 2-8 for settings (*Features*, *Output OP1*, *OP2*, *OP3*). Refer to transfer switch wiring diagram for connections and rating of OP2 and OP3 contacts.

Uninterruptable Power Supply Module
(Accessory 1UP or Kit 935149)



This accessory consists of a module that attaches on a DIN rail. The module provides limited reserve power (approximately 3 minutes) to the controller and some accessories during a power outage until the generator starts. The built-in battery recharges when power is restored.

Load Shed (from emergency source)
(Accessory 30AA and 30BA on 3ATS or 3ADTS only, kit not available)

If optional Accessory 30AA or 30BA was ordered, the controller is factory configured for Load Shed. The home / control status screen displays the load shed operation. Load shed can be set to occur only when the sources are in phase (see page 2-7 and 2-8). Refer to the wiring diagram provided with the transfer switch for connections to these accessories.

Accessory 30AA is a load shedding circuit initiated by opening of a customer-supplied contact.

Accessory 30BA* is a load shedding circuit initiated by removal of customer-supplied voltage (*specify voltage).

⚠ DANGER

Hazardous voltage capable of causing shock, burns, or death is used in this switch. Deenergize both Normal and Emergency power sources before making any changes.

NOTICE

Do not make any setting changes while the controller is energized. Any change in these settings may affect the normal operation of the transfer switch. This change could allow the load circuits to remain connected to low voltage source.

This appendix shows the controller DIP switch settings and jumper block settings for input voltage, frequency, phases, and type of transfer switch used. These controls should only be used by trained technicians from ASCO Services, Inc. (ASI 1-800-800-2726).

Controller Cover Removal

1. Deenergize the controller.
2. Release the cover by pressing the latch outward on the right side with your thumb. Figure A-1.
3. Pull the cover outward and unhook it from the left side.

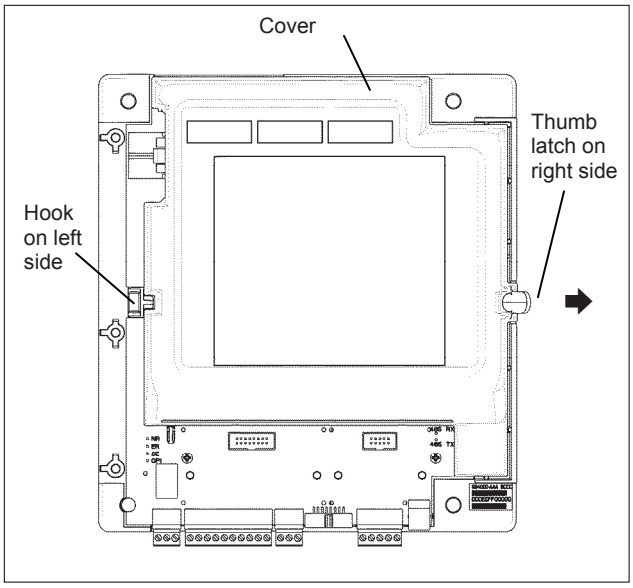


Figure A-1. Cover removal.

Controller Cover Installation

1. Position the cover so that the hole on left side engages the hook on the base.
2. Press the cover inward until it latches on the right side. See Figure A-1.
3. Reenergize the controller.

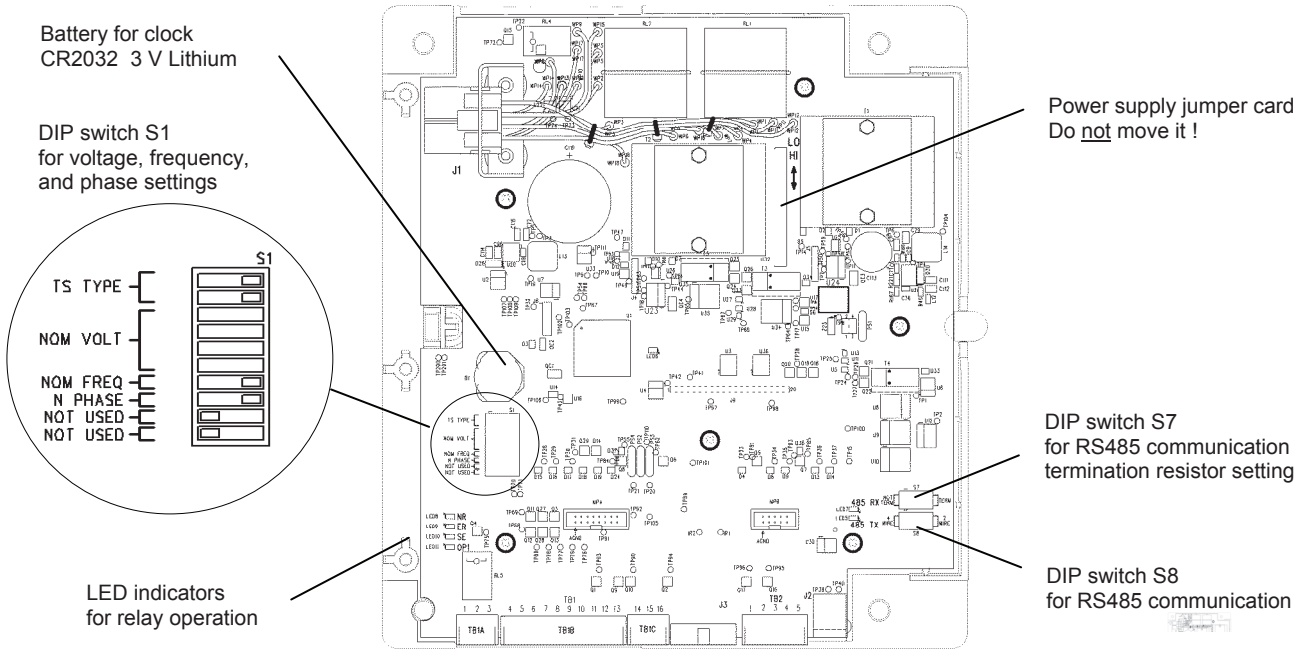


Figure A-2. Location of DIP switches

Power Supply Jumper Card

The power supply jumper card is positioned during manufacture for the customer system voltage. Do not move this card.

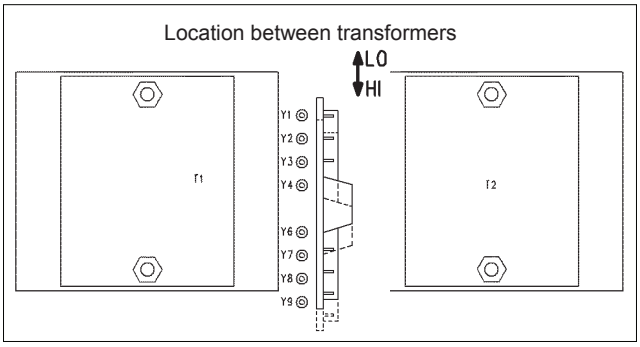


Figure A-3. Power Supply Jumper Card.

Table A-1 shows the appropriate position of the power supply jumper card for different controller part numbers and system voltages.

NOTICE

To avoid permanent damage, be certain that the voltage setting matches the transfer switch system voltage. **Do <u>not</u> apply HI voltage with the jumper card in the LO position.**

Table A-1. Position of Jumper Card.

Controller Part No. 894000-	Position of Jumper Card for system voltage	
	Up ↑ (LO) toward the top	Down ↓ (HI) toward the bottom
001	115V, 120 V	--
002	208V, 220V 230V, 240V	380V, 400V, 415V 440V, 460V, 480V
003	277V	550V, 575V, 600V

Transfer Switch Type Setting

DIP switch S1, actuators 1 and 2 select the type of transfer switch used with the controller (open-transition or delayed-transition). See Table A-2.

NOTICE

To avoid permanent damage be certain that the setting matches the transfer switch type.

Table A-2. Transfer switch type
DIP switch S1, actuators 1 and 2

S1 DIP	Open transition	Delayed transition
1	⇨ on	⇨ on
2	⇨ on	⇦ off

Frequency Setting

DIP switch S1 actuator 7 selects either 50 or 60 Hz source frequency sensing. See Table A-3.

Table A-3. Source Frequency
DIP switch S1, actuator 7

S1 DIP	50 Hz	60 Hz
7	⇦ off	⇨ on

Normal Phase Setting

DIP switch S1 actuator 8 selects either 1 phase or 3 phase sensing for the Normal source. The sensing for the Emergency source is 1 phase. See Table A-4.

Table A-4. Phase of the Normal Source
DIP switch S1, actuator 8

S1 DIP	1 Phase	3 Phase
8	⇦ off	⇨ on

Voltage Setting

DIP switch S1, actuators 3, 4, 5, and 6 select the voltage setting. See Table A-5.

NOTICE

To avoid permanent damage be certain that the voltage setting matches the transfer switch system voltage.

Table A-5. Voltage setting, DIP switch S1, actuators 3, 4, 5, and 6

S1 DIP switch actuators	115	120	208	220	230	240	277	380	400	415	440	460	480	550	575	600
3	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨	⇦	⇨
4	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨	⇦	⇦	⇨	⇨
5	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨
6	⇦	⇦	⇦	⇦	⇦	⇦	⇦	⇦	⇨	⇨	⇨	⇨	⇨	⇨	⇨	⇨

Logged Events and Causes

See page 2-11 for how to view logged events and their causes. The following table lists in alphabetical order the **Event Types** that are displayed. The meaning is shown at the right. The next page lists the **Event Causes** (reasons) that are displayed under the event type.

Recorded Event Types

Displayed Event Type	Meaning
Alarm Reset	The alarms were acknowledged.
Clear Event	The event log database was cleared (erased) by a local or remote user.
Clear Statistics	The statistics data was cleared (erased) by a local or remote user.
Clock Set	The clock was set by a local or remote user.
DST Off	The Daylight Savings Time setting was turned off by a local or remote user.
DST On	The Daylight Savings Time setting was turned on by a local or remote user.
DTTS Type Set	The delayed-transition transfer switch type was set.
E Source Accepted	The emergency source has become acceptable.
E Source Not Accepted	The emergency source not acceptable (voltage or frequency dropout or pickup)
Engine Start	The controller has signaled the engine to start.
Engine Stop	The controller has signaled the engine to stop.
Fail to Accept Timer	The emergency source was not accepted within the time setting.
Firmware Updated	The Firmware was updated.
In-Phase OFF	The inphase setting was turned off by a local or remote user.
In-Phase On	The inphase setting was turned on by a local or remote user.
Internal Error	See HELP in INDEX.
Load Connected	The load was connected to the transfer switch.
Load Disconnected	The load was disconnected from the transfer switch.
Local Transfer Override	Load transfer was cancelled by a local user.
N Source Accepted	The normal source has become acceptable.
N Source Not Accepted	The normal source not acceptable (voltage dropout or pickup).
Not in Automatic	The manual mode enabled or Feature 34B activated.
NVM Defaults Loaded	NVM defaults were loaded.
OTTS Type Set	The open-transition transfer switch type was set.
Password Changed	The password was changed.
Position Error	See HELP in INDEX.
Return to Automatic	The automatic mode was enabled.
Timer 2B Bypass	Feature 2B was bypassed by a local or remote user.
Timer 3A Bypass	Feature 3A was bypassed by a local or remote user.
Timer 31 Bypass	Feature 31 was bypassed by a local or remote user.
Transfer Abort	The transfer has been aborted or cancelled by a local user.
Transfer Committed	Load transfer has been committed by a local or remote user.
Transfer E to N	Transfer from emergency to normal (E source failure, or manual transfer).
Transfer Failure	See HELP in INDEX.
Transfer N to E	Transfer from normal to emergency (N source failure, test, exercise, manual transfer)
TS Initial Position	See HELP in INDEX.

continued on the next page

The following table lists in alphabetical order the **Event Causes** that are displayed under the event type (previous page). The meaning is shown at the right.

Event Cause

Displayed Event Cause	Meaning
Acknowledge Alarms	Alarms acknowledged.
Cancel Test	Test cancelled.
E Not Accepted	Emergency source not accepted.
E Over Frequency	Emergency source over frequency
E Over Voltage	Emergency source over voltage
E Under Frequency	Emergency source under frequency
E Under Voltage	Emergency source under voltage
Engine Exercise	The generator is being exercised.
F6 Aborts NE Transfer	Load transfer cancelled; F6
F34B Inhibit Active	Not in automatic; Feature 34B activated.
Feature 5	Test requested (Feature 5)
Feature 17	Test requested (Feature 17)
Local User	Local user active
Manual Mode Enabled	The manual transfer mode is enabled.
Manual Transfer	The transfer switch is in manual transfer mode.
N Not Accepted	Normal source not accepted.
N Over Frequency	Normal source over frequency
N Over Voltage	Normal source over voltage
N Under Frequency	Normal source under frequency
N Under Voltage	Normal source under voltage
Position Error	See HELP in INDEX.
Remote User	Remote user active
Serial 17	Serial 17 active.
Switch on Center Off	The load is disconnected (for 3DTS, 3NDTS only)
Switch on Emergency	The load is connected to the emergency source.
Switch on Normal	The load is connected to the normal source.

Statistics Kept

See page 2-11 for how to view the statistics kept. The following table lists the statistics that are displayed. The meaning is shown at the right.

Statistics

Displayed Statistics	Meaning
TS Total Transfers	Number of times the transfer switch has transferred the load.
TS Transfer Time	Total time (sec.) it took to transfer the load between sources.
Source Fail Transfers	Number of times transfer switch has transferred load due to source unacceptable.
Days Energized	Total number of days the ATS has been energized.
Time Normal Available	Total time (hours & minutes) the Normal source has been available.
Total Time On Normal	Total time (hours) the load has been connected to the Normal source.
Time Emerge. Available	Total time (hours & minutes) the Emergency source has been available.
Total Time On Emerg.	Total time (hours) the load has been connected to the Emergency source.
Last Gen Start	Last time (date & time) the generator started.
Gen Starting Time	At that time, how long it took for the generator to become acceptable.
In-Phase Time	Time (sec.) it took to run the in-phase monitor achieve in-phase transfer.

INDEX

A

About, 1-3, 2-11
Accessories
  1UP, 2-3, 5-2
  11BE, 2-5, 2-6, 2-9 thru -11, 5-1
  18RX, 5-2
  23GA, 23B, 5-2
  30AA, 30BA, 5-2
  dongle, optional, 1-2
acknowledge alarms, 1-2
Alarm Reset, A-3
alarms, 1-2, 1-3
Appendix, A-1, A-2, A-3, A-4
alert light, 1-1
acknowledge alarm screen, 1-2
Appendix
  battery, A-1
  cover removal, A-1
  DIP switches, A-1, A-2
  frequency setting, A-2
  LED indicators, A-1
  logged events, A-3, A-4
  phase setting, A-2
  statistics, A-4
  transfer switch type, A-2
  voltage hi-lo card, A-1, A-2
  voltage setting, A-2
Are you sure?, 2-1, 3-1
arrow buttons, 1-1, 1-3
ASI is ASCO Services Inc.
  800-800-2726(ASCO)
  customercare@asco.com
ATS status screen, 1-2, 1-3

B

battery, internal, A-1
battery, external, 2-3, 2-5, 2-6, 5-2
baud rate, communication, 2-5, 2-6
buttons, 1-1
Bypass, *Features*, 2-3, 2-4, 2-7, 2-8
Bypass Timer button, 1-1

C

Cancel Test, A-4
change password, 2-1, 2-5, 2-6
Clear Events, 2-5, 2-6, A-3
Clear Statistics, A-3
Clock Set, A-3
Commit Transfer, 2-7, 2-8
Common Alarms settings, 1-3, 2-5, 2-6, 5-1
Communication settings, 1-3, 2-5, 2-6, 5-1
Contrast, *Display*, 2-5, 2-6
control messages, 3-3
control overview, 1-1, 1-3
cooldown, engine, 2-3, 2-4, 3-2, 4-2
cover removal, A-1
CT Ratio, 2-5, 2-6
current sensing, 1-2, 2-5, 2-6, 5-2

D

DANGER statements, cover, A-1
Date & Time settings, 1-2, 1-3, 2-5, 2-6
Day of Week, exerciser, 2-9, 2-10
daylight savings time, 2-5, 2-6, A-3
decrease value button, 1-1
delayed transition transfer, 4-3, 4-4, 4-7, 4-8, A-2
description of operation
  3ATS, 4-1, 4-2
  3ADTS, 4-3, 4-4
  3NTS, 4-5, 4-6
  3NDTS, 4-7, 4-8
  shed load, 5-1
DIP switches, A-1, A-2
display messages, 3-2, 3-3
Display settings, 1-3, 2-5, 2-6
  Contrast, 2-5, 2-6
  Language, 2-5, 2-6
  Source 1/2, 2-5, 2-6
  Volt Label, 2-5, 2-6
dongle, optional, 1-2
drop out settings, 1-3, 2-2
DST, 2-5, 2-6, A-3
Duration, exerciser, 2-9, 2-10

E

E Accept Fail, 2-5, 2-6, 3-1
E Source Accepted, A-3
E Source Not Accepted, A-3
E Accept Fail, 2-5, 2-6, 3-1
Emergency ➜ *Normal Timer*, 2-3, 2-4, 3-2
Enable, exerciser, 2-9, 2-10
Engine Cooldown Timer, 2-3, 2-4, 3-2, 4-2
Engine Exerciser settings, 2-9, 2-10
  Day of Week, 2-9, 2-10
  Duration, 2-9, 2-10
  Enable, 2-9, 2-10
  Program No, 2-9, 2-10
  Time, 2-9, 2-10
  With Load, 2-9, 2-10
Enter Password, 1-3, 2-1, 2-5, 2-6, 3-2
enter/save button, 1-1, 1-3
escape button, 1-1, 1-3
Event Log, 2-11, 5-1, A-3, A-4
Exerciser, Engine, 2-9, 2-10, 5-1
explanations
  engine exercisers, 2-10
  features, 2-8
  general, 2-6
  screen messages, 3-1
  time delays, 2-4
  voltage and frequency, 2-2
Ext. Battery, 2-3, 2-5, 2-6
Ext. Feature 6B, 2-7, 2-8
Ext. Feature 17, 2-7, 2-8

F

Fail Accept Timer, 2-7, 2-8
Fail Acquire E, 3-2
Features settings, 2-7, 2-8
  BP E➜N F31 E Fail, 2-7, 2-8
  BP N➜E F31 N Fail, 2-7, 2-8
  Commit Transfer, 2-7, 2-8
  Ext. Feature 6B, 17, 2-7, 2-8
  Fail Accept Timer, 2-7, 2-8
  In Phase On, 2-7, 2-8
  Output OP1-3, 2-7, 2-8
Format, Date & Time, 2-5, 2-6
frequency, 1-2, 2-2, A-2

INDEX

G

General settings, 1-3, 2-5, 2-6
- *Common Alarms*, 2-5, 2-6
- *Communication*, 2-5, 2-6
- *Date & Time*, 2-5, 2-6
- *Display*, 2-5, 2-6
- *Name & Location*, 2-5, 2-6
- *Other Parameters*, 2-5, 2-6

H

HELP 800-800-2726(ASCO)
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home screen (main menu),1-3, 2-1

I

increase value key, 1-1
In-Phase, 2-3, 2-4, 2-7, 2-8, 5-2, A-4
Internal Error, A-4
interval, exerciser, 2-9, 2-10
increase value button, 1-1
Invalid Password, 2-1, 2-5, 2-6, 3-2

K

key symbol, dongle, optional, 1-2

L

Language, *Display*, 2-5, 2-6
legend, 1-3, 1-4, 1-5, 1-6, 1-7
lights, 1-1, A-1
Ld Disconnect setting, 2-5, 2-6, 3-2
Load Connected, A-3
Load Disconnect Timer, 3-2
Load Disconnected, 5-2, A-3
Load on Emergency, 3-2
Load on Normal, 1-2, 3-2
Load Shed, 5-2
Load Transfer Override, A-4
Local User, A-4
Location, Name &, 1-3, 2-5, 2-6
Loss E when on E, 2-5, 2-6, 3-1

M

Main Menu, 1-3, 2-1
Manual Mode Enabled, A-4
manual operation, 1-1
- 3NTS, 1-6, 4-5, 4-6
- 3NDTS, 1-7, 4-7, 4-8

Manual Transfer, A-4
messages, display, 1-2, 3-1, 3-2
metering screen, 1-2, 1-3

N

N Not Accepted, A-4
N Over Frequency, A-4
N Over Voltage, A-4
N Source Accepted, A-3
N Source Not Accepted, A-3
N Under Frequency, A-4
N Under Voltage, A-4
Name & Location, 2-5, 2-6
navigation, screen, 1-3
No Active Alarms, 1-2, 3-2
non-automatic operation
- 3NTS, 4-5
- 3NDTS, 4-7

Normal ➜ *Emergency Timer*, 2-3, 2-4, 3-2
Normal Fail Timer, 2-3, 2-4, 3-2
Normal Failed, 3-2, 4-1
Normal OK, 1-2, 3-1, 3-2, 4-2
Not in Automatic, A-4
not in automatic light, 1-1
NVM Defaults Loaded, A-4

O

operation, description of
- 3ATS, 4-1, 4-2
- 3ADTS, 4-3, 4-4
- 3NTS, 4-5, 4-6
- 3NDTS, 4-7, 4-8

optional accessories, 5-1, 5-2
Other Parameters, 1-3, 2-5, 2-6
- *Clear Events*, 2-5, 2-6
- *CT Ratio*, 2-5, 2-6
- *Current Sensing*, 2-5, 2-6
- *Ext. Battery*, 2-5, 2-6
- *Password*, 2-5, 2-6

OF over frequency trip, 2-2
OTTS Type Set, A-4
Output OP, 2-7, 2-8
OV over voltage trip, 2-2
overview, 1-1, 1-3

P

password, 1-3, 2-1, 2-5, 2-6, 3-2
- *General* ➜ *Other Parameters*

password, default, **1111**
phase setting, normal source, A-2
pick up settings, 1-3, 2-2
Position Error, A-4
Post Transfer Timer, 2-3, 2-4, 3-2
power supply, 5-2, A-1, A-2
Pre Transfer Timer, 2-3, 2-4, 3-2
Present Time, exerciser, 2-9, 2-10
Press  *Abort Transfer*, 3-3
Press  *Bypass Timer*, 3-3
Press *Re-Transfer*, 3-3
Press  *Test Transfer*, 3-3
Press  *Transfer*, 3-3
Press *to acknowledge alarms* 3-3
Press  *to Test*, 3-3
Press *to Transfer*, 3-3
Press  *to Cancel*, 3-3
Program No, exerciser, 2-9, 2-10
programmable engine exerciser, 2-9, 2-10, 5-1
protocol, communication, 2-5
PU/DO pick up/drop out, 2-2

INDEX

R

relay expansion module, 5-2
retransfer button, 1-1
Return to Automatic, A-3
RS-485, *Communication*, 2-7, 2-8

S

screen messages, 3-1, 3-2
screen navigation, 1-3
sequence of operation, 1-4 thru 1-7
Serial 17, A-4
Settings, 1-3, 2-1, 2-2
    General, 1-3, 2-5, 2-6
    Engine Exerciser, 1-3, 2-9, 2-10
    Features, 1-3, 2-7, 2-8
    Pick Up / Drop Out, 1-3, 2-2
    Timers, 1-3, 2-3, 2-4
Source 1/2, *Display*, 2-5, 2-6
source acceptability, 1-2, 3-1
Start Week, exerciser, 2-9, 2-10
Statistics, 2-11, A-4
status information, 1-2, 1-3, 3-1
status lights, 1-1
Switch on Center Off, A-4
Switch on Emergency, A-4
Switch on Normal, A-4

T

Test Mode, 3-2, 4-1
Time, Date & Time, 1-3, 2-5, 2-6
Time, start, exerciser, 2-9, 2-10
Time Delay 2B Bypass, A-3
Time Delay 3A Bypass, A-3
Time Delay 31 Bypass, A-3
Timers (time delays) settings, 1-3
    1C & 1F, 2-3, 2-4, 4-1
    2B, 2-3, 2-4
    2E, 2-3, 2-4
    3A, 2-3, 2-4
    31F, 2-3, 2-4
    31G, 2-3, 2-4
    31M, 2-3, 2-4
    31N, 2-3, 2-4
    Fail Accept Max, 2-3, 2-4
    In-Phase, 2-3, 2-4
    Ld Disconnect, 2-3, 2-4
Transfer Abort, A-3
transfer button, 1-1
Transfer Committed, A-4
Transfer E to N, A-3
Transfer Failure, A-3
Transfer Inhibit Signal, 3-2
Transfer N to E, A-3
transfer switch, 1-1
    see Installation Manual
    type setting, A-2
transfer test, 1-1
Transfer to Emergency Inhibited, 3-3
Transfer to Normal Inhibited, 3-3
transformers, jumper card, A-2
TS Initial Position, A-3

U

ups, 5-1

V

Volt Label, *Display*, 2-5, 2-6
voltage, 1-2, 2-2, 2-5, 2-6, 3-1, 4-1 through 4-8, A-1, A-2, A-3
    jumper card, A-2
    setting, A-2

W

Waiting for Emergency Available, 3-2, 4-1
Waiting for In-Phase, 3-2, 4-9
Waiting for Retransfer Signal, 3-2
With Load, exerciser, 2-9, 2-10

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ASCO Series 300 Group G Controller
Standard Operational Features, Controls and Status Indicators

Standard Selectable Features

- Inphase monitor to transfer motor loads, without any intentional off time, to prevent inrush currents from exceeding normal starting levels.
- Engine Exerciser to automatically test backup generator each week-with or without load 20 minutes not adjustable.
- Commit to transfer
- Selective load disconnect control contacts (two provided) which operate with time delay prior to and/or after load transfer and re-transfer.
- 60Hz or 50Hz selectable switch.
- Three – phase/single – phase selectable switch.

124* 64 Graphical LCD Display/LED Indicators

- Switch position green LED for normal
- Switch position red LED for emergency
- Source availability green LED for normal
- Source availability red LED for emergency
- “Not in Auto” amber LED
- Common Alarm amber LED
- Soft key for transfer test function
- Soft key for time delay bypass
- Set Engine Exerciser
- Selection of non – automatic operation
- Scroll, Up/Down Arrows
- Escape key
- Enter key

Voltage & Frequency Sensing

- Three phase under and over voltage sensing on normal, and single phase on emergency
- True RMS voltage sensing with +/- 1% accuracy
- Selective settings: single or three phase voltage sensing on normal and single phase sensing on emergency; 50 or 60Hz
- Frequency sensing accuracy is +/- 0.1Hz
- Under and over frequency settings on normal and emergency
- Voltage and frequency parameters adjustable in 1% increments

- Normal source pickup voltage adjustment range is 85 – 100%; drop - out voltage adjustment range is 70 – 98% in 1% increments
- Emergency source pickup voltage adjustment range is 85 – 100%; drop - out voltage adjustment range is 70 – 98% in 1% increments
- Normal source pickup frequency adjustment range is 86 – 100%; drop – out adjustment range is 85 – 98% in 1% increments
- Emergency source pickup frequency adjustment range is 86 – 100%; drop – out adjustment range is 85 – 98% in 1% increments
- Over voltage and over frequency reset is fixed at 2% below the trip setting

Time Delays

- Engine start time delay – delays engine starting signal to override momentary normal source outages – adjustable 0 to 6 seconds (Feature 1C)
- Transfer to emergency time delay – adjustable 0 – 60 minutes (Feature 2B)
- Emergency source stabilization time delay to ignore momentary transients during initial generator set loading – adjustable 0 to 4 seconds (Feature 1F)
- Re-transfer to normal time delay – adjustable 0 to 10 hours (Feature 3A)
- Unloaded running time delay for engine cooldown – adjustable 0 to 60 minutes (Feature 2E)
- Pre and post signal time delay for selective load disconnect with a programmable bypass on source failures – adjustable 0 to 5 minutes (Optional feature 31Z)
- Fully programmable engine exerciser seven independent routines to exercise the engine generator, with or without loads, on a daily, weekly. Bi weekly or monthy basis (Optional feature bundle 11BE)
- Delayed transition load disconnect time delay – adjustable 0 to 5 minutes

Standard Control Contacts

- Switch position indicating contacts (rated 10 amps 250VAC, 32VDC) (1) for normal position (1) for emergency position

Remote Control Features – external inputs for connecting:

- Remote test switch
- Remote contact for test or for peak shaving applications. If emergency source fails, switch will automatically transfer back to normal source if acceptable
- Inhibit transfer to emergency
- Remote time delay bypass switch emergency to normal

Electromagnetic Compliance Testing (EMC)

- IEC 61000 – 4 – 2 Electrostatic Discharge Immunity
- IEC 61000 – 4 – 3 Radiated RF Field Immunity
- IEC 61000 – 4 – 4 Electrical Fast Transient/Burst Immunity
- IEC 61000 – 4 – 5 Surge Immunity
- IEC 61000 – 4 – 6 Conducted RF Immunity
- CISPR 11 – Conducted RF Emissions and Radiated RF Emissions
- FCC CFR 47 Part 15

Additional Design Criteria

- NEMA ICS-109.21 Impulse Withstand Test
- Digital circuitry isolated from line voltages
- Isolated RS – 485 Serial Communications Port (Accessory 11BE Bundle)
- Connectivity Module for remote monitoring and control (Accessory 72EE)

ASCO Power Technologies™

SERIES 300 Service Entrance Power Transfer Switch

Data Sheet

The ASCO Service Entrance Power Transfer Switch combines automatic power switching with the disconnecting, grounding, and bonding required for use as service entrance equipment. It meets all National Electrical Code® requirements for service entrance use.



ASCO SERIES 300
SE Rated 800 amperes Type 1 enclosure



ASCO SERIES 300
SE Rated 200 amperes in Type 3R enclosure

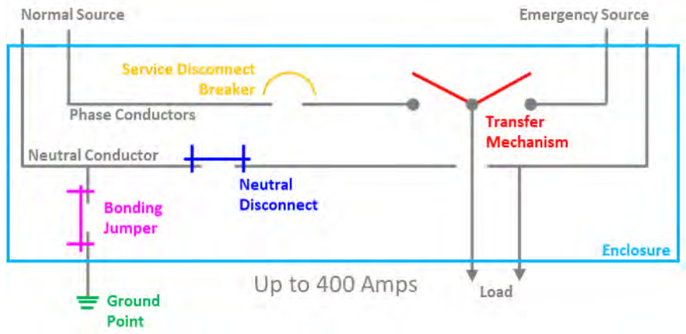
Product Features:

- Sizes available from 70 - 3000 amps, 480VAC or 60 Hz, single or 3-phase
- 70 - 400 Ampere listed to UL 1008
- 600 - 3000 Ampere listed to UL 891
- Automatic Transfer Switch is listed to UL 1008 for total system loads
- Silver plated copper ground and neutral bus with solderless screw type terminals
- Ground fault trip protection provided on 1000 amps and above
- Available with solid or switched neutral
- Line side breaker barriers available in compliance with NEC2020

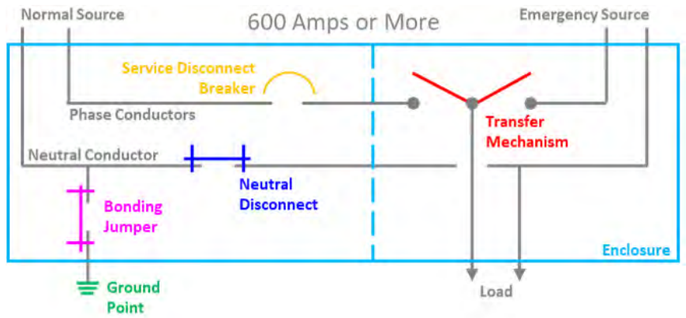
Life Is On | Schneider Electric

Construction

Products 400 amperes or less, utilize a single enclosure, including a service disconnect circuit breaker, as well as the transfer switch and grounding and bonding provisions.



Products 600 amperes and above provide a service equipment section containing the service disconnect circuit breaker as well as grounding and bonding provisions. A second section contains the power transfer switch.



For additional detail, see the interactive 3-D view in the ASCO Digital Hub.

Order Information

To order an ASCO SERIES 300SE Power Transfer Switch, complete the following catalog number:

J	+ 03AUS	+ B	+ 3	+ 0600	+ N	+ GX	+ C
Frame	Product Type	Neutral Code	Phase Poles	Amperes Continous Rating	Voltage Code	Controller Code	Enclosure
D = 70 - 225 Amp J = 150 - 600 Amp 150A - 225A: 3ADUS/3NDUS Only H = 800 - 1200 Amp G = 1600 - 3000 Amp	03AUS = Automatic 03NUS = Non-Automatic 3ADUS = Automatic Delayed Transition 3NDUS = Non-Automatic, Delayed Transition	A = Solid Neutral B = Switched Neutral	2 3	0070, 0100, 0150, 0200, 0225[3], 0250[3], 0400, 0600, 0800, 1000, 1200, 1600, 2000, 2500, 3000	C = 208 D = 220 E = 230 F = 240 H = 380 J = 400 K = 415 L = 440 M = 460 N = 480 P = 550 Q = 575 R = 600	G = No Optional Accessories GX = Optional Accessories	C = Type 1 (Standard) M = Type 3R Secure Double Door N = Type 4[1] Secure Double Door Q = Type 12[1] Secure Double Door V = Type 4X[4,5] Secure Double Door 316 SS

Notes:
1. Available for 70-1600 amperes, use type 3R for 2000-3000 ampere applications.
2. A solid neutral is provided as standard.
3. 200, 225 ampere rated switches suitable for use with copper cable only. Refer to paragraph 310.15 of the NEC for additional information.
4. Type 316 stainless steel is the standard. It provides an improved reduction in corrosion of salt and some chemicals. It is the preferred choice for marine environments.
5. Available only on switches rated 70 - 1600 amperes.

Specifications

refer to drawings on page 112 for exact dimentions

ASCO SERIES 300SE Power Transfer Switch Dimensions and Shipping Weights

UL Type 1 Enclosure[4]

Switch Rating Amps	Phase Poles	Neutral Code	Dimensions, In. (mm) Width	Height	Depth	Approx. Shipping Weight Lb. (kg)
70, 100, 150, 200, 225	2	A	36 (914)	48 (1219)	13 (330)	400 (185)
	2	B	36 (914)	48 (1219)	13 (330)	410 (189)
	3	A	36 (914)	48 (1219)	13 (330)	410 (189)
	3	B	36 (914)	48 (1219)	13 (330)	430 (198)
150, 200, 225, Series 3ADUS/3NDUS Only	2	A	36 (914)	48 (1219)	13 (330)	400 (185)
	2	B	36 (914)	48 (1219)	13 (330)	408 (188)
	3	A	36 (914)	48 (1219)	13 (330)	408 (188)
	3	B	36 (914)	48 (1219)	13 (330)	420 (193)
2501, 4001	2	A	42 (1067)	48 (1219)	15.5 (394)	420 (193)
	2	B	42 (1067)	48 (1219)	15.5 (394)	430 (198)
	3	A	42 (1067)	48 (1219)	15.5 (394)	430 (198)
	3	B	42 (1067)	48 (1219)	15.5 (394)	450 (207)
6001	2	A	38 (965)	91 (2311)	28 (711)	860 (396)
	2	B	38 (965)	91 (2311)	28 (711)	870 (401)
	3	A	38 (965)	91 (2311)	28 (711)	870 (401)
	3	B	38 (965)	91 (2311)	28 (711)	880 (405)
8001	2	A	38 (965)	91 (2311)	28 (711)	1460 (673)
	2	B	38 (965)	91 (2311)	28 (711)	1470 (677)
	3	A	38 (965)	91 (2311)	28 (711)	1470 (677)
	3	B	38 (965)	91 (2311)	28 (711)	1480 (682)
10001, 12001	2	A	38 (965)	91 (2311)	48 (1218)	1460 (673)
	2	B	38 (965)	91 (2311)	48 (1218)	1470 (677)
	3	A	38 (965)	91 (2311)	48 (1218)	1470 (677)
	3	B	38 (965)	91 (2311)	48 (1218)	1480 (682)
16001, 20001	3	A	38 (965)	91 (2311)	48 (1218)	1580 (727)
	3	B	38 (965)	91 (2311)	48 (1218)	1680 (773)
25001, 30001	3	A	38 (965)	91 (2311)	72 (1829)	4590 (2111)
	3	B	38 (965)	91 (2311)	72 (1829)	4690 (2157)

UL Type 3R Enclosure[4]

Switch Rating Amps	Phase Poles	Neutral Code	Dimensions, In. (mm) Width	Height	Depth	Approx. Shipping Weight Lb. (kg)
70, 100, 150, 200, 225	2	A	36 (914)	48 (1219)	16 (406)	500 (232)
	2	B	36 (914)	48 (1219)	16 (406)	520 (241)
	3	A	36 (914)	48 (1219)	16 (406)	520 (241)
	3	B	36 (914)	48 (1219)	16 (406)	530 (246)
150, 200, 225, Series 3ADUS/3NDUS Only	2	A	41 (1041)	95.5 (2424)	33 (838)	500 (232)
	2	B	41 (1041)	95.5 (2424)	33 (838)	520 (241)
	3	A	41 (1041)	95.5 (2424)	33 (838)	520 (241)
	3	B	41 (1041)	95.5 (2424)	33 (838)	530 (246)
2501, 4001	2	A	42 (1067)	48 (1219)	18 (487)	500 (232)
	2	B	42 (1067)	48 (1219)	18 (487)	520 (241)
	3	A	42 (1067)	48 (1219)	18 (487)	520 (241)
	3	B	42 (1067)	48 (1219)	18 (487)	530 (246)
6001	2	A	41 (1041)	95.5 (2425)	33 (838)	1200 (555)
	2	B	41 (1041)	95.5 (2425)	33 (838)	1220 (564)
	3	A	41 (1041)	95.5 (2425)	33 (838)	1220 (564)
	3	B	41 (1041)	95.5 (2425)	33 (838)	1240 (574)
8001	2	A	38 (965)	91 (2311)	28 (711)	1520 (703)
	2	B	38 (965)	91 (2311)	28 (711)	1540 (712)
	3	A	38 (965)	91 (2311)	28 (711)	1540 (712)
	3	B	38 (965)	91 (2311)	28 (711)	1580 (731)
10001, 12001	2	A	38 (965)	91 (2311)	48 (1218)	1520 (703)
	2	B	38 (965)	91 (2311)	48 (1218)	1540 (712)
	3	A	38 (965)	91 (2311)	48 (1218)	1540 (712)
	3	B	38 (965)	91 (2311)	48 (1218)	1580 (731)
16001, 20001	3	A	38 (965)	91 (2311)	48 (1218)	2200 (1018)
	3	B	38 (965)	91 (2311)	48 (1218)	2240 (1036)
25001, 30001	3	A	38 (965)	91 (2311)	72 (1829)	5280 (2479)
	3	B	38 (965)	91 (2311)	72 (1829)	5380 (2475)

Notes:
1. Unit is designed for top and bottom cable entry for all services and load.
2. Enclosures for 600 – 3000 amps are freestanding.
3. A space heater accessory 44G is required with all service entrance (Type 3R) switches to help reduce condensation and protect the circuit breaker. It is recommended when environmental enclosures (Type 4, 12) are ordered for installation outdoors. See Optional Accessories page for space heater options (acc. 44G).
4. Dimensional data is approximate and subject to change. Certified dimensions available upon request.

Series 300SE External Power Connections
Sizes UL-Listed Solderless Screw-Type Terminals

Switch Rating	Ranges of AL-CU Wire Sizes
70, 100, 150, 200[2], 225[2]	One #14 to 4/0 AWG
150[3], 200[3], 225[3], 250, 400	One #4 AWG to 600 MCM Two 1/0 to 250 MCM
600	Two 1/0 to 600 MCM
800, 1000, 1200	Four 1/0 to 600 MCM
1600, 2000	Six 1/0 to 600 MCM
2500	Twelve 3/0 to 750 MCM
3000	Twelve 3/0 to 750 MCM

Notes:
1. All SERIES 300 switches default to a solid neutral assembly unless a switched neutral is specified. If no neutral is required, order as solid neutral and left unwired.
2. 200 and 225 ampere rated switches for use with copper cable only. Refer to paragraph 310.15 of the NEC for all additional information.
3. J 150-225 ampere for Series 3ADUS/3NDUS only.
4. Use wire rated 75 degrees minimum for all power connections.
5. Refer to the outline drawing for maximum power cable connections for circuit breaker.

Extended Warranties for Series 300SE Transfer Switches (3AUS/3NUS/3ADUS/3NDUS)

Description
1 Year Extension (Total of 3 Years)
2 Year Extension (Total of 4 Years)
3 Year Extension (Total of 5 Years)

Notes:
1. Standard warranty is (24) months, 2 years from date of shipment, extended warranty is in addition to the two years, for a total of 3, 4 or 5 years, except where the warranty period for the circuit breaker shall be limited to 24 months from date of shipment from ASCO.
2. Refer to Publication 3223 for warranty terms and conditions.

Series 300SE AIC Breaker Rating[1]

Switch Rating	AIC Rating (kA)	Voltage
70, 100, 150, 200, 225	85	480
150, 200, 225 Series 3ADUS/3NDUS Only	85	480
250, 400, 600	85	480
800	65	480
1000, 1200	50	480
1600, 2000	65	480
2500, 3000	100	480

See BOM on page 57 for optional accessory's.

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ASCO UL1008 Withstand and Closing Ratings [1,2,7]
(RMS Symmetrical Amps)

Frame	Switch Rating (Amps)		300, 4000 & 7000 Series											Short Time Ratings[3] (sec)							
			Current Limiting Fuses				Specific Breaker			Time Based				480V Max.				600V Max.			
	Transfer Switches	Bypass Switches	480V Max.	600V Max.	Max Size, A	Class	240V Max.	480V Max.	600V Max.	Time (sec)	240V Max.	480V Max.	600V Max.	.13	.2	.3	.5	.1	.13	.3	.5
D	30	-	100kA	-	300	J	22kA	25kA	10kA	0.025	10kA	10kA	10kA	-				-			
			200kA	35kA	200	J															
			35kA	35kA	200	RK1															
D	70, 100	-	35kA	35kA	200	RK1	150kA	85kA	25kA	0.025	10kA	10kA	10kA	-				-			
			200kA	35kA	200	J															
D	150	-	35kA	35kA	200	RK1	150kA	85kA	25kA	0.025	10kA	10kA	10kA	-				-			
			200kA	35kA	200	J															
D	200	-	200kA	35kA	200	J	200kA	85kA	14kA	0.025	10kA	10kA	10kA	-				-			
			35kA	35kA	200	RK1															
D	230	-	100kA	-	300	J	200kA	85kA	14kA	0.025	10kA	10kA	-	-				-			
E	260, 400	-	200kA	-	600	J	65kA	42kA	22kA	0.05	35kA	35kA	22kA	-				-			
J	150, 200, 230, 260	150, 200, 230, 260	200kA	200kA	600	J	200kA	200kA	100kA	0.05	65kA	42kA[5]	35kA	7.5kA		-		-			
					800	L															
J	400	400	200kA	200kA	600	J	200kA	200kA	100kA	0.05	65kA	42kA[5]	35kA	7.5kA		-		-			
					800	L															
J	600	600	200kA	200kA	800	L	200kA	200kA	100kA	0.05	65kA	42kA[5]	35kA	7.5kA[9]		-		-			
			200kA	200kA	600	J															
H[8]	600	600	200kA	200kA	1600	L	65kA	150kA[6]	65kA	0.05	50kA	50kA	50kA	36kA			-	36kA			-
P[8]	600	600	200kA	200kA	1600	L	65kA	150kA[6]	65kA	0.05	50kA	50kA	50kA	36kA			30kA	36kA			-
P[8]	800	800 - 1200	200kA	200kA	1600	L	65kA	150kA[6]	65kA	0.05	50kA	50kA	50kA	36kA			30kA	36kA			-
H	800 - 1200	800 - 1200	200kA	200kA	1600[4]	L	65kA	150kA	65kA	0.05	50kA	50kA	50kA	36kA			-	36kA			-
Q[8]	600-1600	600-1600	200kA	200kA	2000	L	65kA	65kA	65kA	0.05	65kA	65kA	65kA	50kA				50kA			
S[8]	800 - 1200	800 - 1200	200kA	200kA	2500	L	100kA	100kA	65kA	0.05	100kA	100kA	65kA	65kA				65kA			
G[8]	1000 - 1200	1000 - 1200	200kA	200kA	2000	L	85kA	85kA	85kA	0.05	85kA	85kA	85kA	-				-			
G	1600 - 2000 (Front Connected TS Only)		200kA	200kA	2500	L	85kA	85kA	85kA	0.05	85kA	85kA	85kA	42kA			36kA	-			
G[8]	1600 - 2000	1600 - 2000	200kA	200kA	3000	L	200kA	200kA	100kA	0.05	100kA	100kA	100kA	42kA			36kA	42kA			-
S[8]	1600 - 2000	1600 - 2000	200kA	200kA	2500	L	100kA	100kA	85kA	0.05	100kA	100kA	85kA	85kA			65kA	85kA			65kA
G	2600 - 3000	2600 - 3000	200kA	200kA	4000	L	125kA[6]	125kA[6]	100kA	0.05	100kA	100kA	100kA	42kA			36kA	42kA			-
G[8]	3200	-	200kA	-	4000	L	100kA	100kA	-	0.05	100kA	100kA	-	-				-			
G	4000	4000	200kA	200kA	5000	L	100kA	100kA	100kA	0.05	100kA	100kA	100kA	85KA		65kA		65kA			
U[8]	2600 - 4000	2600 - 4000	200kA	200kA	5000	L	125kA	125kA	125kA	0.05	125kA	125kA	125kA	100kA				100kA			

Notes:
1) All WCR values indicated are tested in accordance with the requirements of UL 1008, 7th Edition. See ASCO Pub. 1128 for more WCR information
2) Application requirements may permit higher WCR for certain switch sizes.
3) Short Time ratings are provided for applications involving circuit breakers that utilize trip delay settings for system selective coordination
4) Max fuse rating is 1200A on front connected H frame switches
5) Switches utilizing overlapping neutral (code "C") have 35kA, 0.050 Sec time based rating at 480V Max
6) Rating shown is for Bypass switches only, Transfer Switch rating is 100kA for the G frame and 65kA max for the H and P frames. See ASCO Pub. 1128.
7) See ASCO for Service Entrance Switch ratings
8) These frames are only available on the 7000 Series product
9) Short Time Rating applies to 600A Bypass switch only, the 600A Transfer Switch does not have a Short Time Rating

28-Aug-23

Table II. UL1008 Withstand and Closing Ratings by Switch Frame

THREE PHASE WIRING FOR ASCO® SERIES 300 AUTOMATIC TRANSFER SWITCHES RATED 1000-3200 AMPERES WITH GROUP I CONTROLS

CONTROL FEATURES

VOLTAGE AND FREQUENCY SENSING

A. DIFFERENTIAL TYPE VOLTAGE SENSING ON ALL PHASES OF NORMAL SOURCE. DROPOUT SETTING SELECTABLE AT 90, 85, 80 OR 70% OF NOMINAL. FACTORY SET AT 85%. PICKUP VOLTAGE ADJUSTABLE AT 90 OR 95% OF NOMINAL. (DEFAULT IS 95% IF DROPOUT IS SET TO 90%). FACTORY SET AT 90%. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

B. SINGLE PHASE VOLTAGE SENSING OF EMERGENCY SOURCE. NON-ADJUSTABLE DROPOUT SETTING AT 75% OF NOMINAL. NON-ADJUSTABLE PICKUP SETTING AT 90% OF NOMINAL.

C. FREQUENCY SENSING OF EMERGENCY SOURCE. NON-ADJUSTABLE DROPOUT SETTING AT 85% OF NOMINAL. NON-ADJUSTABLE PICKUP SETTING AT 95% OF NOMINAL.

TIME DELAYS

A. MOMENTARY NORMAL SOURCE OUTAGE DELAY – ACTIVATED WHEN THE NORMAL SOURCE FAILS. DEACTIVATED WHEN THE NORMAL SOURCE IS ACCEPTABLE. PROVIDES A SELECTABLE (1 OR 3 SECOND) DELAY ON TRANSFER AND ENGINE STARTING SIGNALS. FACTORY SET AT 3 SECONDS. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

B. TRANSFER TO EMERGENCY DELAY– ACTIVATED AFTER THE MOMENTARY NORMAL SOURCE OUTAGE DELAY EXPIRES AND THE EMERGENCY SOURCE IS SENSED TO BE ACCEPTABLE. TRANSFER TO EMERGENCY IS COMMITTED TO ON INITIATION OF DELAY. DEACTIVATED WHEN THE EMERGENCY SOURCE IS UNACCEPTABLE. PROVIDES AN ADJUSTABLE DELAY FROM 0 TO 5 MINUTES. FACTORY SET AT 0 MINUTES. (REFER TO OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

C. RETRANSFER TO NORMAL DELAY – ACTIVATED WHEN THE NORMAL SOURCE IS ACCEPTABLE. DEACTIVATED WHEN THE NORMAL SOURCE FAILS WITH NO TRANSFER TO NORMAL. ALSO DEACTIVATED WHEN THE EMERGENCY SOURCE FAILS WHILE THE NORMAL SOURCE IS ACCEPTABLE WITH TRANSFER TO NORMAL. ADJUSTABLE DELAY FROM 1 SECOND TO 30 MINUTES. FACTORY SET TO 30 MINUTES. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

D. UNLOADED RUNNING (ENGINE COOL DOWN) DELAY – ACTIVATED ON EXPIRATION OF RETRANSFER TO NORMAL DELAY OR FOLLOWING EXPIRATION OF THE NORMAL SOURCE OUTAGE DELAY WITHOUT A COMMIT TO TRANSFER TO EMERGENCY. NON-ADJUSTABLE DELAY OF 5 MINUTES.

E. MOMENTARY EMERGENCY SOURCE OUTAGE DELAY–ACTIVATED WHEN THE SWITCH IS IN THE EMERGENCY POSITION AND THE EMERGENCY SOURCE FAILS. FACTORY SET AT 4 SECONDS. RESET IF EMERGENCY RESTORES WITHIN 4 SECONDS.

ENGINE CONTROL CONTACTS

ONE SET OF FORM C CONTACTS (1 N/O & 1 N/C) THAT CHANGE POSITION ON EXPIRATION OF THE NORMAL SOURCE OUTAGE DELAY AND RESET ON EXPIRATION OF THE UNLOADED RUNNING (ENGINE COOL DOWN) DELAY. OUTPUT CONTACTS (NR) ARE RATED 5 AMPS RESISTIVE AT 28V DC OR 120V AC MAXIMUM.

OPERATOR INTERFACE INDICATORS & CONTROLS MEMBRANE TYPE

A. TRANSFER SWITCH TEST – MOMENTARY PUSH–BUTTON TO SIMULATE NORMAL SOURCE FAILURE SEQUENCE OF OPERATION. PRESS AND HOLD FOR AT LEAST 15 SECONDS TO ALLOW TIME FOR ENGINE–GENERATOR SET TO START.

B. BYPASS TIME DELAY – MOMENTARY PUSH–BUTTON TO BYPASS EITHER THE TRANSFER TO EMERGENCY DELAY, ENGINE EXERCISER PERIOD OR THE RETRANSFER TO NORMAL DELAY DEPENDING ON WHICH DELAY IS ACTIVE AT THE TIME THE PUSH–BUTTON IS ACTIVATED.

C. SET ENGINE EXERCISER – MOMENTARY PUSH–BUTTON TO ACTIVATE A SEVEN (7) DAY TIMER FOR AUTOMATIC WEEKLY TESTING OF THE ENGINE GENERATOR SET EITHER WITH OR WITHOUT LOAD TRANSFER. THE TIMER IS POWERED BY A NON–RECHARGEABLE 9V BATTERY WHEN NORMAL AND EMERGENCY SOURCES ARE UNAVAILABLE. DEPRESSING THE MOMENTARY PUSH–BUTTON FOR 5 SECONDS SETS THE TIME OF WEEK AT WHICH TESTING IS TO OCCUR. THE FEATURE IS ACTIVATED BY SETTING A DIP SELECTOR SWITCH ON THE CONTROL PANEL. ENGINE START WITH OR WITHOUT LOAD TRANSFER IS SELECTED WITH A SECOND DIP SELECTOR SWITCH ON THE CONTROL PANEL. FACTORY SET TO DISABLED, NO LOAD. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

D. LOAD CONNECTED TO INDICATORS
GREEN LED INDICATOR TO INDICATE WHEN THE TRANSFER SWITCH LOAD IS CONNECTED TO THE NORMAL SOURCE.
RED LED INDICATOR TO INDICATE WHEN THE TRANSFER SWITCH IS CONNECTED TO THE EMERGENCY SOURCE.

E. SOURCE AVAILABLE INDICATORS
GREEN LED INDICATOR TO INDICATE WHEN THE NORMAL SOURCE IS AVAILABLE.
RED LED INDICATOR TO INDICATE WHEN THE EMERGENCY SOURCE IS AVAILABLE.

LOAD DISCONNECT FEATURE

ONE SET OF FORM C CONTACTS (1 N/O & 1 N/C) THAT CHANGE POSITION ON ACTIVATION OF A SELECTABLE TIME DELAY BEFORE TRANSFER (LD TDBT) AND RESET EITHER IMMEDIATELY FOLLOWING TRANSFER OR FOR THE SAME DELAY AS SET FOR PRE–SIGNAL BEFORE TRANSFER. SELECTABLE AS 0, 3, 10 OR 20 SECONDS. FACTORY SET AT 0. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS). OUTPUT CONTACTS (OP) ARE RATED 5 AMPS RESISTIVE AT 28 VDC OR 120 VAC MAXIMUM.

MOTOR LOAD TRANSFER FEATURE

INPHASE TRANSFER CONTROL LOGIC TO INITIATE AN INPHASE TRANSFER OF MOTOR LOADS BETWEEN LIVE SOURCES. USED TO HELP PREVENT NUISANCE TRIPPING OF DISTRIBUTION CIRCUIT BREAKERS AND POSSIBLE DAMAGE TO MECHANICAL LOADS ASSOCIATED WITH OUT OF PHASE TRANSFER. ACTIVATED BY SETTING A DIP SWITCH ON THE CONTROL PANEL. FACTORY SET AS DISABLED. (REFER TO OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

REMOTE CONTROL FEATURES

THE FOLLOWING CONTROL PANEL INPUTS PROVIDE REMOTE CONTROL FUNCTIONS FOR THE AUTOMATIC TRANSFER SWITCH. EACH CONTROL FUNCTION CAN BE IMPLEMENTED BY THE CUSTOMER PROVIDING THE FORM OF CONTROL CONTACT DESCRIBED. EACH CONTROL CONTACT MUST BE SUITABLE FOR A 5 VDC LOW ENERGY CIRCUIT. EACH CONTROL FEATURE IS ACTIVATED BY SETTING A DIP TYPE SELECTOR SWITCH ON THE CONTROL PANEL. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL SETTINGS).

A. REMOTE TEST FEATURE – REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT SIMULATES A FAILURE OF THE NORMAL SOURCE SIMILAR TO THE SEQUENCE OUTLINED FOR THE TRANSFER SWITCH TEST PUSH–BUTTON. THE TRANSFER SWITCH WILL REMAIN CONNECTED TO THE EMERGENCY SOURCE UNDER ALL CONDITIONS WHILE THE CONTACT IS OPEN.

B. REMOTE TRANSFER TO EMERGENCY FEATURE – REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT CAUSES ENGINE START AND TRANSFER TO THE EMERGENCY SOURCE. RECLOSURE OF THE CONTACT ACTIVATES THE RETRANSFER TO NORMAL DELAY PRIOR TO RETRANSFER. IN THE EVENT THAT THE EMERGENCY SOURCE FAILS WHILE THE TRANSFER SWITCH IS CONNECTED TO EMERGENCY AND THE REMOTE CONTACT IS OPEN, THE TRANSFER SWITCH WILL AUTOMATICALLY RETRANSFER TO THE NORMAL SOURCE.

C. INHIBIT TRANSFER TO EMERGENCY FEATURE – REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT WILL PROHIBIT THE TRANSFER SWITCH FROM TRANSFERRING TO THE EMERGENCY SOURCE WHILE CONNECTED TO THE NORMAL SOURCE.

D. BYPASS TRANSFER TIME DELAY FEATURE – REQUIRES A CUSTOMER SUPPLIED, REMOTE, NORMALLY CLOSED CONTACT. OPENING OF THE CONTACT BYPASSES THE RETRANSFER TO NORMAL DELAY IF ACTIVE.

GENERAL NOTES

1. SWITCH SHOWN DE–ENERGIZED CONNECTED TO NORMAL SOURCE. DEVICE SYMBOLS AND DESIGNATIONS ARE IN ACCORDANCE WITH NEMA PUB. ICS 1–1983, PART 1–101A.
2. ALL WIRING IS #16 AWG, TINNED, STRANDED COPPER UNLESS OTHERWISE INDICATED.
3. ○ INDICATES CUSTOMER CONNECTION POINTS.
4. ● INDICATES FACTORY CONNECTION POINTS.
5. CONNECTION POINTS THAT HAVE BOTH CUSTOMER CONNECTIONS AND FACTORY CONNECTIONS ARE SHOWN OPEN AS CUSTOMER CONNECTION POINTS.
6. THE TRANSFER UNIT IS MOUNTED ON THE BACK INSIDE SURFACE OF THE ENCLOSURE. THE CONTROL PANEL AND ANY OPTIONAL ACCESSORIES ARE MOUNTED ON THE INSIDE SURFACE OF THE DOOR.
7. AN OPERATOR'S MANUAL IS FURNISHED WITH EACH AUTOMATIC TRANSFER SWITCH. REFER TO THIS PUBLICATION PRIOR TO INSTALLATION AND OPERATION OF THE SWITCH.
8. GROUND STRAP ON CONTROL PANEL IS AFFIXED TO CHASSIS (ENCLOSURE) AT LOWER LEFT CONTROL PANEL MOUNTING STUD.

OPTIONAL ACCESSORIES

ACCESSORY 11BG – PROGRAMMABLE ENGINE EXERCISER & SOURCE AVAILABILITY SIGNAL MODULES

PROGRAMMABLE ENGINE EXERCISER: A PROGRAMMABLE SEVEN (7) DAY OR FOURTEEN (14) DAY ELECTRONIC TIME SWITCH FOR AUTOMATIC WEEKLY TESTING OF THE ENGINE GENERATOR SET EITHER WITH OR WITHOUT LOAD.
EACH DAY OF THE WEEK IS INDIVIDUALLY PROGRAMMABLE. THE TIME OF DAY IS PRESERVED BY A BATTERY BUILT INTO THE GROUP 1 TRANSFER SWITCH CONTROL PANEL.

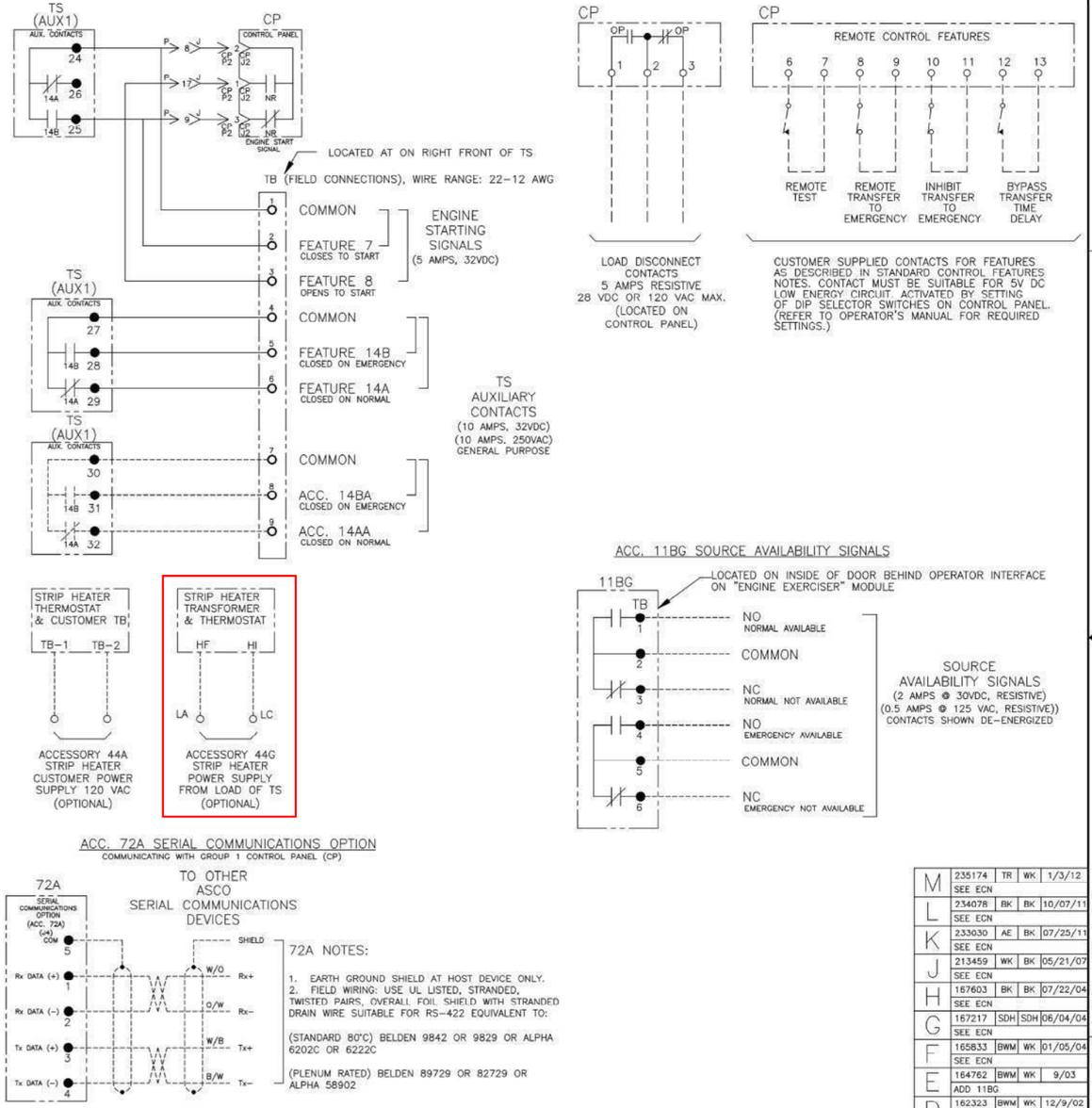
THE FEATURE IS ACTIVATED BY SETTING A DIP SELECTOR SWITCH ON THE CONTROL PANEL. ENGINE START WITH OR WITHOUT LOAD TRANSFER IS SELECTED WITH A SECOND DIP SELECTOR SWITCH ON THE CONTROL PANEL. (REFER TO THE OPERATOR'S MANUAL FURNISHED WITH EACH TRANSFER SWITCH REGARDING CONTROL PANEL AND TIMER SETTINGS).

SOURCE AVAILABILITY SIGNALLING: ONE FORM C CONTACT EACH FOR THE NORMAL & EMERGENCY SOURCES SIGNAL THE ACCEPTABILITY OF THE SOURCE AS SENSED BY THE GROUP 1 CONTROL PANEL. THE SIGNAL CONTACTS OPERATE IN CONJUNCTION WITH THE SOURCE AVAILABILITY LED STATUS INDICATION PROVIDED ON THE OPERATOR INTERFACE. FIELD WIRING TERMINALS ARE PROVIDED AS SHOWN, LOCATED ON THE INSIDE DOOR BEHIND THE OPERATOR INTERFACE. CONTACTS RATED 2 AMPS @ 30VDC, 0.5 AMPS @ 125 VAC (RESISTIVE).

SERIAL COMMUNICATIONS INTERFACE (ACCESSORY 72A)
RS–485 SERIAL INTERFACE TO CONTROL PANEL. FOR REMOTE MONITORING AND CONTROL FROM ASCO COMMUNICATIONS BASED PRODUCTS.

ACC. 14AA	(2) AUXILIARY CONTACT CLOSED ON NORMAL.
ACC. 14BA	(2) AUXILIARY CONTACT CLOSED ON EMERGENCY.
ACC. 44A	STRIP HEATER, THERMOSTAT & TB. CUSTOMER POWER SUPPLY 120VAC.
ACC. 44G	STRIP HEATER, THERMOSTAT & TRANSFOMER. POWER SUPPLY FROM LOAD TERMINALS OF TRANSFER SWITCH.

FIELD CONNECTIONS



ACC. 11BG SOURCE AVAILABILITY SIGNALS

ACC. 72A SERIAL COMMUNICATIONS OPTION
COMMUNICATING WITH GROUP 1 CONTROL PANEL (CP)

72A NOTES:

1. EARTH GROUND SHIELD AT HOST DEVICE ONLY.
2. FIELD WIRING: USE UL LISTED, STRANDED, TWISTED PAIRS, OVERALL FOIL SHIELD WITH STRANDED DRAIN WIRE SUITABLE FOR RS–422 EQUIVALENT TO:

(STANDARD 80°C) BELDEN 9842 OR 9829 OR ALPHA 6202C OR 6222C

(PLENUM RATED) BELDEN 89729 OR 82729 OR ALPHA 58902

BASE CATALOG NUMBER					CATALOG NUMBER SUFFIXES			
TS FRAME	CATALOG TYPE	NEUTRAL TYPE	PHASE POLES	AMPS	VOLT CODE	CONTROLLER	OPTIONAL ACCESSORY	ENCLOSURE CODE
G	300	B C	3	1000 1200 1600 2000 2600 3000 3200	C D E F H J K L M N Q R	1	X BLANK FOR NONE	C F G L BLANK FOR OPEN TYPE

EXPLANATION OF CATALOG NUMBER CODES

NEUTRAL TYPE		VOLTAGE CODES 3 PHASE (3 OR 4 WIRE) 50 OR 60 Hz		ENCLOSURE CODES		
CODE	DESCRIPTION	CODE	NOMINAL VOLTAGE	CODE	TYPE	DESCRIPTION
BLANK	SOLID			BLANK		OPEN TYPE (NO ENCLOSURE)
B	SWITCHING			C	1	GENERAL PURPOSE, INDOOR
C	OVERLAPPING	C	208			
		D	220	F	3R	OUTDOOR, RAINPROOF, SLEET & ICE RESISTANT
		E	230	G	4	INDOOR/OUTDOOR, WATERTIGHT & DUSTTIGHT
		F	240			
		H	380			
		J	400	L	12	INDOOR, INDUSTRIAL ENVIRONMENTS, OILTIGHT & DUSTTIGHT
		K	415			
		L	440			
		M	460			
		N	480			
		Q	575			
		R	600			

See PG 57 for optional accessorys

REV.	ECN NO.	BY	APP.	DATE
M	235174	TR	WK	1/3/12
	SEE ECN			
L	234078	BK	BK	10/07/11
	SEE ECN			
K	233030	AE	BK	07/25/11
	SEE ECN			
J	213459	WK	BK	05/21/07
	SEE ECN			
H	167603	BK	BK	07/22/04
	SEE ECN			
G	167217	SDH	SDH	06/04/04
	SEE ECN			
F	165833	BWM	WK	01/05/04
	SEE ECN			
E	164762	BWM	WK	9/03
	ADD 11BG			
D	162323	BWM	WK	12/9/02
	SEE ECN			
C	162093	BK	BK	12/03/02
	SEE ECN			
B	162198	BWM	BK	11/13/02
	SEE ECN			
A	161983	BWM	WK	10/28/02
	SEE ECN			
—	159489	BWM	WK	12/10/01
	ISSUE			

CATALOG NUMBER
ASCO® CERTIFIED TO
S.O.
BY:
DATE
FORM REV M

PROJECT NAME:

WIRING DIAGRAM
SERIES G300 ATS 3PH 1000–3200 AMPS
"G" FRAME, GROUP 1 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	12/10/01
CHECKED	BK	12/10/01
PROJECT APPROVAL	WK	12/10/01
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP–1–003. FOR PLASTIC PARTS SEE MP–1–055
ASSEM. REF. NO.

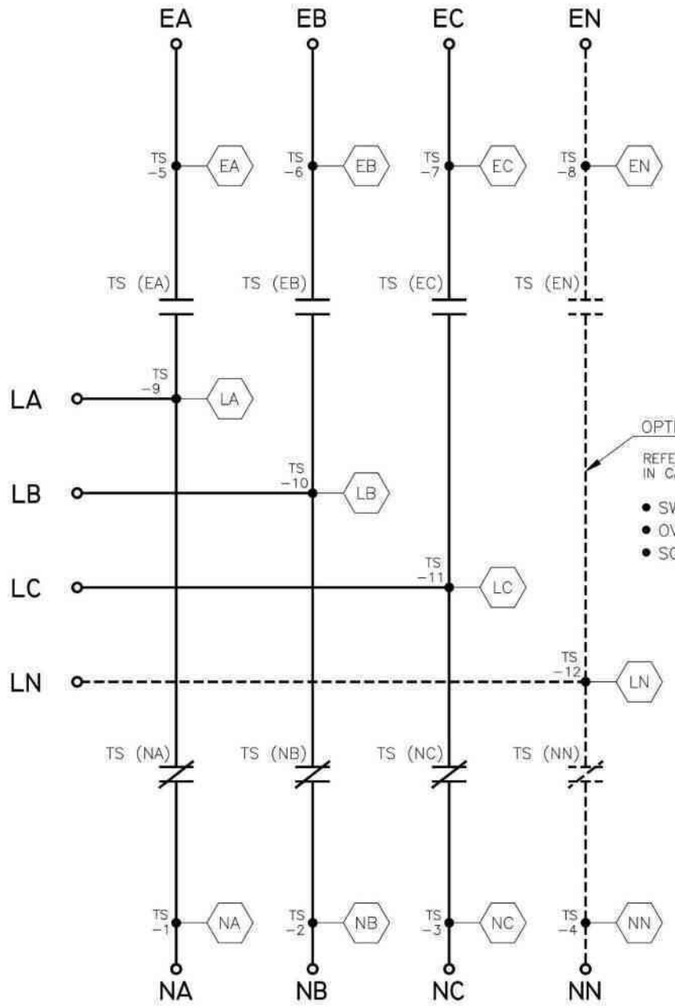
COMPUTER GENERATED DRAWING
SCALE NONE SIZE DS
DWG. NO. 733503
DRAWING REV. M ECN NO. 235174 SHEET 1 OF 4

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ASCO® ASCO POWER TECHNOLOGIES, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

MAIN POWER POLES

EMERGENCY



OPTIONAL NEUTRAL TYPES

REFER TO "EXPLANATION OF CATALOG NUMBER CODES" IN CATALOG NUMBER CHART ON SHEET 1.

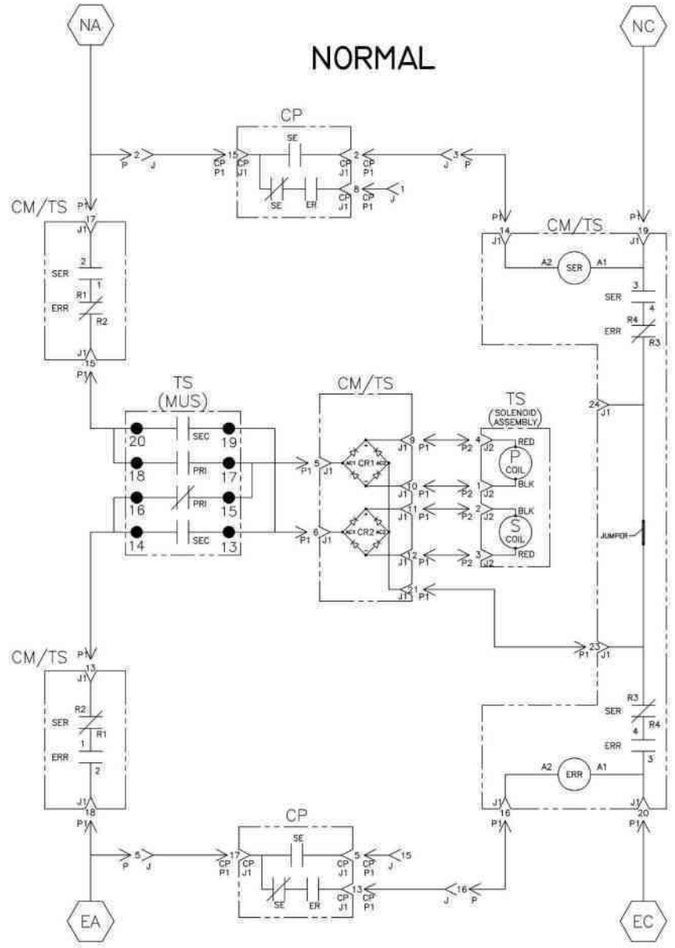
- SWITCHING CONTACTS
- OVERLAPPING CONTACTS
- SOLID BUS PLATE

NORMAL

NOTE:
ATS SHOWN CLOSED ON NORMAL SOURCE.

TS OPERATOR CIRCUIT

NORMAL



EMERGENCY

TS (MUS) CONTACTS					
MUS	SOLENOID POSITION				
	NORM	>	AFTER TDC *	<	EMER
13–14					
15–16					
17–18					
19–20					

* AFTER SOLENOID PASSES THROUGH TOP DEAD CENTER POSITION.

REV. TO SHEET	ECN NO.	BY	APP.	DATE.
M	235174	TR	WK	1/3/11
	SEE ECN			
L	234078	BK	BK	10/07/11
	SEE ECN			
K	233030	AE	BK	07/25/11
	SEE ECN			

PROJECT NAME:

WIRING DIAGRAM

SERIES G300 ATS 3PH 1000–3200 AMPS
"G" FRAME, GROUP 1 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	12/10/01
CHECKED	BK	12/10/01
PROJECT APPROVAL	WK	12/10/01
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

COMPUTER GENERATED DRAWING

SCALE NONE SIZE DS

DWG. NO. 733503

DRAWING REV. M ECN NO. 235174 SHEET 2 OF 4

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FLORHAM PARK, NEW JERSEY 07932 U.S.A.

WIRE RUN LISTING

1 ◄ HARNESS LOCATOR — BOM CHECKED IF HARNESS IS MODIFIED ☒

WIRE No.	605454 (P,P1,P2,J3) MAIN TS	CLR	AWG
1	P-2,TS-1		16
2	P-3,P1-14		
3	P-4,TS-3		
4	P-5,TS-5		
5	P-6,TS-7		
4	P-7,TS-5		
6	P-8,TS(AUX1)-24		
6	TS(AUX1)-24,J3-1		
7	P-9,TS(AUX1)-25		
7	TS(AUX1)-25,J3-2		
8	P-10,TS(AUX1)-21		
9	P-11,TS-2		
10	P-12,TS-1		
11	P-13,TS(AUX1)-22		
12	P-14,TS(AUX1)-23		
13	P-16,P1-16		
14	P-17,J3-3		
15	P-18,TS-6		
16	P-19,TS-9		
17	P-20,TS-10		
18	P-21,TS-11		
19	P-22,TS-4		
20	P-23,TS-8		
21	P-24,TS-12		
22	P1-5,TS(MUS)-17		
23	TS(MUS)-17,TS(MUS)-15		
23	P1-6,TS(MUS)-19		
23	TS(MUS)-19,TS(MUS)-13		
24	P1-9,P2-4		
25	P1-10,P2-1		
26	P1-11,P2-2		
27	P1-12,P2-3		
28	P1-13,TS(MUS)-18		
28	TS(MUS)-16,TS(MUS)-14		
29	P1-15,TS(MUS)-20		
29	TS(MUS)-20,TS(MUS)-18		
1	P1-17,TS-1		
4	P1-18,TS-5		
3	P1-19,TS-3		
5	P1-20,TS-7		
30	P1-21,P1-23		
	REMOVE WIRES		
6	TS(AUX1)-24,J3-1		
7	TS(AUX1)-25,J3-2		
14	P-17,J3-3		
	ADD WIRES		
200	P-1		
222	P-15		
201	P1-1		
202	P1-2		
203	P1-3		
204	P1-4		
205	P1-7		
206	P1-8		
207	P1-16		
208	P1-22		
209	P1-24		

ADDITIONAL WIRE CONNECTIONS

WIRE No.		CLR	AWG
31	TS(AUX1)-27,TB-4		16
32	TS(AUX1)-28,TB-5		
33	TS(AUX1)-29,TB-6		
6	TS(AUX1)-24,TB-1		
7	TS(AUX1)-25,TB-2		
14	P-17,TB-3		

2 HARNESS LOCATOR — BOM CHECKED IF HARNESS IS MODIFIED ☐

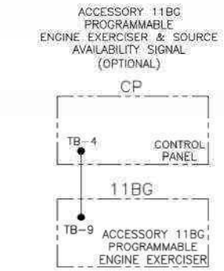
WIRE No.	HARNESS 483763 (J, P1, P2) TS-CP HARNESS	CLR	AWG
1	J-1,P1-8		16
2	J-2,P1-15		
3	J-3,P1-2		
4	J-4,P1-4		
5	J-5,P1-17		
6	J-6,P1-12		
7	J-7,P1-7		
8	J-8,P2-2		
9	J-9,P2-3		
10	J-10,P2-8		
11	J-11,P1-10		
12	J-12,P1-1		
13	J-13,P2-9		
14	J-14,P2-10		
15	J-15,P1-5		
16	J-16,P1-13		
17	J-17,P2-1		
18	J-18,P1-14		

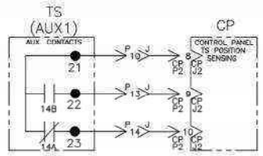
OPTIONAL ACCESSORIES

3 HARNESS LOCATOR

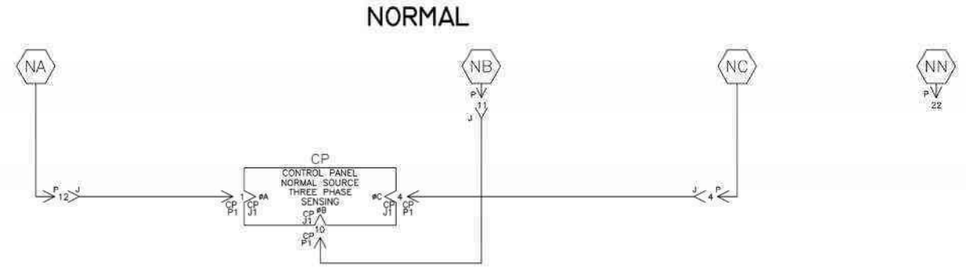
WIRE No.	OPTIONAL ACC. 11BG CKTS.	CLR	AWG
28	CP-TB-4,11BG-TB-9		16
	OPTIONAL ACC. 14AA & 14BA		
39	TS(AUX1)-30,TB-7		
40	TS(AUX1)-31,TB-8		
41	TS(AUX1)-32,TB-9		

CONTROL SIGNALS & INDICATION

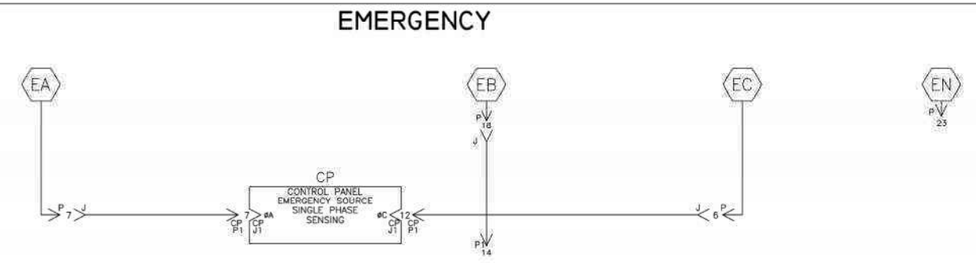




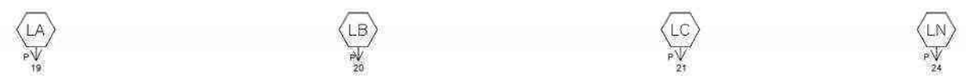
NORMAL SOURCE CIRCUITS



EMERGENCY SOURCE CIRCUITS



LOAD TERMINAL CIRCUITS



M	235174	TR	WK	1/3/11
	SEE ECN			
L	234078	BK	BK	10/07/11
	SEE ECN			
K	233030	AE	BK	07/25/11
	SEE ECN			

REV. TO SHEET	ECN NO.	BY	APP.	DATE

PROJECT NAME:

WIRING DIAGRAM

SERIES G300 ATS 3PH 1000-3200 AMPS
"G" FRAME, GROUP 1 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	12/10/01
CHECKED	BK	12/10/01
PROJECT APPROVAL	WK	12/10/01
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055

ASSEM. REF. NO.

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SCALE NONE SIZE DS

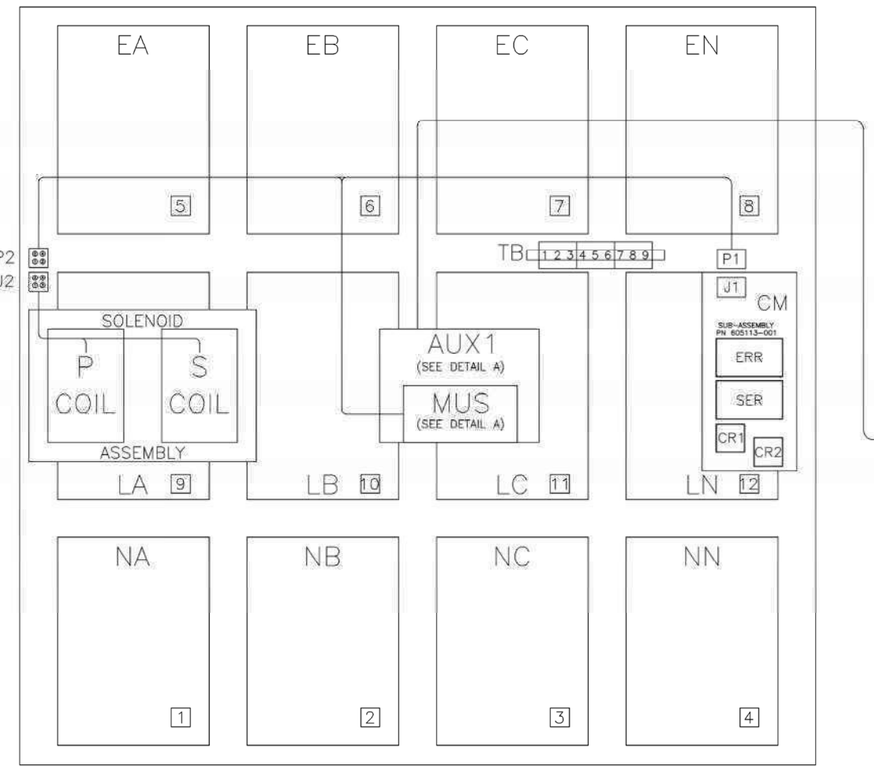
DWG. NO. 733503

DRAWING REV. M ECN NO. 235174 SHEET 3 OF 4

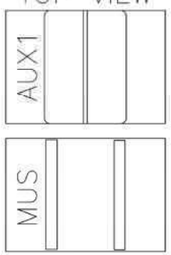
PHYSICAL DIAGRAM

ENCLOSURE

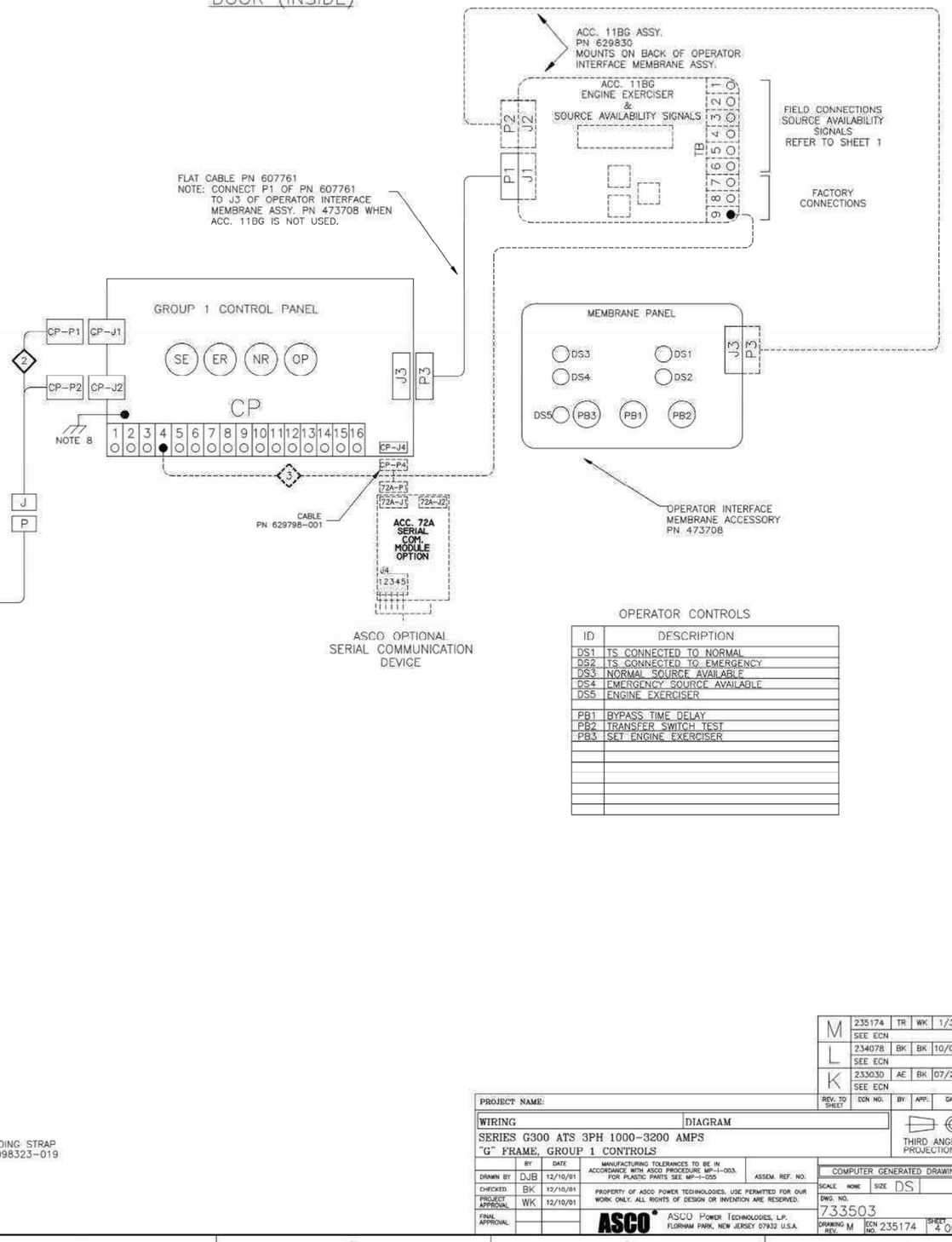
TS (TRANSFER SWITCH)



DETAIL A
MUS, AUX1
TOP VIEW



DOOR (INSIDE)



OPERATOR CONTROLS

ID	DESCRIPTION
DS1	TS CONNECTED TO NORMAL
DS2	TS CONNECTED TO EMERGENCY
DS3	NORMAL SOURCE AVAILABLE
DS4	EMERGENCY SOURCE AVAILABLE
DS5	ENGINE EXERCISER
PB1	BYPASS TIME DELAY
PB2	TRANSFER SWITCH TEST
PB3	SET ENGINE EXERCISER

REV.	REV. TO SHEET	ECN NO.	BY	APP.	DATE
M		235174	TR	WK	1/3/11
		SEE ECN			
L		234078	BK	BK	10/07/11
		SEE ECN			
K		233030	AE	BK	07/25/11
		SEE ECN			

PROJECT NAME:

WIRING DIAGRAM
SERIES G300 ATS 3PH 1000-3200 AMPS
"G" FRAME, GROUP 1 CONTROLS

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	DJB	12/10/01
CHECKED	BK	12/10/01
PROJECT APPROVAL	WK	12/10/01
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP-1-003. FOR PLASTIC PARTS SEE MP-1-055 ASSEM. REF. NO.

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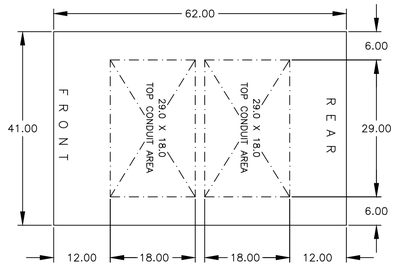
ASCO ASCO Power Technologies, L.P. FLORHAM PARK, NEW JERSEY 07932 U.S.A.

COMPUTER GENERATED DRAWING

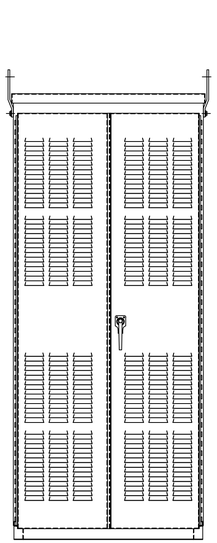
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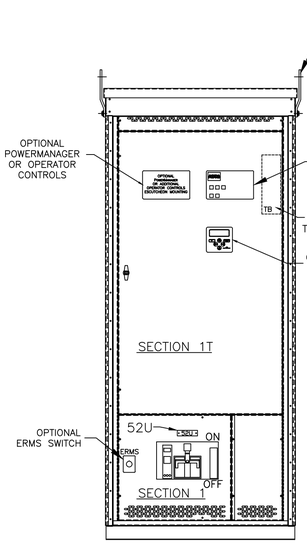
DRAWING REV. M ECN NO. 235174 SHEET 4 OF 4



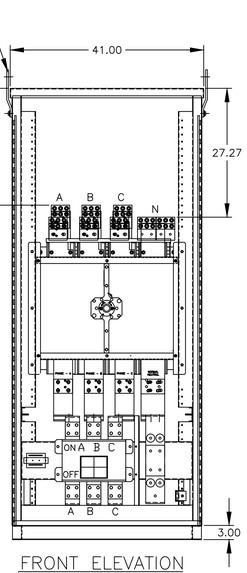
TOP VIEW



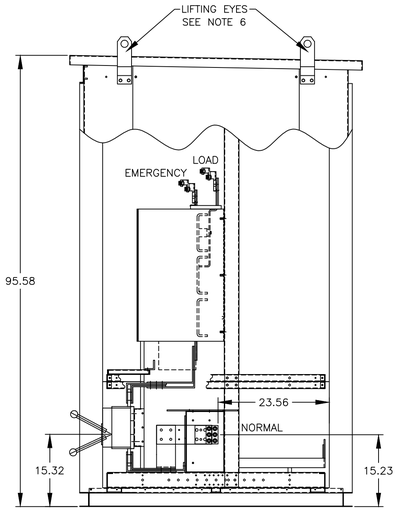
FRONT VIEW



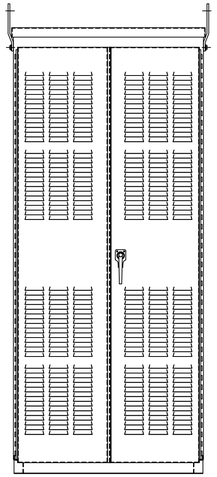
FRONT VIEW
WITHOUT EXTERIOR DOORS



FRONT ELEVATION
INTERIOR VIEW

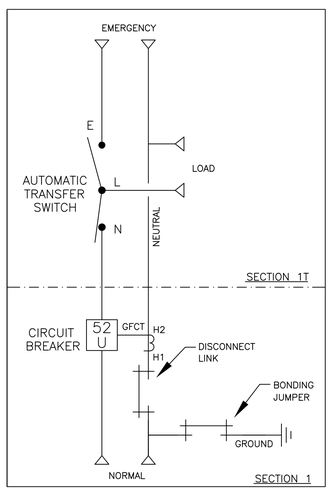


RIGHT SIDE VIEW

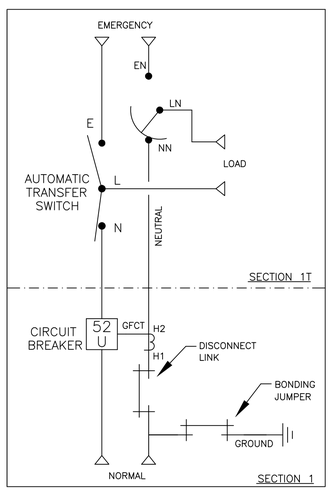


REAR VIEW

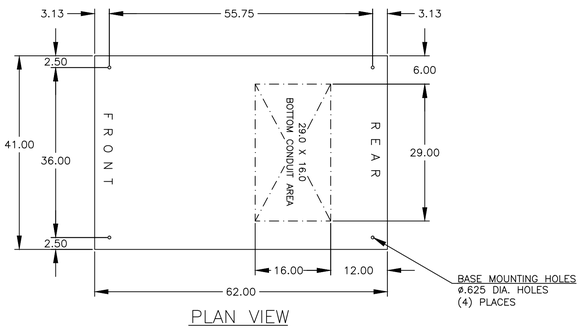
ONE LINE DIAGRAMS



(WITH SOLID NEUTRAL)



(WITH SWITCHED/OVERLAPPING NEUTRAL)



PLAN VIEW

GENERAL NOTES

1. FLOOR MOUNTED ENCLOSURE.
   TYPE 3R CONSTRUCTED FROM CODE GAUGE STEEL.
   FINISH: TYPE 3R, ANSI 61 GRAY POLYESTER SEMI GLOSS ELECTROSTATIC POWDER.
   TYPE 3RX EXTERIOR CONSTRUCTED FROM CODE GAUGE STAINLESS STEEL.
   (R) EXTERIOR CONSTRUCTED FROM TYPE 304 STAINLESS STEEL.
   (S) EXTERIOR CONSTRUCTED FROM TYPE 316 STAINLESS STEEL.
2. EXTERIOR DOORS HAVE PADLOCKABLE HANDLES WITH 3–POINT LATCH
3. DESIGNED FOR FRONT & REAR ACCESS.
4. RECOMMENDED CLEARANCES: FRONT: 38" REAR: 36"
5. EXTERIOR VENTS:
   1000A – 1600A: NO VENTS.
   2000A: VENTS ARE SUPPLIED WITH POLYESTER DUST FILTERS.
6. LIFTING PLATES: SECTIONS ARE SUPPLIED WITH LIFTING PLATES. INSPECT PLATES FOR DAMAGE AND TORQUE BOLTS TO 45 FT LBS BEFORE USE. REFER TO ANSI/NEMA PB 2.1 FOR PROPER HANDLING OF EQUIPMENT. AFTER INSTALLATION OF SECTION, REMOVE LIFTING PLATES. REINSTALL BOLTS INTO EXTERIOR HOLES AND TORQUE TO APPROXIMATELY 20 FT LBS.

SYSTEM NOTES

1. SYSTEM RATING: 1000 AMPS, 1200 AMPS, 1600 AMPS, 2000 AMPS, 3ø, 4W OR 1ø 3W.
   SHORT CIRCUIT RATING: 65,000 RMS SYM AMPERES @ 480V.
   THE EMERGENCY SOURCE INPUT MUST BE PROTECTED BY A REMOTE OVERCURRENT PROTECTION DEVICE AS LISTED ON THE MARKINGS ON THE TRANSFER SWITCH.
2. ALL BUS IS SILVER–PLATED COPPER, BASED ON 1000A PER SQ. IN. DENSITY.
3. GROUND: 20% RATED.
4. NEUTRAL: 100% RATED.
5. APPLICABLE LABEL(S): U.L. 891, SUITABLE ONLY FOR USE AS SERVICE EQUIPMENT.

TRANSFER SWITCH

1. G FRAME AUTOMATIC TRANSFER SWITCH.
2. TRANSFER SWITCH RATING: 1000 AMPS, 1200 AMPS, 1600 AMPS AND 2000 AMPS.
   SHORT CIRCUIT RATING WHEN PROTECTED BY A CIRCUIT BREAKER
   TIME RESPONSE, MAXIMUM 0.05 SECONDS: 65,000 RMS SYM @ 480V.
3. A FULL RATED NEUTRAL CONNECTION FOR EACH SOURCE AND THE LOAD IS OPTIONAL. WHEN PROVIDED IT IS IN ONE OF THE FOLLOWING FORMATS.
   A. SOLID NEUTRAL
   B. SWITCHED NEUTRAL POLE
   C. OVERLAPPING NEUTRAL POLE
4. UL 1008

TERMINATIONS 1000A – 1200A

1. SUPPLIED WITH MECHANICAL (SCREW TYPE) LUGS FOR CU/AL CABLE.
   NORMAL: (4) 1/0 – 600MCM PER PHASE & NEUTRAL
   LOAD: (4) 1/0 – 600MCM PER PHASE & NEUTRAL
   EMERGENCY: (4) 1/0 – 600MCM PER PHASE & NEUTRAL
   GROUND: (12) 1/0 – 600MCM
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED AS PER NEC.
2. OPTIONAL LUGS MAY BE SUPPLIED.

TERMINATIONS 1600A – 2000A

1. SUPPLIED WITH MECHANICAL (SCREW TYPE) LUGS FOR CU/AL CABLE.
   NORMAL: (6) 1/0 – 600MCM PER PHASE & NEUTRAL
   LOAD: (6) 1/0 – 600MCM PER PHASE & NEUTRAL
   EMERGENCY: (6) 1/0 – 600MCM PER PHASE & NEUTRAL
   GROUND: (18) 1/0 – 600MCM
   A. SUITABLE WIRE BENDING SPACE IS PROVIDED AS PER NEC.
2. OPTIONAL LUGS MAY BE SUPPLIED.

CIRCUIT BREAKER: ITEM 52U

1. SQUARE "D" 80% RATED, TYPE 'RJF' 3000AF/1000AT, 3000AF/1200AT, 3000AF/1600AT (P/N RJF36160U44A) OR 3000AF/2000AT (P/N RJF36200U44A) STATIONARY MOUNTED, MANUALLY OPERATED BREAKER WITH LONG DELAY, SHORT DELAY, INSTANTANEOUS AND GROUND FAULT TRIP SETTINGS.
   SHORT CIRCUIT RATING: AIC 65,000 RMS SYS @ 480V.
2. OPTIONAL 100% RATED BREAKER MAY BE SUPPLIED.
3. OPTIONAL ENERGY REDUCTION MAINTENECE SETTING MAY BE SUPPLIED
4. U.L. 489

REV. TO SHEET	ECN NO.	BY	APP.	DATE
L	282074	BG	RN	02/18/20
	SEE ECN			
K	261842	RG	RN	07/05/16
	SEE ECN			
J	258022	BS	RN	11/13/15
	SEE ECN			
H	255006	RN		5–27–15
	SEE ECN			
G	252571	AE	RN	1/08/15
	SEE ECN			
F	248105	VAK	RN	
	SEE ECN			
E	240309	RBR	RN	12/18/12
	NEW ISSUE			
D	231836	LK	RN	05/03/11
	SEE ECN			
C	221423	DP	RN	1/15/09
	ADDED "80% RATED"			
B	218103	AE	WK	04/23/08
	SEE ECN			
A	213080	RN		4–25–07
	SEE ECN			

PROJECT NAME:

OUTLINE | MOUNTING

GAUS 1000A – 2000A, RJF SE BREAKER
TYPE 3R/3RX 95.5 X 41 X 62 SECTION 1 & 1T

THIRD ANGLE PROJECTION

	BY	DATE
DRAWN BY	SG	12/26/13
CHECKED	RN	
PROJECT APPROVAL		
FINAL APPROVAL		

MANUFACTURING TOLERANCES TO BE IN ACCORDANCE WITH ASCO PROCEDURE MP–I–003. FOR PLASTIC PARTS SEE MP–I–055

ASSEM. REF. NO.

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SCALE NONE | SIZE DS

DWG. NO. 754577–050

DRAWING REV. L | ECN NO. 282074 | SHEET 1 OF 1

SECTION 01 65 60

PRESSURE PIPE TESTING AND DISINFECTION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Requirements for pressure pipe testing and disinfection.

1.1 THE REQUIREMENT

A. The CONTRACTOR shall test and disinfect all water pipelines and appurtenant piping, in accordance with the Contract Documents.

B. The CONTRACTOR shall be responsible for obtaining permits for discharging excess testing and disinfection water and dichlorination of such water if required to satisfy permit limits.

1.2 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Contractor Submittals.

B. Furnish:

1. A testing plan and schedule, including method for water conveyance, control, disposal, and disinfection shall be submitted in writing for approval.
2. Name of certified bacteriological testing laboratory.
3. Resume of experienced disinfection technician if the use of liquid chlorine is proposed. Technician shall have a minimum of 5-years of experience with liquid chlorine pipeline disinfection.
4. Disinfection testing report as required by AWWA C651.
5. Pressure testing report.

PART 2 – PRODUCTS

2.0 MATERIAL REQUIREMENTS

A. All test equipment, chemicals for chlorination, temporary valves, bulkheads, and other water control equipment, and choice of disinfectant shall be as determined by the CONTRACTOR. No materials shall be used which would be injurious to the WORK.

B. Chlorine for disinfection may be in the form of liquid chlorine or sodium hypochlorite solution.

1. Liquid chlorine shall be in accordance with the requirements of ANSI/AWWA B301 - Liquid Chlorine, and shall be used only when each of the following conditions are satisfied:

a. Appropriate gas flow chlorinators and ejectors are used.

b. An experienced technician directly supervises.

c. Appropriate safety practices are observed.

2. Sodium hypochlorite shall be in accordance with ANSI/AWWA B300 – Hypochlorite.

C. Dichlorination agents may be sodium bisulfate, sodium sulfite, or sodium thiosulfate.

PART 3 – EXECUTION

3.0 GENERAL

A. Water for testing and disinfecting water pipelines will be furnished by the CONTRACTOR.

B. All pressure pipelines shall be tested and disinfected. All chlorinating and testing operations shall be performed in the presence of the OWNER's Representative.

C. The CONTRACTOR shall isolate from pressure or remove any instrumentation or devices that cannot safely be exposed to the test pressures.

D. Disposal of flushing water and water containing chlorine shall be by methods acceptable to the OWNER's Representative.

E. Disinfection operations shall be scheduled as late as possible during the Contract Time to maximize the degree of sterility of the facilities at the time the WORK is accepted by the OWNER. Bacteriological testing shall be performed by a certified testing laboratory accepted by the OWNER. Results of the bacteriological testing shall be satisfactory to the Oregon Health Authority or other appropriate regulatory agency.

3.1 HYDROSTATIC TESTING OF PIPELINES

A. Pipelines 30-inches diameter and larger shall be visually inspected that all debris has been removed prior to flushing.

B. Prior to hydrostatic testing, pipelines shall be flushed or blown out as appropriate. The CONTRACTOR shall test the pipeline from the butterfly valves at the pumps to the end of the pipeline at its connection point to the adjacent section of pipeline. No testing of the pipeline shall occur until field-placed concrete or mortar has attained an age of 14 Days. The test shall be made by closing valves when available or by placing a plug, bulkhead, or temporary blind flange at the end of the pipe and filling the line slowly with water. The CONTRACTOR shall be responsible for ascertaining that test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to or movement of the adjacent pipe. Unharnessed sleeve type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test to avoid movement and damage to piping and equipment. Remove or protect any pipeline-mounted devices that may be damaged by the test pressure. The CONTRACTOR shall provide sufficient temporary taps in the pipelines to allow for trapped air to exit. After completion of the tests, such taps shall be permanently plugged. Care shall be taken that air relief valves are open during filling.

C. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the release valves at a reasonable velocity. The air within the pipeline shall be allowed to escape completely. The differential pressure across the orifices in the air release valves shall not be allowed to exceed 5 psi at any time during filling. After the pipeline has been filled, it shall be allowed to stand under a pressure of approximately 5 psi for at least 24 hours to allow the concrete or mortar lining, as applicable, to absorb water and to allow the escape of air from air pockets. During this period, bulkheads, valves, and connections shall be examined for leaks. If leaks are found, corrective measures satisfactory to the OWNER's Representative shall be taken.

D. The hydrostatic test shall be performed in the presence of the OWNER's Representative and shall consist of holding a test pressure of 150 psi on the pipeline for a period of 4 hours. The test pressure for piping shall be measured at the lowest point of the pipeline. Visible leaks that appear during testing shall be repaired in a manner acceptable to the OWNER's Representative. Add water to restore the test pressure if the pressure decreases 5 psi below test pressure during the test period.

E. The maximum allowable leakage for distribution and transmission pipelines shall be determined according to the following formula:

$$L = \mathbf{S} \times D \times P^{1/2} / 133{,}200$$

Where:
L = leakage (gallons per hour)
S = length (feet)
D = pipe inside diameter (inches)
P = test pressure (psi)

F. Exposed piping shall show no visible leaks and no pressure loss during the test.

G. In the case of pipelines that fail to pass the leakage test, the CONTRACTOR shall determine the cause of the leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipeline, repeating as necessary until the pipeline passes.

3.2 DISINFECTING PIPELINES

A. General: Pipelines shall be disinfected in accordance with the requirements of ANSI/AWWA C651 – Disinfecting Water Mains, using the Continuous-Feed Method as modified herein.

B. Chlorination: A chlorine-water mixture shall be uniformly introduced into the pipeline by means of a solution-feed chlorinating device. The chlorine solution shall be introduced at one end of the pipeline through a tap in such a manner that as the pipeline is filled with water, the dosage applied to the water entering the pipe shall be approximately 50 mg/l. Care shall be taken to prevent the strong chlorine solution in the line being disinfected from flowing back into the line supplying the water.

C. Retention Period: Chlorinated water shall be retained in the pipeline for at least 24 hours. After the chlorine-treated water has been retained for the required time, the free chlorine residual at the pipeline extremities and at other representative points shall be at least 25 mg/l. If testing does not demonstrate a residual of 25 mg/l or greater, the disinfection procedure above shall be repeated.

D. Sampling Ports: The CONTRACTOR shall provide sampling ports along the pipeline as defined in AWWA C651. Taps may be made at manways and air valves to help facilitate the spacing requirement.

E. Final Flushing: After the applicable retention period, the heavily chlorinated water shall be flushed from the pipeline until chlorine measurements show that the concentration in the water leaving the pipeline is no higher than that generally prevailing in the system or is acceptable for domestic use. Any release of chlorinated water shall comply with federal, state, and local

regulation and the permits for the project. Chlorine in excessive amounts shall be treated before discharge.

F. Bacteriological Testing: After final flushing and before the pipeline is placed in service, a sample, or samples shall be collected from the end of the line and shall be tested for bacteriological quality in accordance with the requirements of the Oregon Health Authority or other appropriate regulatory agency. For this purpose, the pipe shall be re-filled with fresh potable water and left for a period of 24 hours before any sample is collected. If testing does not demonstrate a free chlorine residual after the 24-hour period, the disinfection procedure above shall be repeated. If the initial disinfection treatment fails to produce satisfactory bacteriological test results, the disinfection procedure shall be repeated until acceptable results are obtained.

3.3 CONNECTION TO ADJACENT PIPELINE SECTION

A. Following testing and disinfection the connection to the continuation of the pipeline to the south shall be made. The interior surfaces of all pipe and fittings used in making the connection shall be swabbed or sprayed with a one percent hypochlorite solution before installation.

B. The connection area shall be left exposed to allow visual inspection for leakage during the operational start up and commissioning of the pump station and pipeline. Any leaks shall be repaired to the satisfaction of the OWNER's Representative.

– End of Section –

SECTION 01 77 00

PROJECT CLOSEOUT

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Final Cleanup

B. Closeout Timetable

C. Final Submittals

D. Maintenance and Guarantee

E. Bond

F. Project Record Documents

1.1 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 and restoration of the Site.

1.2 CLOSEOUT TIMETABLE

A. The CONTRACTOR shall provide 1 week notification for all testing unless otherwise noted on the drawings or specifications.

1.3 FINAL SUBMITTALS

A. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the OWNER's Representative:

1. Written guarantees, where required.
2. Completed record drawings.
3. Bonds for maintenance, etc., as required.
4. Certificates of inspection and acceptance by local governing agencies having jurisdiction.
5. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

1.4 MAINTENANCE AND GUARANTEE

A. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in the OWNER's Contract.

B. 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. Replacement of earth fill or backfill, and surfacing where it has settled below the required finish elevations, shall be considered as a part of such required repair WORK.

1.5 BOND

A. The CONTRACTOR shall provide a bond to guarantee performance of the provisions contained in the OWNER's Contract.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the WORK:

1. Contract Drawings.
2. Addenda.
3. Change Orders and other Modifications to the Contract.
4. Schematic layout of conduits, circuits, piping, ducts and other similar items, as appropriate.

B. Ensure entries are complete and accurate, enabling future reference by OWNER.

C. Store Record Documents separate from documents used for construction.

D. Record information concurrent with construction progress and make available to OWNER's Representative for review.

E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:

1. Measured horizontal and vertical locations of all underground utilities and appurtenances discovered in the course of the WORK, referenced to permanent surface improvements.
2. Measured locations of utilities and appurtenances concealed in construction, referenced to visible and accessible features of the WORK.

3. Field changes of dimension and detail.

4. Details not on original Contract Drawings.

F. Submit documents to OWNER's Representative with claim for final Application for Payment.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 00

DEMOLITION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Provide all equipment, labor, and materials required for demolition and disposal of existing pump intake, pipeline, and associated equipment and materials.

B. Provide all equipment, labor, and materials required for restoring all disturbed areas at the conclusion of demolition.

1.1 RELATED SECTIONS

Section 01 57 10 – Stormwater Pollution Prevention
Section 01 57 19 – Spill Prevention, Control, and Countermeasures
Section 31 20 00 – Earthwork
Section 32 90 00 – Revegetation

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.0 GENERAL

A. Demolition shall not start before the existing electrical service to the pump intake has been disconnected by Umatilla Electrical Cooperative. CONTRACTOR to coordinate and confirm with local utility that services have been disconnected and that it is safe to start demolition.

B. Demolition of Umatilla Electric Cooperative's facilities such as the primary transformer and metering equipment shall be scheduled and coordinated by the CONTRACTOR with UEC.

C. All demolition work performed below the ordinary high water line shall comply with the requirements of the Corps of Engineers Section 404 permit. Installation of a turbidity curtain and salvage of any fish within the curtain is required.

D. CONTRACTOR is responsible for obtaining any applicable permits prior to demolition commencement.

E. Demolition sequence shall conform to the project schedule, drawings, and CONTRACTOR's approved WORK plan.

F. Use of explosives is not permitted.

G. Repair or replace damaged trees and shrubs at no additional cost to OWNER. Finish grade and seed all disturbed areas at the completion of demolition.

H. CONTRACTOR shall demolish structures in a safe, orderly manner, which includes the use of temporary rails, barricades and nets in accordance with applicable federal, state, and local regulations, and shall protect all adjacent structures, utilities, and services during demolition. Note: If water is necessary for any demolition or surface preparation that could have the potential to introduce leachate into adjacent water bodies, wastewater control features shall be provided as part of the demolition WORK and in accordance with approved Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention, Control and Countermeasure Plan (SPCCP).

I. CONTRACTOR is responsible for preventing non-stormwater run-off, including drill cuttings and solids, from entering all adjacent water bodies.

J. Precautions shall be taken to prevent damage to existing WORK which is to remain in place, be reused or remain the property of OWNER and to any new WORK constructed or installed under this contract. Any damage to such WORK shall be repaired or replaced as approved by OWNER at no additional cost to OWNER. CONTRACTOR shall ensure that structural elements are not overloaded as a result of the demolition WORK. Shoring, bracing, and supports shall be installed and maintained, as required.

K. Dust resulting from demolition shall be controlled to avoid creation of a nuisance in the surrounding area. The use of water for dust control will not be permitted when it would result in or create hazardous or objectionable conditions, such as erosion, transport of sediments into river, pollution, flooding or ice. Do not use oil, waste, waste water, or other illegal materials as dust suppressants.

L. The burning of refuse and debris on the project site will not be permitted.

M. Demolished materials shall be removed and disposed of as the WORK progresses. Debris shall not be allowed to accumulate in any work/staging areas, as required by local, state and federal regulation. Concrete rubble shall not be used in areas subject to inundation, on the surface or as riprap due to risk of contamination of adjacent water.

N. Uncontaminated demolished materials shall be disposed of off-site at a regulated landfill facility. Care shall be taken to prevent refuse and debris from falling into adjacent water bodies. Any debris or refuse which falls into the water shall be removed promptly.

O. Restore all areas after removal of all structures by adding topsoil, seeding, and mulching as shown on drawings.

3.1 EXISTING PUMP INTAKE DEMOLITION

A. The OWNER reserves the right to remove any and all equipment from the existing CTUIR POD prior to the start of demolition.

B. Remove fencing as necessary to complete work. Reinstall after completion of demolition.

C. Remove and dispose of pump intake structure, floor, supports, and incidentals. Remove concrete foundation flush with adjacent ground or rock slope.

D. Remove and dispose of all mechanical and electrical equipment after confirming with OWNER which equipment the OWNER would like to salvage.

E. Remove and dispose of all submerged river intake screens and pipes.

3.2 SALVAGE

A. All salvageable materials and equipment not salvaged by OWNER become the property of the CONTRACTOR.

– End of Section –

DIVISION 03 – CONCRETE

SECTION 03 10 00

CONCRETE ACCESSORIES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered in this section consists of furnishing all equipment and material and performing all the labor for installation of the following, as shown on the Drawings and specified herein.

1. Pre-molded Expansion Joint Filler Strips.
2. Joint Sealants and Seals.
3. Waterstops.
4. Circumferential expansion rings for large diameter penstocks.

1.1 RELATED SECTIONS

Section 03 11 00 – Concrete Forming
Section 03 20 00 – Concrete Reinforcing
Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCE STANDARDS

A. ACI 504 - Guide to Joint Sealants for Concrete Structures

B. ASTM C920 - Elastomeric Joint Sealants

C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension

D. ASTM D570 - Standard Test Method for Water Absorption of Plastics

E. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers

F. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

G. ASTM D792 - Standard Test Methods for Specific Gravity and Density of Plastics by Displacement

H. ASTM D1056 - Standard Specification for Flexible Cellular Materials – Sponge or Expanded Rubber

I. ASTM D1190 - Standard Specification for Hot-Poured Elastic Type Concrete Joint Sealer

J. ASTM D1751 - Standard Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)

K. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers and Concrete Paving and Structural Construction

L. ASTM D2240 - Standard Test Method for Rubber Property—Durometer Hardness

M. FS TT-S-00227E - Sealing Compound, Elastomeric Type

N. U.S. Army Corps of Engineers Concrete Research Division: CRD-C572 - Polyvinylchloride Waterstop

1.3 QUALITY ASSURANCE

A. All waterstop field joints and joint sealant installation shall be subject to continuous inspection by OWNER'S Representative.

B. All field joints shall be subject to inspection for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects that would reduce the potential resistance of the material to water pressure at any point. All defective joints shall be replaced, and all faulty material shall be removed from the site and disposed of by CONTRACTOR.

1.4 SUBMITTALS

A. Literature and Test Reports: Manufacturer's literature and certified manufacturer's test reports shall be provided for flexible expanded rubber strips, pre-molded expansion joint filler strips, field-molded sealant and primer (when use of primer is recommended by the sealant manufacturer), and waterstops to verify compliance with the applicable specification.

B. Procedure and Performance Qualifications for Splicing Waterstops: CONTRACTOR shall demonstrate procedure and performance qualifications for splicing waterstops in the presence of OWNER's Representative by making a 12-inch-long sample splice of each size and type of finished waterstop. Splicing shall be done in accordance with manufacturer's instructions.

C. Shop Drawings: Submit drawings showing locations of all joints to receive waterstops and methods of supporting waterstops in forms without displacement from pressure of concrete placement.

D. Samples: Submit 12-inch-long samples of typical waterstop, flexible expanded rubber strips, joint fillers, and joint sealants.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Flexible Expanded Rubber Strips: Flexible expanded rubber (closed cell) strips and filler shall conform to ASTM D1056, Grade Number 2B2.

B. Pre-molded Expansion Joint Filler Strips: Bituminous pre-molded expansion joint filler strips shall conform to ASTM D1751. Non-bituminous types shall be Type I or resin impregnated fiberboard conforming to the physical requirements of ASTM D1752.

C. Joint Sealants and Seals:

1. Field Molded Sealants: Field-molded sealants shall conform to ASTM C920 Type S or M, Grade NS for vertical joints and Grade D for horizontal joints, Class M Bond breaker material shall be polyethylene tape, coated paper, metal foil, or similar type materials. The back-up material shall be compressible, non-shrink, non-reactive with sealant, and non-absorptive material type such as extruded butyl or polychloroprene foam rubber.

D. Waterstop: Non-expansive waterstop shall be Centerbulb Ribbed Wirestopes/Waterstops, 6 inches wide serrated with center bulb, 3/8 inch in web thickness as manufactured by Paul Murphy Plastics, or approved equal. Waterstop shall conform to CRD-C572.

E. Bond Breaker: Sikasil WS-290 FPS Silicone Sealant as supplied by Sika, (www.usa.sika.com), or approved equal.

PART 3 – EXECUTION

3.0 INSTALLATION

A. General: Joint locations and details, including materials and methods of installation of joint fillers and waterstops, shall be as specified, shown on the drawings, and as required by ENGINEER. In no case shall any fixed metal be continuous through an expansion or contraction joint.

1. Install all products in accordance with manufacturer's instructions.

B. Expansion Joints:

1. Pre-molded filler strips shall have oiled wood strips secured to the top thereof and shall be accurately positioned and secured against

displacement to clean, smooth concrete surfaces. The wood strips shall be slightly tapered, dressed, and of the size required to install filler strips at the desired level below the finished concrete surface and to form the groove for the joint sealant to the size shown on the drawings. Material used to secure pre-molded fillers and wood strips to concrete shall not harm the concrete and shall be compatible with the joint sealant or seals. The wood strips shall not be removed until after the concrete curing period.

2. The formed groove shall be thoroughly cleaned of all laitance, curing compound, foreign materials, protrusions of hardened concrete and any dust which shall be blown out of the groove with oil-free compressed air.

3. Bond-breaker and back-up material shall be installed where required. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

C. Joints with Field-Molded Sealant: Joints shall not be sealed when the sealant, air, or concrete temperature, is less than 40°F. Bond-breaker and back-up material shall be installed where required by manufacturer. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

D. Contraction Joints: Joints requiring a bond breaker shall be coated with curing compound or with bituminous paint. Waterstops shall be protected against application of bond-breaker material to prevent them from being coated.

E. Waterstops:

1. General: Waterstops shall be carefully and correctly positioned before concrete placement to eliminate faulty installation that may result in joint leakage and terminated per manufacturer requirements. Have equal portions of waterstop on each side of concrete joint. All waterstops shall be installed to form a continuous watertight diaphragm in each joint. Adequate provision shall be made to support and protect the waterstops during the progress of the WORK. Any waterstop punctured or damaged shall be replaced or repaired at CONTRACTOR’s expense. The concrete shall be thoroughly consolidated in the vicinity of the waterstop. Suitable guards shall be provided to protect exposed projecting edges and ends of partially embedded waterstops from damage. Waterstops to be provided at all construction joints in the wet well or concrete structure below EL. 360ft as indicated on the drawings.

2. Splices:

   a. Joints in waterstops shall be spliced together by qualified people using the approved splicing procedures to form a continuous watertight diaphragm. Splices shall be made on a bench in a temporary shop provided at the site of the installation or at the manufacturer's plant. A miter guide and portable power saw shall be used to cut the ends to be joined to ensure good alignment and contact between joined surfaces. The continuity of the characteristic features of the cross section of the waterstop (ribs, center axis, protrusions, and the like) shall be maintained across the splice.

   b. Splices shall be made by heat sealing the adjacent surfaces in accordance with the approved procedure. A thermostatically controlled electric source of heat shall be used to make all splices. The correct temperature at which splices should be made will differ with the material concerned, but the applied heat should be sufficient to melt but not char the plastic. Waterstops shall be reformed at splices with a remolding iron with ribs or corrugations to match the pattern of the waterstop. The spliced area, when cooled and bent by hand in as sharp an angle as possible, shall show no sign of separation.

F. Expansion Rings:

1. Flexible expanded rubber strips shall be accurately positioned and secured against displacement to the pipe surface. Material used to adhere rubber strips to steel shall not harm the steel and shall be compatible with the joint sealant or seals.

2. Filler strips of the same size and material as expanded rubber strips shall be installed to form the groove for the joint sealant and back-up material to the size shown on the Drawings. Filler strips shall be accurately positioned and secured against displacement and shall not be removed until after the concrete curing period.

3. The groove shall be thoroughly cleaned of all laitance, curing compound, foreign materials, and protrusions of hardened concrete. Any dust shall be blown out of the groove with oil-free compressed air.

4. Joints with Field-Molded Sealant: Joints shall not be sealed when the sealant, air, or concrete temperature is less than 40˚F. Bond-breaker and back-up material shall be installed as shown on the Drawings

and where required by manufacturer. Joints shall be primed and filled flush with joint sealant in accordance with the manufacturer's recommendations.

– End of Section –

SECTION 03 11 00

CONCRETE FORMING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This Section covers formwork for cast-in-place concrete, including supports, fasteners, surface treatment and other items required to achieve the specified finish.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 03 30 00 – Cast-In-Place Concrete

1.2 REFERENCE STANDARDS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition available shall be used, except as they are modified and supplemented herein. In addition to the above codes and standards, CONTRACTOR shall comply with all pertinent State and local ordinances, laws, and regulations. In the event of any apparent conflict among codes, standards or this specification, CONTRACTOR shall refer the conflict to City of Umatilla (City) for written resolution; the most stringent specification will apply.

B. American Concrete Institute (ACI)

1. ACI 117 - Specification for Tolerances for Concrete Construction and Materials
2. ACI 347 - Guide to Formwork for Concrete

C. American Society of Civil Engineers (ASCE)

1. ASCE 37 – Design Loads on Structures During Construction

D. American Society for Testing and Materials (ASTM)

1. ASTM C-31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. ASTM C-39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

E. Department of Commerce (DOC)

1. DOC PS 1 - Voluntary Product Standard - Structural Plywood

1.3 SYSTEM DESCRIPTION

A. The CONTRACTOR shall design, ENGINEER, and construct formwork, shoring, and bracing to meet design and code requirements so that resultant concrete conforms to required shapes, lines, and dimensions.

1.4 QUALITY ASSURANCE

A. General

1. The CONTRACTOR is solely responsible for designing formwork for structural stability and efficiency, and for bracing, shoring and reinforcing all formwork as required to perform the intended function.

2. Design formwork in accordance with methodology of ASCE 37 and ACI 347 for anticipated loads, lateral pressures, and stresses.

3. Monitor the adequacy of formwork design and construction prior to and during concrete placement.

1.5 CONTRACTOR SUBMITTALS

A. General

1. The CONTRACTOR shall submit formwork drawings under provisions of Section 01 33 00 – Contractor Submittals.

B. Shop Drawings

1. Provide design computations, showing the following: materials and details of form systems and supports; methods of form construction and erection; falsework; locations and details of shoring; locations and methods of installing embedded items; locations and patterns of form joints, ties, and other items affecting the appearance of concrete; locations and dimensions of blockouts; sequence and schedule of erecting and removing formwork and shoring.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General

1. Form materials shall be delivered in the manufacturer's packaging with installation instructions. Materials shall be stored off the ground

in a ventilated and protected area to prevent deterioration from moisture or damage.

PART 2 – PRODUCTS

2.0 MATERIALS

A. General

1. Materials for formwork shall be suitable to achieve the finish requirements for formed surfaces specified in Section 03 30 00 – Cast-in-Place Concrete.

B. Form Ties

1. Form ties shall be metal rods or bolts of approved type. Wire form ties shall not be used. Bolts and rods used for internal ties shall be so arranged that when the forms are removed there shall be no metal within 3-inches of any concrete surface. Form ties shall not leave irregular holes for repair or lead to repair marks that would detract from the specified finishes.

C. Form Coatings, Sealers, and Release Agents

1. Form coating, sealers and release agents shall be approved by the City before use. Form coatings shall not bond with, stain nor adversely affect concrete surfaces, and shall not impair subsequent treatments of concrete surfaces.

D. Anchors and Other Inserts

1. Anchors, embeds and other inserts shall be fixed in accordance with the standard practice for formwork.

E. Forms

1. Forms shall be of steel or heavy plywood, sized and reinforced for spans and construction loading. Battered, bent, twisted, broken or dirty forms shall not be used. Do not use forms for any above grade exposed concrete that will not perform as well as new formwork. Do not patch forms or use rust-stained forms.

F. Chamfer Strips

1. Exposed corners and edges of concrete shall be chamfered, 3/4-inches in dimension, except for joint rustication or unless otherwise indicated on the Drawings, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

G. Reveal Strips

1. Reveal strips shall be installed in locations as shown on the Drawings and shall produce uniform smooth line and tight edges.

PART 3 – EXECUTION

3.0 INSPECTION

A. General

1. The CONTRACTOR shall verify lines, levels, and centers before proceeding with formwork, and shall ensure that dimensions agree with the Drawings.

2. The City of Umatilla (City) will inspect formwork prior to concrete placement to verify compliance with all Contract requirements.

3. Concrete shall not be placed until the City and any governing agencies have inspected and approved the formwork. Concrete placed in violation of this requirement will be subject to removal and rejection.

3.1 PREPARATION

A. General

1. The CONTRACTOR shall hand-trim sides and bottoms of earth forms; remove loose dirt prior to placing concrete.

2. The CONTRACTOR shall minimize form joints, symmetrically align joints and make watertight joints to prevent leakage of mortar.

3. Arrangement and assembly of formwork shall be performed to permit dismantling and stripping so that concrete is not damaged during its removal. Forms are to be arranged to allow stripping without removal of principal shores, where required to remain in place.

3.2 ERECTION

A. General

1. The CONTRACTOR shall provide bracing to ensure stability of formwork and strengthen formwork liable to be overstressed by construction loads.

2. Formwork and falsework support accessories shall not be welded to the permanent structural steelwork.

3. Temporary ports in formwork shall be provided to facilitate cleaning, removal of chips, saw dust, extraneous matter, and general inspection. Locate openings at bottoms of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

4. 3/4-inch chamfer strips shall be provided on external corners of beams, slabs, columns, and walls unless noted otherwise in the drawings.

5. Reveal strips shall be provided on walls at locations, and as indicated in the plans.

6. In no case shall any concrete be placed in any form until the form has been checked by the City.

3.3 CLEANING

A. General

1. The Contractor shall clean forms to remove foreign matter as erection proceeds.

2. During cold weather, the CONTRACTOR is to remove ice and snow from forms without the use of de-icing salts. Water cannot be used to clean out completed forms, unless formwork and construction proceed within heated enclosure. Compressed air shall be used to remove foreign matter.

3.4 APPLICATION OF FORM RELEASE AGENT

A. General

1. Before concrete is placed within the forms, the accumulated dust and debris shall be removed from the form surfaces, and the inside surfaces of forms shall be coated with a form oil reviewed by the City.

2. The CONTRACTOR shall apply a form release agent on formwork in accordance with manufacturer's instructions. Apply prior to placing reinforcing steel, anchoring devices, and embedded items.

3. Form release agent is not to be applied where concrete will be in contact with surfaces which are scheduled to receive special finishes or applied coverings which may be affected by agent.

4. The oil shall be applied several days before the concrete is placed and in such a quantity that it will be fully absorbed by the wood and

will not discolor the surface of the concrete. Excess form coating material shall not stand in puddles in the forms nor shall coating come in contact with hardened concrete against which fresh concrete is to be placed.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. General

1. The CONTRACTOR shall provide formed openings where required for work embedded in or passing through concrete. This work shall be coordinated with other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

2. Accessories shall be installed in accordance with manufacturer's instructions, being level and plumb. The CONTRACTOR shall ensure that items are not disturbed during concrete placement.

3.6 FORM REMOVAL

A. General

1. The CONTRACTOR shall not remove forms and shoring bracing until concrete has sufficient strength to support its own weight, has hardened sufficiently to resist damage from removal operations, nor before the expiration of a minimum time indicated below, or as specifically authorized by the City. Removal of load supporting forms can be done when concrete has attained 75% of required 28-day compressive strength, provided construction is re-shored.

   a. Bottom forms and supports shall not be removed before 7 days.

   b. Side forms and supports shall not be removed before 48 hours.

   c. These periods represent the cumulative number of consecutive days or fractions thereof during which the temperature of the concrete is above 50°F.

   d. For concrete temperatures above 80°F, these periods may be reduced as reviewed by the City.

2. Re-shored concrete shall not have any additional dead or live loads placed on it without the approval of the City.

3. Concrete surfaces are not to be damaged during form removal. The formwork shall be stripped with care to avoid damage to the green

concrete and special precautions shall be taken to avoid chipping of exposed edges and corners.

4. Apply sealant or curing agent to exposed concrete immediately after form removal.

5. Protection and heating, where used, shall be withdrawn progressively in such a manner as not to introduce thermal shock stresses in the concrete.

6. During the prescribed curing period after the initial temperature rise in the concrete due to heat of hydration, the temperature of the concrete adjacent to and in contact with the forms shall be reduced at a gradual rate not exceeding 5°F per day to within 4°F of ambient (outside air) temperature.

7. To achieve this in a heated housing, the heat shall be slowly reduced, and regulated as necessary, and the whole housing shall be allowed to cool to air temperature before the housing itself or the formwork is removed.

8. Where the work is to proceed within the same housing on the next stage of the work, the formwork may be removed as soon as the prescribed curing period is over.

9. With insulated formwork, the forms themselves may be slackened and some insulation removed if needed.

10. In order to avoid thermal shock and associated cracking, the forms shall not be removed unless and until the concrete temperature has fallen to within 40°F of ambient temperature, and within 46°F of the low ambient temperature as forecast for the following 24 hours.

11. Forms shall be completely removed unless in the discretion of the ENGINEER the ground conditions or other considerations at a particular structure warrant leaving them in place.

3.7 TOLERANCES FOR FORMED SURFACES

A. General

1. The CONTRACTOR shall surface, design, and construct forms in accordance with the specifications for allowable tolerances.

2. Where tolerances are not stated in the specifications or shown on the drawings for all individual structure or feature thereof, permissible deviation will be interpreted in accordance with the provisions of this section. The CONTRACTOR shall be responsible for setting and

maintaining concrete forms sufficiently within the tolerance limits so as to ensure completed work within the tolerances specified herein. Concrete work that exceeds the tolerance limits specified herein shall be remedied or removed by the CONTRACTOR at no additional cost.

3. Tolerance limitations for all structures shall be in accordance with the following values, except that for all element of the structure the tolerances permitted in the several categories shall not be combined to allow a total combined tolerance greater than that allowable under a single category:

B. General Tolerances for Formed Services

1. Variations from the plumb	In any 10-feet of length	1/4-inch
a) In the lines and surfaces of columns, piers, walls and in arises	Maximum for entire length	1-inch
b) For exposed corner columns, control-joint grooves, and other conspicuous lines	In any 20-feet of length	1/4-inch
2. Variation from the level or from the grades indicated on the drawings:	In any 10-feet of length	1/4-inch
	In any bay or in any 20-feet of length	3/8-inch
a) In slab soffits, ceilings, beam soffits, and in arises, measured before removal of supporting shores	Maximum for entire length	3/4-inch
b) In exposed horizontal and vertical reveals and other conspicuous lines	Maximum for entire length	3/4-inch
3. Variation of the linear building lines from established position in plan	In any 20-feet In any 20-feet	1/2-inch 1-inch
4. Variation of distance between walls, columns, partitions	1/4-inch per 10-feet of distance, but not more than 1/2-inch in any one bay, and not more than 1-inch total variation	
5. Variation in the sizes and locations of sleeves, slab openings, and wall opening	Minus Plus	1/4-inch 1/2-inch
6. Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls	Minus Plus	1/4-inch 1/2-inch

7. Footings:		
a) Variation of dimensions in plan	Minus Plus	1/2-inch 2-inches
	When formed or plus 3-inches when placed against unformed excavation	
b) Misplacement of eccentricity	2% of the footing width in the direction of Misplacement but not more than 2-inches	
c) Reduction in thickness of specified thickness	Minus	5%
8. Variation in steps:	Riser	1/8-inch
a) In a flight of stairs	Tread	1/4-inch
b) In consecutive steps	Riser Tread	1/16-inch 1/8-inch
9. Where tolerances closer than those given above are necessary to accommodate the installation of all items of equipment, they shall be limited to values compatible with the installation requirements.		
10. Failure of forms to produce specified tolerances will be grounds for rejection of concrete work.		

– End of Section –

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered by this Section consists of furnishing all equipment and material and performing all labor for detailing, fabricating, delivering, and installing steel bars, welded wire fabric, dowels, and accessories for concrete reinforcement as shown on the drawings and specified herein.

1.1 RELATED WORK

Section 03 10 00 – Concrete Accessories
Section 03 11 00 – Concrete Forming
Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCE STANDARDS

A. ASTM A497 - Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement

B. ASTM A615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

C. ASTM E8 - Tension Testing of Metallic Materials

D. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials

E. ACI 301 - Specifications for Structural Concrete for Buildings

F. ACI 315 -Manual of Standard Practice for Detailing Reinforced Concrete Structures

G. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary

H. ACI SP 66 - Detailing Manual

I. AWS D1.4 - Structural Welding Code in Reinforcing Steel

1.3 SUBMITTALS

A. Mill Test Reports: Certified mill test reports for reinforcing steel showing that the steel complies with the applicable specifications shall be submitted to OWNER'S Representative by CONTRACTOR. Reports and delivery tickets

shall be furnished for each steel shipment and shall be identified with specific lots prior to use of the steel in the WORK.

B. Mechanical Splices: The method and equipment proposed for making mechanical splices shall be submitted for review by OWNER's Representative.

C. Shop Drawings:

1. CONTRACTOR shall prepare and submit to OWNER, shop drawings for reinforcing steel including any "As-Built" revisions. Shop Drawings shall be drawn to scale and clearly present reinforcing details. Adequate notes, symbols, and abbreviations, which can easily be interpreted, shall be included. Show concrete outline and construction joint locations of lifts including station numbers, if applicable, and elevations.

2. The shop drawings shall contain reinforcing steel bar schedules with the quantity, shape and size, weight per foot and total weights, bending details, mark numbers and splice lengths.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Reinforcing Bars: Reinforcing bars shall be deformed bars conforming to ASTM A615, Grade 60.

B. Accessories:

1. Bar Supports:

a. Bar supports shall conform to ACI 315. Bar supports for formed surfaces that are to be permanently exposed to view or to be painted shall be plastic-protected wire, stainless steel or precast concrete supports.

b. Precast concrete bar supports shall be wedge-shaped, not larger than 3- 1/2 x 3-1/2 inches, of thickness equal to that indicated for concrete cover. If formed surface is to be permanently exposed to view, the precast concrete bar support shall be the same quality, texture and color as the finish surface.

2. Wire Ties: Wire ties shall be 16-gage or heavier black annealed wire.

C. Chairs, Hangers, Spacers, and Other Supports for Reinforcing Bars: Concrete, metal, or other approved material.

D. Two-Component Adhesive for Adhesive Dowel Installations: "Dowel-Fast" system two- component epoxy as manufactured by Powers Fasteners, Inc. (www.powers.com), or "HIT-HY 150" two-part adhesive as manufactured by Hilti, Inc. (www.hilti.com.)

2.1 FABRICATION

A. Reinforcing bars shall be furnished, cut, and bent, in accordance with ACI 318.

B. Reinforcing bars shall not be bent or straightened in a manner that will damage the material.

C. Bends for hooks shall be made around a pin of a diameter of not less than 6 times the diameter of the bar being bent. Diameter of bends for stirrup and tie bar bend for #3, #4, and #5 bar shall not be less than 4 times the diameter of the bar being bent.

D. Reinforcing bars shall be bent cold unless authorized by OWNER's Representative.

E. Reinforcing bars with kinks or unnecessary bend shall not be used.

F. Welding of reinforcing bars shall not be permitted unless approved by OWNER.

G. Welding of reinforcing bars at bends shall not be permitted for any reason.

PART 3 – EXECUTION

3.0 DELIVERY, STORAGE, AND HANDLING

A. Reinforcing steel shall be bundled, identified, and tagged with marking shown on approved Shop Drawings and shall include quantity in each bundle.

B. Each bundle shall be limited to one size and grade of material.

C. Reinforcing materials shall be stored off the ground and protected from the elements and contaminates that adversely affect bond.

3.1 INSTALLATION

A. General: Reinforcing steel and accessories shall be installed or placed as specified and as shown on contract and approved shop drawings. Placement details of reinforcement and accessories not specified or shown on the drawings shall be in accordance with ACI 315 or ACI 318. Reinforcement shall be fabricated to shapes and dimensions shown, placed

where indicated within specified tolerances, and adequately supported against displacement during concrete placement. At the time placing of concrete in a lift is begun, all reinforcement shall be free from loose, flaky rust; scale (except tight mill scale); mud; oil; grease; or any other coating that might reduce the bond with the concrete.

B. Hooks and Bends: Reinforcing bars may be shop or field bent. No bars partially embedded in concrete shall be field bent unless indicated on the drawings or otherwise authorized by OWNER's Representative. All hooks or bends shall be in accordance with ACI 318

C. Welding: Welding of reinforcing bars to other reinforcing bars or to embedded items will be permitted only where indicated on the drawings or as otherwise directed by OWNER's Representative. Welding shall be performed in accordance with AWS D1.4, except where otherwise specified or indicated on the drawings.

D. Placing Tolerances:

1. Spacing of Bars: Bars shall be spaced as indicated on the drawings or as otherwise directed. The spacing between adjacent bars and the distance between layers may not vary from the indicated position by more than one bar diameter nor more than one inch.

2. Concrete Cover: The minimum concrete cover of main reinforcement steel shall be as indicated on the drawings. The tolerances shall be in accordance with ACI 318.

3. Typical project cover is 3 inches for formed, exterior exposure, 4 inches for water passages or surfaces exposed to flowing water.

E. Splicing:

1. Splices in reinforcement steel shall be as specified, shown on the drawings or as directed by OWNER's Representative. Bars may be spliced at alternative or additional locations at no additional cost to OWNER, subject to the acceptance of OWNER's Representative. Except as provided herein, all splicing shall be in accordance with approved splicing procedures and the requirements of ACI 318.

2. Lap Splices: Lap splices shall be used for all bars. Bar laps may be placed in contact and securely tied or may be spaced transversely apart to permit embedment of the entire surface of each bar in concrete, but shall not be spaced farther apart than one-fifth the required length of lap or 6 inches. Lengths of laps for bars or welded wire fabric shall conform to the requirements of ACI 318, except when otherwise shown on the drawings.

3. Mechanical Splices:

   a. A mechanical splice shall be used where part of the projecting length of a partially embedded bar is broken off or becomes damaged and must be cut off, and the length remaining is not sufficient for the required lap splice, or as shown on the drawings.

   b. Mechanical splices shall be an exothermic, threaded coupling, swaged sleeve or other positive connecting type which will develop in tension or compression, as required, 125 percent of specified yield strength of the bar, unless otherwise noted on the drawings.

   c. Bar ends may be prepared by sawing, shearing, or flame cutting, provided that the ends of sheared bars are reshaped after shearing, and all slag is removed from the ends of flame cut bars by chipping and wire brushing prior to splicing. Surfaces to be enclosed in a splice sleeve or coupling shall be cleaned prior to splicing by wire brushing or other approved method.

   d. Splices shall be made in accordance with manufacturer's instructions using manufacturer's standard jigs, clamps, ignition devices and other required accessories.

   e. Mechanical tension splices shall be staggered longitudinally a minimum of five feet so that no more than half of the bars are spliced at any one section, unless otherwise noted on the drawings.

   f. Mechanical splicing operations will be subject to visual examination and tension tests as required by OWNER’s Representative.

F. Inspection:

1. Areas where reinforcing bars will be installed shall be inspected for defects that would prohibit their satisfactory installation and performance. Defects, if existing, shall be corrected prior to commencing installation of reinforcing materials.

2. After installation of reinforcement, CONTRACTOR shall notify OWNER’s Representative and provide adequate access inspection. CONTRACTOR shall not begin concrete placement until receiving approval from OWNER’s Representative of reinforcement installation.

3.2 ANCHOR BAR AND DOWEL INSTALLATION

A. Reinforcing steel for adhesive dowels shall be provided with standard hook geometry per ACI 318.

B. Holes for adhesive dowel installation shall be drilled at a diameter 1/8 inch greater than the anchor diameter. Holes shall be drilled and roughened with percussion drill.

C. Holes shall be cleaned with compressed air, brushed with wire brush, and cleaned again with compressed air. Holes shall be cleaned and sound and free of standing water or frost.

D. Holes shall be filled approximately half-way with two-component epoxy adhesive. Holes shall be filled from the rear of the hole slowly withdrawing the static mixing nozzle to avoid creating air pockets.

E. Adhesive dowels shall be pushed into the hole in existing concrete while turning it slightly to ensure positive distribution of adhesive. The anchor shall be confirmed to be fully seated at the bottom of the hole and some adhesive will flow from the top of the hole.

F. Two-component epoxy adhesive shall be allowed to cure for time specified by the adhesive manufacturer prior to applying any load.

G. Follow adhesive manufacturer recommendations for minimum placement temperature requirements.

– End of Section –

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered by this Section consists of furnishing all equipment and material and performing all labor for manufacturing, transporting, placing, finishing, and curing and facilitating concrete testing in the structures shown on the drawings as specified herein. Anchor Cover Concrete used for encapsulating recessed anchors on concrete structures is also covered by this section.

B. Materials Testing by OWNER'S Materials Testing Lab: Facilitate and assist the OWNER's Materials Testing Lab personnel in concrete sampling and testing for the duration of the project to perform concrete materials tests as specified below.

1.1 RELATED SECTIONS

Section 03 10 00 – Concrete Accessories
Section 03 11 00 – Concrete Forming
Section 03 20 00 – Concrete Reinforcing

1.2 REFERENCE STANDARDS

A. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field

B. ASTM C33 - Standard Specification for Concrete Aggregates

C. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens

D. ASTM C94 - Standard Specification for Ready-Mixed Concrete

E. ASTM C125 - Standard Terminology Relating to Concrete and Concrete Aggregates

F. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

G. ASTM C 138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

H. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete

I. ASTM C150 - Standard Specification for Portland Cement

J. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete

K. ASTM C172 - Standard Test Method for Sampling Freshly Mixed Concrete

L. ASTM C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

M. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete

N. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete

O. ASTM C566 - Standard Test Method for Total Moisture Content of Aggregate by Drying

P. ASTM C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete

Q. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete

R. ASTM D75 - Standard Practice for Sampling Aggregates

S. ASTM E11 - Standard Specification for Wire-Cloth Sieves for Testing Purposes

T. ASTM E329 - Standard Practice for Use in the Evaluation of Testing and Inspection Agencies as Used in Construction

U. ACI 117 -Standard Specifications Tolerances for Concrete Construction and Materials

V. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete

W. ACI 214 - Recommended Practice for Evaluation of Strength Test Results of Concrete

X. ACI 301 - Structural Concrete for Buildings

Y. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete

Z. ACI 304.2R - Placing Concrete by Pumping Methods AA.

AA. ACI 305R – Hot Weather Concreting

BB. ACI 306R - Cold Weather Concreting

CC. ACI 309 - Guide for Consolidation of Concrete

DD. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary

EE. ACI SP-2 - ACI Manual of Concrete Inspection

FF. CRD C119 - Flat and Elongated Particles in Coarse Aggregate

GG. NRMCA - Certification of Ready-Mixed Concrete Production Facilities

HH. CPMB - Concrete Plant Mixer Standards

II. TMMB - Truck Mixer and Agitator Standards

1.3 QUALITY ASSURANCE

A. Preconstruction Testing and Acceptance:

1. Concrete mix test and reporting requirements

a. Provide certificates of compliance for all concrete aggregates, cement, water, air-entraining and water-reducing admixtures, curing compounds, and all other proposed admixtures.

b. Provide 28-day compressive test results indicating the strength requirement specified below is met.

c. Test a minimum of 5 concrete cylinders and summarize compressive test results for the each of the Mixes A and B batched with one break at 3 days, one break at 7 days and 3 breaks at 28 days. Have available a 6th cylinder for each mix type for testing at greater than 28 days if necessary to estimate long term strength gain.

d. Prepare comprehensive submittal reporting on batch test results and basis for proposed Mixes A and B for Engineer's review and acceptance.

B. Construction Period Sampling and Testing by OWNER's Materials Testing Lab:

1. Provide sample of fine and coarse aggregates, and facilitate concrete sampling required by OWNER's Materials Testing Lab to confirm concrete is in compliance with Contract Documents. OWNER will provide an independent, industry qualified, concrete testing laboratory to perform strength tests and labor necessary for handling of sampling and testing of grout and concrete materials. Samples of aggregates will be obtained from the plant stockpiles or weigh batchers for acceptance. At the discretion of OWNER's Representative and/or the OWNER's Materials Testing Lab, facilitate sampling at various stages in the concrete production process and handling operations

2. Assist OWNER's Materials Testing Lab field personnel in obtaining samples. Concrete will be sampled in accordance with ASTM C172, compression test specimens will be made and cured in accordance with ASTM C31, and compression test specimens tested in accordance with ASTM C39. Slump and air content will be determined in accordance with ASTM C143, and ASTM C1064, respectively.

3. It is anticipated that the following concrete testing by the OWNER's Materials Testing Lab will include:

    a. Concrete will be sampled at the point of truck discharge, except that when it is conveyed from truck to forms by pumping, it will be sampled at the point of pump line discharge.

    b. For each concrete placement, samples for the determination of slump, air content and temperature will be taken at the beginning of placement and thereafter at a frequency of at least one sample for each 50 cubic yards or fraction thereof for each placement.

    c. Samples for strength test specimens will be taken at a frequency of at least one sample for each 50 cubic yards or fraction thereof for each placement.

    d. Whenever the measured air content falls outside the specified range, a check test will be made immediately on another portion of the same sample. In the event of a second failure, the batching plant operator shall be notified, and the operator shall take immediate corrective action. Samples will be taken from each succeeding load and tested until the air content falls within the specified range. Concrete for which the air content falls outside the specified range shall not be placed in the forms.

    e. Whenever the measured slump exceeds the specified maximum, a check test will be made on another portion of the same sample. In the event of a second failure, the batching plant operator shall be notified, and the operator shall take immediate corrective action. Samples will be taken from each succeeding load and tested until the slump falls below the maximum specified. Concrete for which the slump exceeds the maximum specified shall not be placed in the forms.

f. Concrete temperature shall be testing in accordance with ASTM C1064 immediately prior to discharge into forms. Any concrete outside the temperature ranges specified below shall not be placed in the forms.

4. Remove all excess or rejected concrete from the jobsite and dispose of properly at the CONTRACTOR'S expense.

1.4 EVALUATION AND ACCEPTANCE

A. Concrete: Test results of compressive strength specimens will be acceptable provided the averages of all sets of three consecutive test results equal or exceed the required specified 28-day compressive strength f'c = 5,000 psi and no individual test result (average of two cylinders) falls below the specified strength of f'c =5,000 psi by more than 500 pounds per square inch.

B. Construction Tolerances: Variation in alignment, grade, and dimensions of the structures from the established alignment, grade, and dimensions shown on the drawings shall be within the tolerances given in ACI 117.

C. Surface Requirements: The surface requirements for the classes of finish required by Section 03 11 00 – Concrete Forming shall be as shown in Table 03 30 00-1. Allowable irregularities are designated "abrupt" or "gradual" for purposes of providing for surface variations. Offsets resulting from displaced, misplaced or mismatched forms, or sheathing, or by loose knots in sheathing, or other similar form defects, or air bubbles shall be considered "abrupt" irregularities. Irregularities resulting from warping, out-of-plane or similar uniform variations from plane, or true curvature, shall be considered "gradual" irregularities. "Gradual" irregularities will be checked for compliance with prescribed limits with a 5-foot template, consisting of a straightedge for plane surfaces and a shaped template for curved or warped surfaces. In measuring irregularities, the straightedge or template may be placed anywhere on the surface in any direction, with the testing edge held parallel to the intended surface.

D. Appearance: Clean and/or treat surfaces that are to be permanently exposed, if stained or otherwise discolored, by a method that does not harm the concrete and that is acceptable to OWNER'S Representative.

Table 03 30 00-1 Allowable Surface Variations

ALLOWABLE SURFACE IRREGULARITIES		
Finish	**Abrupt, Inches**	**Gradual, Inches**
F_1	1	1
F_2	1/4	1/2
F_3	1/8	1/4
F_4	1/8	1/4

1.5 SUBMITTALS

A. Mix Design Test Reports and Certificates of Compliance: Prior to placement of any concrete CONTRACTOR shall submit the following:

1. Concrete mix design for each of the gradations listed below.
2. Provide certificates of compliance for all concrete aggregates, cement, water, air-entraining and water-reducing admixtures, curing compounds, and all other proposed admixtures
3. Provide test results for batches tested for Mixes A and B. Indicate selected mix proportions proposed for construction.
4. Provide plots showing compressive test gain based on 3, 7 and 28 day breaks.
5. No concrete shall be placed until concrete mixes have been approved by OWNER's Representative.
6. Cement: Provide mill test reports that shows proposed cementitious materials meet the requirements of the specification under which it is furnished. Certification and mill test reports shall identify the particular lot furnished.
7. Concrete Mixture Proportions: Provide proportions of all ingredients and nominal maximum coarse aggregate size. Indicate weight of cementitious material, water, of aggregates in a saturated surface-dry condition, and admixtures..
8. Supporting Test Data: Provide test reports from a laboratory complying with ASTM E329 showing that the concrete mix proportions will produce concrete of the qualities indicated.
9. Admixtures: Provide manufacturer's written procedures for admixture proportions and batch sequencing.

B. Concrete Placement Plans and Procedures: Provide submittal covering all aspects of concrete placement plans and procedures including the following.

1. Placing equipment and methods.
2. Consolidation: Mechanical vibration equipment and methods
3. Joint Cleanup: Present proposed method and equipment for joint cleanup, as well as the method of waste disposal for any method proposed for joint cleanup.
4. Curing material, methods and procedures.
5. Cold-Weather Placement Procedures: If concrete is proposed to be placed under cold-weather conditions provide placement procedures including proposed materials, methods, and protection measures in accordance with the requirements of this Section.

C. Lift Drawings: Provide lift drawings three weeks or more before placement of the respective lift. Show details of the lift, including dimensions, elevations, waterstops, embedded items and finish.

D. Batch Tickets: Submit a delivery ticket from the concrete supplier with each batch delivered to the site. Include the following information:

1. Name of Supplier;
2. Name of batching plant and location;
3. Serial number of ticket;
4. Date;
5. Truck number and batch number;
6. Specific job designation (Contract number and location);
7. Volume of concrete (cubic yard);
8. Amount of water in aggregate (above or below SSD conditions) at time of delivery;
9. Time loaded and amount of water added at plant;
10. Maximum permissible amount of water to be added at the site, if any;
11. Allowable slump;
12. Allowable air content;
13. Type and brand of cement;
14. Weight of cement;

15. Maximum size of aggregates;
16. Weights of coarse and fine aggregates, respectively;
17. Type and amount of admixtures, including fly ash;
18. Mix design designation; and
19. Time at which concrete was placed in forms.

1.6 MATERIALS DELIVERY, STORAGE, AND HANDLING

A. Transportation of Cement:

1. Transport bulk cement from the mill or intermediate storage to the batching plant in separate, adequately designed weather tight trucks that will protect the material completely from exposure to moisture.
2. The temperature of the cement as delivered to storage at the batching plant shall not exceed 150°F.

B. Storage of Cement: Immediately upon receipt at the batching plant, store cement in dry, weather tight, and properly ventilated separate structures. All storage facilities shall be subject to acceptance by OWNER and shall permit easy access for inspection and identification. Sufficient cement shall be in storage at all times to permit continuous placement and to complete any lift of concrete started.

C. Aggregates: Arrange and use aggregate stockpiles in a manner to avoid excessive segregation and to prevent contamination with other materials or with other sizes of aggregate. CONTRACTOR shall provide adequate shelter for aggregate if exposure to the environment and difficulty in maintaining aggregate moisture content control is anticipated. Coarse aggregate shall be stored in separated size groups. Sufficient fine and coarse aggregate shall be maintained at the batching plant at all times to permit continuous placement and completion of any lift of concrete started.

D. Admixtures: Maintain sufficient volumes of air-entraining, water-reducing, and all other admixtures, at the batching plant at all times to permit continuous placement and completion of any lift of concrete started. Admixtures shall be stored, mixed and dispensed in accordance with the manufacturer's instructions and recommendations.

PART 2 – PRODUCTS

2.0 MIX DESIGN

A. CONTRACTOR-Furnished Mix Design

1. Provide mix designs conforming to ACI 211.1, ACI 301, ACI 318 and ACI 304.2R, except as otherwise specified, and to parameters given herein.
2. Mix A: Normal Structural Concrete (1 ½-inch aggregate), uses include thrust block, generator pad and misc. concrete. Table 03 30 00-2.
3. Mix B: Normal Structural Concrete (3/4-inch aggregate), uses include all concrete in the powerhouse. Table 03 30 00-3.

B. Required Average Strength of Mix Design:

1. The selected Mix design shall produce an average compressive strength exceeding the specified strength by no less than 15 percent based on laboratory trial mixtures.

Table 03 30 00-2 Mix A (Class I) Requirements

Minimum 28-day compressive strength, f'c	4000 psi
Slump at placement	3 to 4 inches
Slump for walls and other locations approved by OWNER's Representative	4 to 7 inches
Maximum Water-Cement Ratio (by weight)	0.55
Air Content at placement	4 to 5 percent
Suggested Minimum Cementitious Material Content	550 lb/cy

Table 03 30 00-3. Mix B (Class II) Requirements

Minimum 28-day compressive strength, f'c	5000 psi
Slump at placement	3 to 4 inches
Slump for walls and other locations approved by OWNER's Representative	4 to 7 inches
Maximum Water-Cement Ratio (by weight)	0.45
Air Content at placement	5 to 7 percent
Suggested Minimum Cementitious Material Content	500 lb/cy

2.1 MATERIALS FOR CONCRETE

A. Cement:

1. ASTM C150, Type II low alkali with maximum heat of hydration of 70 calories per gram at 7 days.

B. Pozzolan:

1. ASTM C618, Class F, except that the maximum allowable loss on ignition shall be 3 percent. Pozzolan shall be from a single source.

C. Water:

1. Water for mixing and curing shall conform to ASTM C1602.

D. Aggregates:

1. Fine Aggregates: ASTM C33

2. Coarse Aggregates: ASTM C33 Class Designation 4S

3. Reactivity of Selected Aggregates

a. Aggregates shall conform to ASTM C33, except as modified herein. Furnish coarse aggregates and fine aggregates from single sources. Aggregates shall not contain any substance that may be deleteriously reactive with the alkalis in the cementitious materials unless effective mitigating measures are taken to control reactivity.

b. Aggregates shall show expansions less than 0.10 percent at sixteen (16) days when tested in accordance with ASTM C1260 using a cementitious materials with an alkali content above 0.8 percent (expressed as sodium oxide), and shall not possess properties or constituents that are known to have specific unfavorable effects in concrete when tested in accordance with ASTM C295.

c. If mitigating measures are used to control reactivity, submit satisfactory test results from ASTM C1260 as modified below. Satisfactory results shall have a measured expansion of no more than 0.08 percent at 16 days. Should the test data indicate an expansion of more than 0.08 percent, the relative proportions of pozzolan shall be increased and the aggregate retested or a new aggregate source with acceptable expansion shall be submitted.

d. ASTM C1260 shall be modified to utilize the CONTRACTOR's proposed low alkali Portland cementitious materials and pozzolan in combination for the test proportioning. The laboratory shall use the CONTRACTOR's proposed percentage of cementitious materials and pozzolan.

E. Admixtures:

1. Admixtures, if used, shall conform to the following requirements:

a. All admixtures shall be provided by the same supplier.

b. Air-Entraining admixture shall conform to ASTM C260.

2. Water Reducing – Water reducing admixtures shall conform to ASTM C494, Types A or D. The dosage of water-reducing admixtures shall be in the upper portion of the range recommended by the supplier.

3. Plasticizing admixture – ASTM C1017, Type I or II

F. Materials for Curing Concrete:

1. Impervious Sheeting – ASTM C171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

2. Liquid Membrane-Forming Compound – ASTM C309, resin base with fugitive dye, Type 2, Class B. No liquid membrane is to be used where monolithic behavior is required, such as at the dam horizontal joints.

G. Epoxy Resin:

1. Epoxy resin for use in repairs shall conform to ASTM C881/C881M, Type III, Grade I or II.

H. Miscellaneous Materials:

1. Embedded Items: Confirm that all embedded items are as indicated on the drawings or required are included in the placement area prior to concrete placement. Voids in sleeves, inserts, and anchors slots shall be filled temporarily with readily removable materials to prevent the entry of concrete into the voids.

2. Embedded Metals: Place embedded miscellaneous metal accurately and such that they are securely held in correct position while the concrete is placed. The surfaces of metalwork in contact with or embedded in concrete shall be thoroughly cleaned of all rust, dirt, grease, loose scale, grout, mortar, and other foreign matter. All metalwork shall have proper fit and shall be job measured where necessary.

2.2 CONCRETE MIXTURE PROPORTIONING

A. Quality of Mixture: For each portion of the structure, select mixture proportions so that the strength and W/C requirements listed herein are met.

B. Nominal Maximum-Size Coarse Aggregate

1. Mix A: Nominal maximum-size coarse aggregate shall be 1 ½ inches and shall consist of a combination of ASTM C33 Size Number 4 and Size Number 67 coarse aggregates. The quantity of Size Number 4 by weight of total coarse aggregate shall not be less than 40 percent.

2. Mix B: Nominal maximum size coarse aggregate shall be ¾ inches and shall consist of ASTM C33 Size Number 67.

C. Air Content: Air content as delivered to the forms and as determined by ASTM C231 as indicated herein.

D. Slump: Determine in accordance with ASTM C143/C143M and as indicated herein. Where placement by pump is used, the slump shall not exceed 7 inches. Note: Segregation of aggregates may occur at slumps in excess of 7 inches, continual monitoring is required.

E. All concrete shall contain water reducing admixture.

2.3 REPAIR CONCRETE

A. For repair of concrete, use materials specified in the repair procedures detailed in the USBR Guide to Concrete Repair and USBR M47.

B. The repair concrete shall not have a maximum aggregate size larger than the surrounding concrete.

C. The repair concrete strength shall exceed the strength of the surrounding concrete.

2.4 ANCHOR COVER CONCRETE

A. Cement Anchor Grout: Masterflow 928 T Grout (http://www.basf-cc.com)

B. 3/8" Coarse Aggregate: Maximum aggregate size 3/8", washed clean of fines, meeting ASTM C 33, Grading Size No. 8.

C. Water: Clean, clear, and not containing substances that cause discoloration or odor. Mix Proportions: One 55 lb bag cement anchor grout mixed with 25 lb. of course aggregate (dry weight). Water mix quantity according to cement anchor grout Manufacturer's recommendation to required strength gain and workability.

D. Required Strength Gain: 3,000 psi in 24 hours.

PART 3 – EXECUTION

3.0 DELIVERY, STORAGE, AND HANDLING

A. Furnish "Pre-placement Checkout Form" per ACI SP2 to OWNER'S Representative confirming that forms, reinforcement, embedded items, construction joints are prepared, and downstream chamfers are in place and ready for concrete placement prior to concrete delivery.

B. Refer to ACI 301 for job site storage of materials. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed.

3.1 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

A. General: Conform to the requirements of ACI 301, ACI 302.1R, ACI 304.2R, and ASTM C94 except as modified herein. The batching plant shall be fully automatic and computer controlled.

B. Measuring:

1. Make measurements at intervals as specified in paragraphs entitled "Sampling" and "Testing."

C. Mixing:

1. Concrete Temperature Control for Hot-Weather Mass Concrete Placements: Pre-cool concrete to a maximum temperature of 65 degrees Fahrenheit at placement when measured in accordance with ASTM C1064. Provide effective means such as pre-cooling aggregates; refrigerating the mixing water; adding to the mix water chip, crushed, tube, or other forms of ice up to the full amount of the added mixing water; or a combination of these or other approved methods, as necessary to maintain the temperature of the concrete less than the specified maximum placing temperature.

2. Concrete Temperature Control for Cold-Weather Mass Concrete:

a. Cold-Weather Placing: Concrete shall not be placed without a procedure approved in accordance with Item 1.07.B.7 when the concrete is likely to be subjected to freezing temperatures before the expiration of the curing period. The ambient temperature of the space adjacent to the concrete placement and surfaces to receive concrete shall be maintained at not less than 40°F. The placing temperature of the concrete having a minimum dimension less than 12 inches shall be between 60°F and 75°F. The placing temperature of the concrete having a minimum dimension greater than 12 inches shall be between 50°F and 65°F.

b. Heating of the mixing water or aggregates will be required to regulate the concrete placing temperatures. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing. CONTRACTOR shall be

responsible for all costs associated with cold-weather placement.

c. Conform to the requirements of ASTM C94 and ACI 301. Machine Mix Concrete.

d. Reduce mixing time and place concrete within 60 minutes if the air temperature is greater than 85 degrees Fahrenheit except as follows: If set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes.

e. Additional water may be added on arrival of the truck at the placement, prior to the start of discharge to adjust the slump within the specified range provided that the maximum water/cementitious materials ratio is not exceeded. Obtain approval of OWNER'S Representative or his representative prior to adding water to truck. The amount of added water shall be recorded. When additional water is added, an additional 30 revolutions of the mixer at mixing speed is required. Concrete test cylinders shall be taken after any additional water is added. Concrete test cylinders taken prior to adding water shall be discarded.

f. Add a sufficient quantity of admixture to bring the entrained air content within the specified limits if the entrained air content falls below the specified limit. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch.

g. Concrete admixtures shall be added to the concrete mix at the time of batching the concrete or in accordance with the supplier's written procedure and as reviewed by the OWNER'S Representative.

3. Transporting:

a. Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete, which has segregated in transporting and dispose of in accordance with the SPCC plan.

b. CONTRACTOR shall dispose of material cleaned from transporting equipment in accordance with approved ESCP

and SPCC plan from Section 01 57 10 – Stormwater Pollution Prevention.

3.2 WATERSTOPS, INSTALLATION, AND SPLICES

A. Install in accordance with Section 03 10 00 – Concrete Accessories.

3.3 PREPARATION FOR PLACING

A. Construction joint treatment and existing concrete surface cleaning shall conform to the following requirements:

1. Preparation: Concrete surfaces to which additional concrete is to be bonded shall be prepared by cleaning with high-pressure water-blasting or other approved method. Resulting surfaces shall be free from all laitance and inferior concrete so that clean, well-bonded coarse aggregate is exposed uniformly throughout the lift surface. The edges of the coarse aggregate shall not be undercut. Above water surfaces shall be washed clean again as the last operation prior to placing the next lift. There shall be no standing water on the surface upon which concrete is placed. Remove silt, debris and fines from submerged joints immediately prior to placing concrete.

2. High-Pressure Water Jet: A stream of water under a pressure of not less than 6,000 psi may be used for cleaning. Its use shall be delayed until the concrete is sufficiently hard so that only the surface skin or mortar is removed and there is no undercutting of coarse aggregate particles. If the water jet is incapable of a satisfactory cleaning, the water pressure shall be increased until the surface is cleaned to the District's satisfaction. Do not green cut with an air-water mixture.

3. Waste Disposal: The method used in disposing of waste water employed in cleaning, washing, and rinsing of concrete surfaces shall be such that the waste water does not stain, discolor or affect exposed surfaces of the structures, or damage the environment of the project area. The method of disposal shall be subject to approval.

3.4 FIELD QUALITY CONTROL

A. Facilitate OWNER's Materials Testing Lab in performance of on-site and off-site concrete testing. Provide access to WORK areas and any on-site laboratory facilities for OWNER's laboratory technicians to accomplish testing activities. Provide samples for testing purposes, assist in obtaining samples and review test reports.

B. Concrete Testing by OWNER's Materials Testing Lab:

1. Fresh concrete sampling per ASTM C 172, except as modified for slump to comply with ASTM C 94.

2. Concrete slump tests per ASTM C 143, air content tests per ASTM C 231, unit weight tests per ASTM C 138 as follows:

    a. One test at the start of concrete placement and one test for each 50 cubic yards of concrete at point of discharge.

    b. One test for each set of compressive strength test specimens.

3. Concrete temperature: Tested hourly when air temperature is 40 F and below, and when 80 F and above; and each time a set of compression test specimens is made.

4. Compression Tests: Facilitate sampling of concrete by OWNER's Materials Testing Lab. Testing will include:

    a. A minimum of six cylinders per sample of concrete with a specified compressive strength at 28 days and a minimum of eight cylinders per sample of concrete with a specified compressive strength of 90 days will be made and cured in accordance with ASTM C31. The number of concrete samples to be taken will be the minimum required by any one of the following criteria.

        i. One sample per each 100 cubic yards of each concrete mix placed.
        ii. One sample for each day of placement of each concrete mix placed.

    b. Samples will be taken randomly. Results will be identified with respect to location.

    c. Concrete cylinder compression testing for concrete with a specified compressive strength at 28 days will follow ASTM C 31 for curing and ASTM C 39 for testing. For each sample, the following tests will be performed: 2 cylinders at 7 days and 2 cylinders at 28 days. A test result shall be the average of 2 cylinder breaks. The 2 other cylinders shall be held.

    d. Provide safe storage location and protect concrete cylinders left by the OWNER's Materials Testing Lab for field curing.

    e. OWNER's Materials Testing Lab will evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete when the strength of field-

cured cylinders is less than 85% of companion laboratory-cured cylinders.

f. Review of Concrete Test Reports: The OWNER's Materials Testing Lab will submit concrete test reports to the ENGINEER and CONTRACTOR for review. Reports of compressive strength tests will contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in the structure, design compressive strength at 28 days, concrete mix proportions and materials compressive breaking strength, and type of break for both 7-day tests and 28-day tests.

g. Review concrete test reports and, in consultation with the OWNER's Representative, immediately make necessary modifications to concrete materials and/or production procedures if deficiencies are found in concrete test results.

h. Additional Tests.

i. OWNER's Materials Testing Lab may make additional tests of in- place concrete when test results indicate that the specified concrete strengths and other characteristics have not been attained in the structure.

ii. OWNER's Materials Testing Lab may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42.

i. The costs of such tests conducted, and of any other additional testing required when the presence of unacceptable concrete is verified, shall be borne by the CONTRACTOR, at no extra cost to the OWNER.

3.5 PLACING CONCRETE

A. General: Place concrete as soon as practical after approval for placement by OWNER'S Representative. Confirm the placement area to be placed is clean and all dirt, construction debris, organic deposits, water, snow and ice is removed.

B. Conveying from Delivery Point to Forms:

1. Buckets:

a. Bottom-dump buckets that have a capacity of 2 cubic yards or less shall conform to the following requirements:

i. The interior hopper slope shall be not less than 60º from the horizontal, the minimum dimension of the clear gate opening shall be at least 5 times the nominal maximum size aggregate and the area of the gate opening shall be not less than 2 square ft.

ii. The maximum dimension shall not be greater than twice the minimum dimension.

iii. The bucket-gates shall be grout-tight when closed and may be manually, pneumatically or hydraulically operated.

iv. The design of the bucket shall provide means for positive regulation of the amount and rate of discharge of concrete in each dumping position.

b. Bottom-dump buckets, which have a capacity exceeding 2 cubic yards, shall conform to the following requirements:

i. The area of the clear gate opening or gate throat opening shall be not less than one-third the maximum interior horizontal area, and the interior hopper slope shall be not less than 70º from the horizontal.

ii. The minimum dimension of the clear gate opening shall be at least five times the nominal maximum size aggregate.

iii. The bucket gates shall be essentially grout-tight when closed, shall be of the double clamshell type, and shall be pneumatically or hydraulically operated.

iv. The gate opening mechanism shall be designed to close the gates automatically when the control is released or when the air or hydraulic line is broken.

v. If gate actuation is dependent on integral air or hydraulic reservoirs, capacity of the reservoirs shall be sufficient to open and close the gates three times without recharging the reservoir.

2. Chutes: When concrete can be placed directly from a truck mixer or agitator, the chutes attached to this equipment may be used. Separate chutes and other similar equipment will not be permitted for conveying concrete except when specifically accepted by OWNER'S Representative.

3. Belt Conveyors: Belt conveyors may be used when accepted by OWNER'S Representative. Such conveyors shall be designed and operated to assure a uniform flow of concrete from the transporting

unit to final place of deposit without segregation of ingredients or loss of mortar and shall be provided with positive means for preventing segregation of the concrete at the transfer points and the point of discharge.

4. Pump Placement:

   a. Concrete Mixes A and B may be conveyed by positive displacement pump when accepted by OWNER'S Representative. The pumping equipment shall be piston or squeeze pressure type. The pipeline shall be rigid steel pipe or heavy-duty flexible hose. Aluminum alloy pipe shall not be used. The inside diameter of the pipe shall be at least three times the nominal maximum size coarse aggregate in the concrete mixture to be pumped.

   b. The maximum size coarse aggregate will not be reduced to accommodate the pumps. The distance to be pumped shall not exceed limits recommended by the pump supplier. The concrete shall be supplied to the concrete pump continuously. When pumping is completed, concrete remaining in the pipeline shall be ejected without contamination of concrete in place. After each operation, equipment shall be thoroughly cleaned, and flushing water shall be wasted outside the forms. Flushing water shall not be discharged directly into the river. Water shall be discharged to areas specifically designated for this purpose.

C. Concrete Placement:

1. Concrete delivered to the WORK shall conform to ASTM C94.

2. Transporting and placing concrete shall follow standard practices contained in ACI 304.

3. The slump of concrete shall be as indicated herein. Concrete exceeding the maximum slump may be rejected by the OWNER'S Representative. Concrete rejected for excessive slump shall be immediately disposed of in accordance with the SPCC plan. Concrete having less than the minimum slump may be adjusted in accordance with paragraph 3.02 C, and can be placed and vibrated as long as placement requirements are met.

4. Place concrete Mixes A and B by bucket, drop chute, conveyor, pump or combination thereof. Equipment for placing concrete shall be

capable of handling the specified mass concrete mixture at the specified slump without modification of the mixture.

5. Concrete placement shall be in or close to its final position; segregation due to re- handling or flowing shall be avoided.

6. Perform placement of concrete in horizontal layers, not to exceed 20 inches thickness, in a continuous operation until each section or panel is complete. Each layer shall be thoroughly vibrated before placing the succeeding layer. Top surface shall be generally level during placement.

7. Maximum Lift Height: As submitted and approved for other features.

8. Maximum layer thickness: Individual layers shall not exceed approximately 18 to 20 inches in depth unless otherwise indicated on the plans. Layer heights shall be limited in height so that successive layers will be placed quickly enough that vibrators will penetrate lower layer(s) to effectively mix and bond layers within the lifts before initial set. Lift heights and layouts shown on the plans are advisory and may be altered subject to approval of the OWNER'S Representative. Utilize a method of placement that includes confirmation, by continuous inspection, of concrete set as the placement progresses. Identify maximum height of fluid concrete that should be present at any time during a concrete placement to maintain bulkhead and form stability. Adjust concrete mix design and rate of placement to achieve this requirement.

9. Placing of concrete shall be regulated so that the pressure caused by the wet concrete shall not exceed that used in the design of the forms.

10. Concrete shall not be allowed to free fall a distance of more than 3 feet, and shall not be deposited as a large quantity at any point. For consolidation of concrete it is necessary to vibrate throughout and along the formwork. Forms shall be designed for the added pressure.

11. Concrete on Rock Foundations or Existing Concrete Surfaces: Surfaces upon which concrete is to be placed shall be clean, free from oil, standing or running water, ice, mud, algae, drummy rock (or concrete), coatings, debris, and loose, semi-detached or unsound fragments. Faults or seams shall be cleaned to a depth satisfactory to ENGINEER and to firm rock/concrete on the sides. Immediately before concrete is placed, all rock/concrete surfaces shall be cleaned

thoroughly by the use of air-water jets, wet sandblasting, high-pressure water jet or other approved methods.

12. All rock/concrete surfaces shall be kept continuously wet for at least 24 hours and allowed to surface dry immediately prior to placing concrete thereon. The first layer of concrete to be placed on a rock foundation shall be thoroughly worked into all irregularities in the surface.

13. Concrete shall be thoroughly worked around reinforcement and embedded items and into corners of forms and existing concrete by effective vibration. Vibrators shall penetrate each layer and into the top of the underlying layer . In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs.

14. CONTRACTOR shall note that the two principal indicators of well consolidated concrete are:

    a. Embedment of large aggregates which requires general batch levelling, blending of the branch perimeter with concrete previously placed, a thin film of mortar on the top surface, and cementitious materials paste showing at the perimeter of the concrete and forms.

    b. General cessation in escape of large entrapped air bubbles at the top surface. Time of vibration required depends upon the thickness of the layer.

15. Securely anchor embedded items and restrain them from flotation or movement during placement of concrete. Concrete shall be placed at a rate to prohibit movement of embedded parts.

16. Concrete shall not be placed into or under water. Flowing water shall be diverted away or controlled in a manner approved by the OWNER'S Representative.

D. Vibration for Concrete:

1. Conform to the requirements of ACI 301. Furnish no less than two (2) spare vibrators on the job site whenever concrete is placed. Consolidate concrete with high frequency, immersion, mechanical vibrating equipment supplemented by hand spading and tamping. Operate vibrators with vibratory element submerged in the concrete, with a minimum frequency of not less than 8,000 vibrations per minute when submerged with a head diameter of 2 ½ inches. Concrete shall be consolidated by vibration to the maximum

practicable density, so that it is free from pockets of coarse aggregate and confined air, and closes snugly against existing concrete and surfaces of forms and embedded materials. In consolidating each layer, the vibrator shall be operated at regular and closely spaced intervals and in a near vertical position.

E. Cold Weather for Concrete:

1. Conform to the requirements of ACI 306.1.

2. Do not allow fresh concrete temperature to decrease below 50 degrees Fahrenheit. Obtain approval prior to placing concrete when the ambient temperature is below 40 degrees Fahrenheit or when concrete is likely to be subjected to freezing temperatures within 24 hours. Have insulating materials and heaters on hand for immediate protection of fresh concrete.

3. Insulate concrete and provide sufficient heat to maintain 50 degrees Fahrenheit minimum ambient air temperature adjacent to both the formwork (except formwork that also is a water retaining bulkhead) and the structure while curing. Limit the rate of concrete surface cooling to five (5) degrees Fahrenheit in any one (1) hour and 20 degrees Fahrenheit per 24 hours after forms or insulation is removed.

4. Use no frozen materials or materials containing ice in concrete.

5. Do not use salt or other chemicals to prevent freezing.

F. Hot Weather:

1. Conform to the requirements of ACI 305R. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage.

2. Steel forms and reinforcement shall be cooled prior to concrete placement when steel temperatures are greater than 120 degrees Fahrenheit.

3. Prior to placing concrete have ready water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete for mass concrete or when weather conditions prevent the use of either

liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.6 SURFACE FINISHES

A. General: Finishes shall be in accordance with ACI 301 unless otherwise noted.

B. Formed Surfaces: Provide chamfers and "V" groves at corners and construction joints.

C. Non-formed surfaces (flatwork): broomed finish as shown.

3.7 FINISHING UNFORMED SURFACES

A. General: The ambient temperature of spaces adjacent to surfaces being finished shall be not less than 50°F. All unformed surfaces that are not to be covered by additional concrete or backfill shall be finished to the elevations shown on the drawings. Surfaces to receive additional concrete or backfill shall be brought to the elevations shown on the drawings and left true and regular. Exterior surfaces shall be sloped for drainage unless otherwise shown on the drawing or as directed. Joints shall be carefully made with a jointing tool. The finished surfaces shall be protected from stains or abrasions. Surfaces or edges likely to be damaged during the construction period shall be protected from damage. Tolerance for a screeded finish shall be true planes within 1/4-inch in 2 ft as determined by a 2-ft straightedge placed anywhere on the slab in any direction. Tolerance for a floated finish shall be true planes within 1/4-inch in 10 ft as determined by a 10-ft straightedge placed anywhere on the slab in any direction. Tolerance for a troweled finish shall be true planes within 1/8-inch in 10 ft as determined by 10-ft straightedge placed anywhere on the slab in any direction.

B. Finish U1 - Float Finish: All unformed surfaces of concrete that are not to be covered by additional concrete or backfill shall have a float finish unless a steel-trowel finish is specified. Surfaces shall be screeded and darbied or bullfloated to bring the surface to the required finish level with no coarse aggregate visible. No cementitious materials or water shall be added to the surface during the finishing operation. The concrete, while still green but sufficiently hardened to bear a man's weight without deep imprint, shall be floated to a true and even plane. Floating may be performed by use of hand- or power-driven equipment. Hand floats shall be of aluminum or magnesium.

C. Finish U2 - Trowel Finish: A steel trowel finish shall be applied to various surfaces as indicated on the drawings. Concrete surfaces shall be finished with a float finish and after surface moisture has disappeared, the surface shall be steel-troweled to a smooth, even, dense finish free from blemishes including trowel marks.

D. Finish U3 - Broom Finish: A broom finish shall be applied to various exterior unformed surfaces as indicated on the drawings. Concrete surfaces shall be finished to the requirements of Finish U2 and then prior to hardening of the surface shall be brushed with bristle push broom to lightly score the surface to product a uniform non-slip surface. Broom finish for sloped surfaces shall be across the slope to improve surface traction.

3.8 FINISHING FORMED SURFACES

A. General: Surfaces, unless other type of finish is specified, shall be smooth rubbed and/or grout cleaned except defective surfaces shall be repaired in accordance with Item 3.06.

B. Rubbed Finishes: Where smooth rubbed finish is to be applied, the forms shall have been removed and necessary patching completed as soon after placement as possible without jeopardizing the structure. Formed surfaces shall be given a rubbed finish where indicated on the drawings.

1. Smooth Rubbed Finish: Smooth rubbed finish shall be produced on newly hardened concrete no later than the day following form removal. Surfaces shall be wetted and rubbed with carborundum brick or other abrasives until uniform color and texture are produced. No cementitious materials grout shall be used other than the cementitious materials paste drawn from the concrete itself by the rubbing process.

2. Grout Cleaned Finish:

a. No cleaning operations shall be undertaken until all contiguous surfaces to be cleaned are completed and accessible. Cleaning as the WORK progresses shall not be permitted. A grout having the consistency of thick paint shall be produced by mixing 1 part Portland cementitious materials and 12 parts fine sand with sufficient water. White Portland cementitious materials shall be substituted for a part of the gray Portland cementitious materials in order to produce a color matching the color of the surrounding concrete, as determined by a trial patch. The surface of the concrete shall be wetted sufficiently to prevent absorption of water from the

grout and the grout applied uniformly with brushes or a spray gun. Immediately after the grout is applied, the surface shall be scrubbed vigorously with a cork float or stone to coat the surface and fill all air bubbles and holes. While the grout is still plastic, all excess grout shall be removed by working the surface with a rubber float, sack, or other means.

b. After the surface whitens from drying (about 30 minutes at normal temperatures), it shall be rubbed vigorously with clean burlap. The finish shall be kept damp for at least 36 hours after final rubbing.

3.9 CURING AND PROTECTION

A. General: Conform to the requirements of ACI 301 unless otherwise specified.

B. Curing: As per ACI 301 begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cementitious materials and hardening of the concrete. The materials and methods of curing shall be subject to approval by the OWNER'S Representative. Concrete shall be cured for a period not less than 7 consecutive days by impervious sheeting or liquid membrane-forming curing compound to prevent moisture loss, unless covered with fresh concrete. Liquid membrane-forming curing compound is never to be used on construction joints.

C. Impervious Sheeting: Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with Impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider that the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing. Sheeting and sheeting supports must withstand local weather conditions.

D. Liquid Membrane-Forming Curing Compound: Seal or cover joint openings prior to application of curing compound. Prevent curing compound from entering the joint. Apply in accordance with the recommendations of the supplier immediately after any water sheen, which may develop after

finishing has disappeared from the concrete surface. Provide and maintain compound on the concrete surface throughout the curing period.

E. Application: Unless the supplier recommends otherwise, apply compound immediately after the surface loses its water sheen and has a dull appearance, on formed surfaces only. Mechanically agitate curing compound thoroughly during use. Use reviewed power-spraying equipment to uniformly apply two coats of compound in a continuous operation. The total coverage for the two coats shall be 200 square feet maximum per gallon of undiluted compound unless otherwise recommended by the supplier's written instructions.

F. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel. Immediately apply an additional coat of compound to areas where the film is defective. Re-spray concrete surfaces subjected to rainfall within three (3) hours after the curing compound application.

G. Protection of Treated Surfaces: Prohibit pedestrian traffic and other sources of abrasion for at least 72 hours after compound application. Maintain continuity of the coating for the entire curing period and immediately repair any damage.

H. Cold-Weather Curing and Protection: When the daily outdoor low temperature is less than 32 degrees Fahrenheit, the temperature of the concrete shall be maintained above 40 degrees Fahrenheit for mass concrete, above 50 degrees Fahrenheit for structural concrete, by heating, insulation or both, for the first seven (7) days after placing. In addition, during the period of protection removal, the air temperature adjacent to the concrete surfaces shall be controlled so that concrete near the surface will not be subjected to a temperature differential of more than 35 degrees Fahrenheit as determined by observation of ambient and concrete temperatures indicated by thermocouples furnished by the CONTRACTOR as required and installed adjacent to the concrete surface and 2 inches inside the surface of the concrete. The installation of the thermometers shall be made by the CONTRACTOR such locations as may be directed.

3.10 PREPARATION OF REPAIR CONCRETE

A. For repair of concrete, prepare the area according to the procedures detailed in the USBR Guide to Concrete Repair and USBR M47. The repair concrete must be as strong as the surrounding concrete.

3.11 CONSTRUCTION TOLERANCES

A. Except as specified otherwise, a plus tolerance increases and a minus tolerance decreases the dimension to which it applies. A tolerance without sign means plus or minus. Where only one sign is specified, there is no limit in the other direction. Tolerances are not cumulative. The most restrictive tolerance will control.

1. Level and grade tolerance measurements of slabs shall be made as soon as possible after finishing. When forms or shoring are used, the measurements shall be made prior to removal.

2. Construction tolerances shall meet the requirements of ACI 117.

3.12 CONSTRUCTION TOLERANCES

A. Mix anchor cement grout and 3/8" coarse aggregate by mechanical means according to the anchor cement grout manufacturer's recommendations to achieve required strength gain and workability. Provide mix with flowability of 5 drops in 3 seconds per ASTM C230.

B. Place anchor cover concrete over top of anchor to achieve full encapsulation. Manually vibrate to eliminate any air pockets. Finish level with surrounding concrete to create a level surface.

– End of Section –

SECTION 03 34 00

CONTROLLED LOW STRENGTH MATERIAL

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The CONTRACTOR shall perform all controlled low strength material (CLSM) installation indicated and required for construction of the WORK, complete and in place, in accordance with the Contract Documents.

1.1 CONTRACTOR SUBMITTALS

A. The CONTRACTOR shall provide submittals in accordance with the requirements in Section 01 33 00 – Contractor Submittals.

B. Material submittal: Submit proposed mix design to the OWNER'S Representative for review and acceptance prior to commencement of WORK.

C. Delivery Tickets: Furnish copies of delivery tickets for each load of CLSM delivered to the site. Provide items of information to the OWNER's Representative as specified by ASTM C94.

1.2 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 03 30 00 – Cast-in-Place Concrete

1.3 REFERENCES

A. Oregon Department of Transportation (ODOT) (2018), Standard Specifications for Construction Section 00442

B. ASTM C33 - Standard Specification for Aggregates

C. ASTM C94 - Standard Specification for Ready-Mixed Concrete

D. ASTM C150 - Standard Specifications for Portland Cement

E. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

F. ASTM C494 - Standard Specification for Chemical Admixture for Concrete

G. ASTM C618-12 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for use in Concrete

H. ASTM C940-22 - Standard Specification for Expansion and Bleeding of Freshly Mixed Grouts for Preplaced – Aggregate Concrete in the Laboratory

I. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength (CLSM) Test Cylinders

J. ASTM D5084 - Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

K. ASTM D5971 - Sampling Freshly Mixed Controlled Low Strength Material

L. ASTM D6023-16 - Unit Weight, Yield, Cement Content and Air Content (Gravimetric) of Controlled Low Strength Material

M. ASTM D6103 - Flow Consistency of Controlled Low Strength Material

PART 2 – PRODUCTS

2.0 CONTROLLED LOW STRENGTH MATERIAL

A. Controlled low strength material shall be a mixture of Portland cement, fly ash, aggregates, water and admixtures proportioned to provide a non-segregating and excavatable material which will result in a hardened, dense, non-settling fill that is self-consolidating and free flowing. Aggregate gradation shall be commercial quality concrete sand selected by the CONTRACTOR to achieve the above.

B. Materials for controlled low strength material shall conform to the applicable requirements of Section 03 30 00 – Cast-in-Place Concrete. Measuring, mixing, delivery and placing shall conform to ASTM C94.

C. Controlled low strength material shall conform to the following proportions and requirements:

Compressive Strength, psi	100-300
Cement, pounds per cubic yard	50
Fly Ash, pounds per cubic yards	200-400
Water, gallons per cubic yard	50
Aggregate, pounds per cubic yards[1]	3200
Slump, inches	6-8

[1] Aggregate weight is based on a specific gravity of 2.67. Adjust the aggregate proportion for the specific gravity of the aggregate used.

If air entraining or water reducing admixture is used for flowability, total water and aggregate may be adjusted for yield.

Weights may be adjusted for flowability and pumpability.

PART 3 – EXECUTION

3.0 CONTROLLED LOW STRENGTH MATERIAL

A. Controlled low strength material shall be used where shown on the drawings or directed by the OWNER's Representative and may be used, at the discretion of the CONTRACTOR, in lieu of Pipe Bedding, Trench Backfill, Structural Fill and Backfill, or Compacted Fill.

B. CLSM shall be brought up uniformly to the elevations shown on the drawings. Compaction of CLSM is not required provided it is sufficiently flowable to fill the entire trench.

C. CLSM mixing and placing may be started if the temperature is at least 34 degrees F and rising. At the time of placement, CLSM must have a temperature of at least 40 degrees F. Mixing and placing shall stop when the temperature is 38 degrees F or less and falling. Each filling stage shall be as continuous as possible. CLSM shall not be placed on frozen ground or in water.

– End of Section –

SECTION 03 60 00

GROUTING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. CONTRACTOR shall furnish all equipment and materials and perform all labor required for consolidation grouting, contact grouting, structural grouting, and dry pack grouting. Note: Rock bolt grouting is covered in Section 31 33 13 – Rock Bolting and Grouting.

B. This Section covers supply and placement of non-shrink grout at bearing pads, metal mounting plates, and other miscellaneous applications, as shown on the Drawings.

C. Intent of Specification: Engineer will direct the grouting operations, with the exception of dry pack grouting. The specified procedures are the basic grouting requirements; however, since all grouting eventualities cannot be predicted, variations in procedures, sequence of grouting and/or grout mixes may be adjusted in the field.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 03 20 00 – Concrete Reinforcing
Section 03 30 00 – Cast-In-Place Concrete
Section 03 65 00 – Water Pressure Testing
Section 05 11 00 – Structural Steel Framing
Section 31 33 13 – Rock Dowels and Grouting

1.2 DEFINITIONS

A. "Curtain grouting" – Drilling and grouting performed to reduce the permeability of rock strata under hydraulic structures.

B. "Contact grouting" – Grouting through grout piping installed to allow filling of possible voids between concrete foundation base and rock.

C. "Foundation grouting" – General term used for the combination of consolidation and curtain grouting.

D. “Consolidation grouting” – Drilling and grouting of holes to fill voids around the drill hole to increase the structural strength and reduce the permeability of the surrounding material.

E. "Gage pressure for grouting" – Pressure of grout as measured at the header while grout is being pumped into the grout piping.

F. "Grouting pressure" – Pressure of grout, while being pumped, at the midpoint of the section of the hole begin grouted, as calculated from the gage grouting pressure at the header plus the pressure head due to the weight of grout in the hole and feed lines.

G. "Grout take" – The quantity of materials injected in a hole expressed in bags of cement (94 lbs).

H. "Stage grouting" – Drilling, washing, water-pressure testing, and the grouting of a hole in stages. The grouting of stages may be performed either stage-up or stage-down.

I. "Water-cement ratio" – The ratio of the volume of water to the volume of cement.

1.3 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM)

1. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated, Welded and Seamless
2. ASTM A197 – Standard Specification for Cupola Malleable Iron
3. ASTM A234 – Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
4. ASTM C33 – Standard Specification for Concrete Aggregates
5. ASTM C94 – Standard Specification for Ready Mixed Concrete
6. ASTM C109 – Test Method for Compressive Strength of Hydraulic Cement Mortars
7. ASTM C150 – Specification for Portland Cement
8. ASTM C494 – Standard Specification for Chemical Admixtures for Concrete
9. ASTM C942 – Test Method for Compressive Strength of Grouts for Pre-placed Aggregate Concrete in the Lab
10. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)
11. ASTM C1602 – Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete

1.4 HANDLING, STORAGE AND PREPARATION

A. Deliver, store, and handle products in accordance with manufacturer's instructions.

B. Do not use packaged cementitious materials

1. From torn or damaged bags.
2. Containing lumps.
3. Prematurely hydrated.
4. Otherwise damaged.

C. Furnish cementitious materials in waterproof packaging which will prevent, for a minimum of 90 days, hydration and formation of lumps in the materials due to warehouse set.

D. Leave grout and cement in manufacturer's sealed containers, with seals and label intact, in a weatherproof, damp-proof enclosure with a raised floor.

E. Handle, store, and protect all cement, grout, and additives in such a manner that these materials will not be subject to deterioration or contamination. Deteriorated, contaminated or expired materials shall not be used in this work.

1.5 EXPERIENCE

A. CONTRACTOR shall employee a grouting crew who is experienced in performing grouting operations and the maintenance of grouting equipment. The grouting crew's experience shall meet but not be limited to the following:

1. Grouting Supervisor: Minimum 5 years of experience in responsible charge of grouting for construction similar in nature to that required by this contract.
2. Other grouting personnel shall have a minimum of 2 years' experience in grouting for construction similar in nature to that required by this contract.
3. Maintain sufficient qualified personnel to perform required drilling and grouting work, such that grouting operations may be performed uninterrupted.

1.6 SUBMITTALS

A. For all proposed grouting operations submit the manufacturer's data for cementitious grout, and all admixtures.

1. Cement: Supplier's certification and test reports for each lot of cement from which shipments are drawn.

2. Admixtures: Manufactured Dates and anticipated shelf life of each shipment of plasticizer.

B. Consolidation Grouting Plan: Submit for review at least 2 weeks prior to any proposed grouting activity the following information:

1. Equipment to be used. Schematic layout sketch showing the general layout of mixer, pump, gages, valves, hoses, connection and all associated equipment (Grouting Equipment Checklist is included in Attachment A to this section).

a. Grout Plant Details: Pump rating curves; mixer and agitator details; photographs of mixing and pumping equipment; power system for grout pump and agitator; and agitator tubs. Note: Utilizing the helical screw grout pump as the agitator will not be allowed.

b. Flow Meter/Density Gauge Information: Supplier's instructions and operations manual.

2. Experience: Qualifying experience of individuals responsible for supervising and directing pressure grouting foundation work. Also include experience record of key grouting personnel.

C. Present details for proposed contact grout system including supply, injection and return pipes. Include example(s) showing successful implementation of a similar contact grout system under similar conditions.

D. Structural mix design: Provide proposed mix design and test data showing it meets strength and flowability requirement.

E. Grouting Records: Maintain grouting records for all grouting operations and submit completed and signed copies at completion of grouting. The minimum requirements for grouting records shall include but not be limited to:

1. Project Name.

2. OWNER.

3. Date and time of grouting.

4. Type of Grouting.

5. Grouting location.

6. Name and signature of individual supervising the grouting and record keeping.
7. Location and I.D. # of grout hole.
8. Total depth.
9. Height of interval between pressure gage and top of packer.
10. Stage number/stage elevation top.
11. Time of start and completion.
12. For cementitious grout:
    a. Water-cement ratio (w/c) for each stage.
    b. Total number of bags pumped for each (w/c).
    c. Time duration for each w/c pumped, and gage pressure/actual pressure at regular time intervals.
13. Total quantity (bags of cement) used in each hole.
14. Any miscellaneous conditions affecting grouting operations.

PART 2 – PRODUCTS

2.0 TUBING

A. Pipe: Standard weight, schedule 40 conforming to ASTM A 53.

B. Pipe Caps, Couplings, and Fittings: Galvanized, malleable iron conforming to ASTM A 197.

2.1 GROUTING MATERIALS

A. Cementitious Grout for Foundation and Consolidation Grouting

1. Type III Portland Cement, 1 bag = 94 lb typical.
2. Sand: Not used unless directed by OWNER.
3. Water shall conform to ASTM C1602 and proportioning shall be adjusted to achieve a water-cement ratio as required.
4. Provide admixtures to plastify and increase the viscosity of the grout. Rheobuild 1000 as manufactured by BASF superplasticizer or approved equal. Follow manufacturer recommendations for proportioning and procedures.
5. Anti-Washout Admixture: Micro-Aid UWG Underwater Grouting Admixture as manufactured by Specrete-IP.

B. Cementitious Grout for Structural Grouting

1. Provide non shrink grout capable of being pumped through proposed grout tubing with minimum compressive strength of 4,000 psi.

2. Same components as cementitious grout for foundation grouting except with fine aggregate and Type II or III Portland cement as required to meet strength requirements.

3. Fine Aggregate: ASTM C 33 provided that 100 percent by weight shall pass a No. 16 U.S. Standard Series Sieve and not less than 50 percent by weight shall pass a No.50 U.S. Standard Series Sieve.

C. Cementitious Fill Grout: Type II Portland cement and fine aggregate and admixtures proportioned to achieve a flowable/pumpable grout to fill all void spaces. Cementitious grout shall achieve a minimum 28 day compressive strength of 2000 psi. Fill grout shall be free of chlorides, inorganic accelerators, and oxidizing catalysts.

D. Water: As specified in Section 03 30 00 Cast-in-Place Concrete. Water for mixing shall be clean and free of oil, acids, organic materials, alkalis and other salts.

E. Use other additives only as specified on approval by OWNER's Representative. No additional payment will be made for grout additives except as provided authorized by OWNER's Representative.

F. Dry Pack Grout: Non shrinking cement grout, provide Five Star Grout (www.fivestarproducts.com), or approved equal.

1. Prepare grout according to the manufacturer's recommended proportions and procedures.

2. Compressive strength: Grout shall have the following minimum compressive strengths at different ages: 24 hours – 3,000 psi, 7 days – 6,000 psi, and 28 days – 8,000 psi.

2.2 GROUT PLANT AND EQUIPMENT

A. Use plant and equipment capable of effective mixing and stirring of grout and grout into grout holes or grout connections in a continuous flow at any pressure up to a maximum of 250 pounds per square inch.

B. Maintain an adequate nearby water and cement supply to achieve required pumping rate.

C. Maintain power supplies, cables, connectors, and electrical boxes as recommended by Suppliers. Protect from damage; keep operational during all grouting operations.

D. Provide a reliable communications system between grout plant and/or mixing plant and the holes being grouted.

E. Mixing Plant:

1. Cylinder mixing tank:

a. Mounted vertically.

b. Minimum volume of 17 cubic feet.

c. High-speed colloidal type.

d. Equipped with high-speed, diffuser-type centrifugal mixing pump operating at 1,500 to 2,000 revolutions per minute during mixing.

e. Delivers 300 gallons per minute at 30 pounds per square inch.

f. Water meter reading cubic feet to tenths of a cubic foot for controlling amount of mixing water used in the grout. Water meter shall have capability to be reset to zero after each batch is mixed.

2. Return flow from centrifugal mixing pump directed tangentially into the cylindrical tank near the top to create a vortex.

3. Provide a holdover mechanical agitator tank similar in volume to the mixer.

4. Pass grout through a screen as it is discharged from the mixer to agitator.

a. Maximum screen size is No 16.

b. Make screen readily accessible for cleaning and replacement. Keep it free of grout scale and build-up.

F. Grout Plant:

1. Grout pump: Helical-screw, rotor-type pumps that produce a uniform flow without pulsation.

a. Pump minimum capacity of 35 gallons per minute at pressure of 250 pounds per square inch.

b. No grout pumps allowed with open-throat design or open throat hoppers.

2. Arrange grouting equipment to provide a supply line and a return line from the grout pump to the grout hole.

3. Provide manifold at top of grout nipples of grout holes As Shown. Locate manifold in the grout line at the top of grout nipple of the hole to permit continuous circulation, accurate control and monitoring of grouting pressure, bleeding, and regulation of flow into grout holes.

4. Minimum size of supply lines and manifolds including valves and fittings: 1-inch inside diameter.

G. Pressure Gauges: Full scale reading not greater than 300 psi placed at some point in the grout line between outlet and injection location.

H. Grouting headers shall be provided for feeding grout into the holes. The header shall include a supply connection, a connection with a valve to the hole, and a return line with a valve. Two 6-inch Bourdon type pressure gauges for the appropriate pressure range shall be installed. One shall be installed to indicate the pressure of the supply of grout to the hole, and the other to measure the backpressure of grout in the hole.

I. Flow Density Meters: Flow-Density meters: Micro Motion Series T-Series, Coriolis Flow and Density Meters as manufactured by Emerson Process Management, or approved equal. Install one flow density meter in the supply line for each pump.

J. Grout Supply Pipes and Packers:

1. Packers to consist of pneumatic tubes attached to the end of the grout supply pipe.

   a. Packers must be capable of being expanded and be able to withstand leakage and water pressure equal to the maximum grout pressures to be used for the entire period of time in which the packer is used.

2. Heavy gauge packers are recommended.

3. The minimum diameter pipe through packer is ¾ inch.

4. Supply pipe to packer: Flush coupled, box threaded packer pipe or tubing with a 1-inch minimum inside diameter.

5. Obstructions to inside diameter of the packer or packer pipe caused by the supply airline hookup to the packer will cause the packer to be rejected.

6. Use of grout reels in place of packer pipe shall not be allowed.

7. Poly pipe for grouting shall not be allowed.

PART 3 – EXECUTION

3.0 GENERAL

A. Install erosion, sediment and pollution control measures in accordance with Section 01 57 19 to prevent drill cuttings, oil, grout, or other substances from plugging drains or from defacing or damaging any surface of any part of the uncompleted or completed WORK .

B. During grouting WORK provide for adequate disposal of all waste. Remove all waste grout, and empty packaging.

3.1 FOUNDATION GROUTING

A. Grout Nipples:

1. Provide 2" or 2 ½" diameter pipe with crimped bottom and threaded on top.

2. Install grout nipple pipes to a depth in rock of approximately 2 feet. Extend grout nipples approximately 1 foot above the surface of rock.

3.2 STRUCTURAL GROUTING

A. Grout Tubing:

1. Set supply and return grout tubing such that grout will flow freely and fill the voices between existing and new concrete.

2. Test grout system and repair leaks.

3. Secure tubing so that grouting system will not move during placement of grout.

B. Mix non shrink grout by mechanical means required strength gain and workability. Flowability shall be 5 drops in 3 seconds as measured according to ASTM C230.

C. Pump structural grout sequentially through grout tubes such that the entire void is completely filled, grout is in intimate contact with grouting surfaces and embedded items, and grout is free of entrapped air.

D. Keep exposed surfaces of structural grout moist for 72 hours.

E. Do not apply load to structural grout for 72 hours after placement. If cold weather conditions exist as defined in Section 03 30 00 – Cast-in-Place Concrete, do not apply load to grout for seven (7) days after placement.

3.3 FOUNDATION CONSOLIDATION GROUTING

A. Perform water pressure testing in accordance with Section 03 65 00 – Water Pressure Testing.

B. Perform foundation consolidation grouting as directed by ENGINEER, based on water pressure testing.

C. Redrill hole and test the entire hole for watertightness by filing it with fresh water and subjecting it to a pressure of 5 psi, as measured at the top of the hole. If the leakage rate from the hole over a period of 10 minutes exceeds 0.01 gallons per inch-diameter per foot of depth notify the OWNER and proceed to step C below. If the hole passes the leakage test remove water from the hole and fill the hole with grout.

D. Redrill hole after a minimum of 24 hours have elapsed to allow grout to gain initial strength. Perform consolidation grouting at a maximum pressure of 5 psi, measured at the top of the hole. After consolidation grouting and redrilling, repeat the watertightness test. If necessary, perform consolidation grouting, redrill, and perform water test until the leakage rate limit defined above is obtained. For each iteration allow 24 hours between grouting and redrilling. At the completion of the successful watertightness tests, remove all water from the holes and grout the hole full.

3.4 DRY PACK GROUT

A. Base plate and concrete slab contact surface shall be cleaned with water and high-pressure air.

B. Loose leveling nuts shall be secured.

C. Surface water shall be removed from contact surfaces.

D. Dry-pack grout shall be mixed according to Grout Manufacturer's recommendations.

E. Dry-pack grout shall be applied by hand.

F. Dry-pack grout shall be worked under baseplate from both inside instrument house and outside on instrument house roof.

G. Uniform 1:1 chamfer shall be formed around baseplate.

H. Grout Testing:

1. Sample and test grout in accordance with ASTM C109. Cast a minimum of two 2" cube specimens out of each batch of grout prepared.

2. Report cube compression test and other test results to OWNER's ENGINEER within 1 day of the time of testing.

3. Maintain record of structural grout test results with project feature, sample location, date, time and other relevant information.

4. Facilitate any grout sampling and/or testing activities performed by OWNER's Representative.

3.5 FORMS

A. See Attached Forms for the following.

1. Grouting Equipment Checklist.

2. Grout Log.

Grouting Equipment Check List

Mixer: Type: _____
Capacity: _____ cu ft
Model: _____
Manufacturer: _____

Grout Pump Type: _____
Capacity: _____ cu ft _____ psi
Model: _____
Manufacturer: _____

Grout Lines Size: _____ inch internal diameter

Gages:
Number of _____ Number of _____
Range 0 to ____ psi Range 0 to _____ psi
Type: _____ Type: _____
Manufacturer: _____ Manufacturer: _____
Diameter: _____ inch Diameter: _____ inch

Packers: Type: _____
Size: _____
If gas filled, max inflation pressure _____ psi

Method of Measurement of Volume of Grout Take _____

Project: _____ Work Area: _____ Hole No.: _____

Date: _____ Shift: _____ Inclination: _____

Inspector: _____ Contractor: _____ Water Table: _____

Time	Mix Ratio (w:c)	Number of Cement Sacks	Grout Take (volume)	Injection Depth Top	Injection Depth Bottom	Gage Pressure	Remarks

SECTION 03 65 00

WATER PRESSURE TESTING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Water pressure testing performed in order to estimate rock porosity and determine grouting plan.

1.1 RELATED SECTIONS

Section 01 57 19 – Spill Prevention, Control, and Countermeasures
Section 03 30 00 – Cast-in-Place Concrete
Section 03 60 00 – Grouting
Section 31 33 13 – Rock Bolting and Grouting

1.2 REFERENCES

A. ASTM D4044 - Standard Test Method for (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers

B. ASTM D6034 - Standard Test Method (Analytical Procedure) for Determining the Efficiency of a Production Well in a Confined Aquifer from a Constant Rate Pumping Test

1.3 SUBMITTALS

A. At least 2 weeks prior to any proposed drilling for grouting, rock bolts, or rock anchors, submit to the OWNER'S Representative a proposed Water Pressure Test Procedure. Include a list of proposed equipment, a water pressure testing schematic and proposed test record sheets. The schematic shall be a simple line sketch showing pumps, gages, valves, hoses, hookups, and all other associated equipment to be used in water pressure testing. An equipment check list is attached at the end of this section

B. At the end of each day where water pressure tests are conducted, submit water pressure testing records. Utilize the form at the end of this section for recording water pressure testing results.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Water: Clean, not containing substances that cause discoloration or odor. River water may be used with approval of OWNER's Representative.

2.1 EQUIPMENT FOR WATER PRESSURE TESTING

A. All water pressure testing equipment shall be of a type and capacity and in mechanical condition suitable for performing the WORK satisfactorily (see attached water pressure testing equipment checklist).

B. Water-pressure testing equipment shall consist of pumps, piping, pressure gages, valves, fittings, seal assemblies (packers), and all other accessories. The pumps furnished shall be of gear, centrifugal, or other approved type, with an output of not less than 50 gpm at 50 psi pressure, and shall be capable of maintaining constant pressures. There shall be a water supply with storage tanks having sufficient capacity for the pumps in addition to two sets of flowmeters and Bourdon gages for calibration and checking purposes.

C. The packers or seals shall be of the multiple leather cup, mechanically expanded rubber ring, or pneumatically expanded rubber sleeve type. Packers shall be capable of sealing holes at any specified level to a maximum depth of 100 ft without leakage. These packers shall be capable of being used either singly or in pairs, separated by up to 10 ft of perforated pipe. The diameter of the pipes used for separating the packers and for placing the packers in holes shall be the maximum possible for the size of the hole. The packers shall be capable of withstanding the maximum gage plus existing water column pressure without leakage for a period of 10 minutes.

PART 3 – EXECUTION

3.0 WATER PRESSURE TESTING

A. Test holes drilled into rock for watertightness as directed by OWNER's Representative. For selected holes, document hole depth, hole location, and water tightness.

B. Water-pressure testing in sections shall be carried out only on those holes as required by the ENGINEER. Each section shall be isolated by means of two packers spaced a minimum distance of 5 feet apart and a maximum distance of 10 feet, the actual spacing to be determined by the ENGINEER. For each section, backpressure shall be measured at the collar of the hole

with the hole full of water. Water pressure shall then be applied to the test section for a minimum period of 5 minutes.

C. The applied pressure at the midpoint of the interval being washed or water pressure tested shall not exceed the grouting pressure or 1 psi per ft of depth being tested, except where specifically directed by OWNER's Representative to exceed this value by up to 5 psi.

D. Any water loss shall be measured to an accuracy of 0.1 gallon.

E. Any hole that has an acceptance rate of less than 1 cubic foot in a 5-minute period (Approx 1.5 gpm), shall be considered a tight formation. The hole does not require pressure injection of grout. It shall be backfilled with grout in accordance with Section 03 60 00 – Grouting.

F. Document water-tightness test results. Use forms provided in this Subsection 3.3 below.

3.1 WASTEWATER DISPOSAL

A. Dispose of wastewater in an approved manner. Environmental management in accordance with Section 01 57 19 – Spill Prevention, Control, and Countermeasures.

3.2 BOREHOLE LEAKAGE TEST

A. A static-head borehole leakage test may be conducted in lieu of the water pressure test. This test shall be applied as a check on rock anchor hole leakage prior to consolidation grouting of the anchor hole. This test will in no way relieve CONTRACTOR's obligation to perform a final watertightness pressure test and meet the acceptance criteria recommended by PTI on each anchor hole.

B. The borehole to be tested will be filled with water and maintained at a constant head. The flow of water into the top of the hole will be regulated to equal the leakage flow out of the borehole column. This rate of flow will be observed and measured for a minimum period of 5 minutes.

3.3 FORMS

A. See attached forms for the following:

1. Water pressure testing equipment checklist.
2. Water pressure testing log.

Water Pressure Testing Equipment Check List

Gages:

Number of _____
Range 0 to _____ psi
Type: _____
Manufacturer: _____
Diameter: _____ inch

Number of _____
Range 0 to _____ psi
Type: _____
Manufacturer: _____
Diameter: _____ inch

Water Meter: Type: _____
Reading Accuracy: _____ gallon

Packers: Type: _____
Size: _____
If gas filled, max inflation pressure _____ psi

Water Pump Type: _____
Capacity: _____ gpm _____ psi
Model: _____
Manufacturer: _____

Water Pressure Testing

Project: _____

Site: _____

Job _____

Borehole _____

Sheet _____ of _____

Inspector _____

Date _____

Height of Gauge above Drilling Datum _____ (ft) (m)* Borehole Dia. _____ (mm)

Depth of Static Water Level below Drilling Datum _____ (ft) (m)* Packer Type _____

Test From To (ft)* (m)	Test Length (ft) (m)	Gauge Pressure (psi) (kg/cm²) (kPa)	Time		Meter Reading		Flow Rate (gal/min) (l/min)	Remarks
			Start Finish	Elapsed	Start Finish	Volume (gal.) (litres)		

* Cross out units which do not apply

– End of Section –

DIVISION 04 – MASONRY

SECTION 04 20 00

CONCRETE BLOCK MASONRY

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The CONTRACTOR shall provide concrete masonry and appurtenant WORK, complete and in place, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals

1.2 REFERENCE STANDARDS

A. ACI 530 - Building Code Requirements for Masonry Structures

B. ACI 530.1 - Specification for Masonry Structures

C. ASTM A 615 - Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

D. ASTM C 90 - Load-Bearing Concrete Masonry Units

E. ASTM C 140 -Test Methods of Sampling and Testing Concrete Masonry and Related Units

F. ASTM C 144 - Aggregate for Masonry Mortar

G. ASTM C 150 - Portland Cement

H. ASTM C 207 - Hydrated Lime for Masonry Purposes

I. ASTM C 270 - Mortar for Unit Masonry

J. ASTM C 404 - Aggregates for Masonry Grout

K. ASTM C 476 - Grout for Masonry

L. ASTM C 1019 - Standard Test Method for Sampling and Testing Grout

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Contractor Submittals

B. Samples:

1. If the required product Is a colored and textured unit, the samples shall be colored and textured units. Submit samples of concrete masonry units illustrating colors and textures available for the

Contracting Officer to choose. Full size samples of the blocks selected shall be submitted for final approval after color selection, if requested.

2. Samples of mortar colors for color selection.

3. A minimum 4-ft square free-standing sample panel shall be prepared for approval before starting masonry WORK. The panel shall remain at the Site for reference until masonry WORK is completed.

C. Documentation:

1. Reports from testing masonry units

2. Reports from mortar and grout testing.

3. Reports from prism testing.

D. Grout and mortar mix design:

1. Proportions for components

2. Mill tests for cement

3. Admixture certification. Include chloride ion content.

4. Aggregate graduation and certification

5. Lime certification

1.4 QUALITY ASSURANCE

A. Applicable Standards: Concrete masonry shall conform to the 2018 International Building Code (IBC), American Concrete Institute ACI 530, ACI 530, and other applicable codes and standards of the governing authorities.

B. WORK shall conform to the standard of quality established by the approved free- standing sample panel.

C. Concrete block masonry units shall be sampled and tested in accordance with ASTM C 140.

D. Testing of Mortar and Grout: The CONTRACTOR shall have the mortar and grout tested to assure compliance with the Specifications and the governing codes by a recognized testing laboratory approved by the Contracting Officer. Test reports shall be submitted to the Contracting Officer.

1. Tests shall be taken at the following times:

a. At commencement of masonry WORK, at least 2 test samples each of mortar and grout shall be taken on 3 successive Days.

b. At any change in materials or job conditions, at least 2 samples of each modified material, grout, and mortar shall be tested.

c. Four random tests each of mortar and grout shall be made. The random test samples shall be taken when requested by the Contracting Officer.

d. Additional samples and tests may be required whenever, in the judgment of the Contracting Officer, additional tests beyond the four random tests are necessary to determine the quality of the materials.

e. The costs of tests and test reports, except for any additional tests requested by the Contracting Officer, shall be paid by the CONTRACTOR as part of the WORK. The costs of the additional tests and reports, when reports verify compliance with the Contract Documents, will be paid by the Government. When tests or reports do not verify compliance, the cost of every additional test and report shall be paid by the CONTRACTOR.

2. Samples shall be stored in a moist environment until tested, unless directed otherwise by the Contracting Officer or the testing laboratory. Testing for mortar shall be in accordance with ASTM C 270. Grout shall be tested per ASTM C 1019.

E. Inspection: Whenever required under the provisions of the Building Code, WORK hereunder will be subject to inspection by a Special Inspector selected by the Contracting Officer and approved by the local Building Code representative having jurisdiction. Costs of such inspection will be paid by the Government. The Special Inspector will work under the supervision of the Contracting Officer.

F. Extreme Weather Construction: Cold or hot weather construction shall be per the more stringent of ACI 530.1, IBC Section 2104.1, and local Code requirements.

G. Product Storage: Cement, lime, and other cementitious materials shall be delivered and stored in dry, weather-tight sheds or enclosures, in unbroken bags, barrels, or other approved containers, plainly marked and labeled with the manufacturers' names and brands. Mortar and grout shall be stored and handled in a manner that prevents the inclusion of foreign materials and damage by water or dampness. Masonry units shall be handled with care to avoid chipping and breakage, and shall be stored as directed in ACI 530.1.

Masonry materials shall be protected from contact with the earth and exposure to the weather and shall be kept dry and clean until used.

PART 2 – PRODUCTS

2.0 CONCRETE MASONRY UNITS

A. Concrete masonry units shall conform to ASTM C 90. Units shall be medium weight units unless indicated otherwise.

B. Concrete masonry units at exterior walls shall be 8-inch by 8-inch by 16-inch modular size, with split faces. Units shall be natural gray color.

C. Bond beam, corner, lintel, sill, and other specially shaped blocks shall be provided where required or necessary. Specially shaped non-structural blocks may be constructed by saw cutting. Color and texture shall match that of adjacent units.

D. Concrete masonry units at interior walls shall be normal weight block 8-inch by 8-inch by 16-inch modular size units. Units shall be natural gray color.

2.1 MATERIALS

A. Portland cement shall be Type I or II, low alkali, conforming to ASTM C 150.

B. Hydrated lime shall be Type S conforming to ASTM C 207.

C. Aggregate for mortar shall conform to ASTM C 144. Aggregate for grout shall conform to ASTM C 404.

D. Water for mixing shall be clear potable water.

E. Reinforcing steel shall be deformed bars conforming to ASTM A 615, Grade 60.

F. Admixture for mortar shall be Master Builders PS-235 or Rheomix-235, Sika Co., Sika Red Label, or equal. The admixture shall not be detrimental to the bonding or help the process of efflorescence.

G. Admixture for grout shall be Sika Co., Sika Grout Aid, Type II, Master Builders Pozzolith, normal, or equal.

2.2 MORTAR

A. Mortar for concrete block masonry shall conform to ASTM C 270 and IBC section 2103.2 for cement-lime Type S, with a minimum 28 Day compressive strength of 2,800 psi.

2.3 GROUT

A. Grout shall conform to ASTM C 476 and have a minimum 28 Day compressive strength of 2000 psi. Where the grout space is less than 4-inches, coarse aggregate shall be omitted.

B. Admixtures may only be used when approved by the Contracting Officer. If approved for use, admixtures shall be used in accordance with the manufacturer's published recommendations for the grout.

2.4 INSULATION

A. All masonry cells shall be grouted.

2.5 SEALER

A. Masonry Sealer: Shall be Fabrishield 653 Siloxane/Quartz Water Repellent as manufactured by Fabrikem Chemicals International, or approved equal

PART 3 – EXECUTION

3.0 GENERAL

A. Measurements for mortar and grout shall be accurately made. Shovel measurements are not acceptable. Mortar proportions shall be accurately controlled and maintained.

B. WORK shall be performed in accordance with the provisions of ACI 530 and 530.1, the IBC, and the local codes for reinforced concrete hollow-unit masonry.

C. The CONTRACTOR shall set or embed anchors, bolts, reglets, sleeves, conduits, and other items as required.

D. Block cutting shall be by machine.

E. Masonry units shall be supported off the ground and shall be covered to protect them from rain. Only clean, dry, uncracked units shall be incorporated.

F. Reinforcing steel shall be cleaned of loose rust and scale, oil, dirt, paint, laitance, or other substances that may be detrimental to or reduce bonding of the steel and concrete.

G. Immediately before starting WORK, concrete upon which the masonry will be laid shall be cleaned with water under pressure.

H. Full mortar joint for first course shall be provided.

I. Units shall be shoved tightly against adjacent units to assure good mortar bond.

J. Equipment for mixing and transporting the mortar and grout shall be clean and free from set mortar, dirt, or other foreign matter.

3.1 MIXING

A. Mortar shall be mixed by placing 1/2 of the water and sand in the operating mixer, after which the cement, lime, and remainder of the sand and water shall be added. After ingredients are in the mixer, they shall be mechanically mixed for not less than 5 minutes. Retempering shall be done on the mortar board by adding water within a basin formed within the mortar, and the mortar reworked into the water. Mortar that is not used within one hour shall be discarded.

3.2 ERECTION OF CONCRETE BLOCK MASONRY

A. Masonry WORK shall be erected in plane, plumb, level, straight and true to dimensions, and be executed in accordance with acceptable practices of the trade and the tolerances of ACI 530.1.

B. Unless indicated otherwise, masonry shall be laid up in straight uniform courses with running bond.

C. Masonry shall be erected to preserve the unobstructed vertical continuity of the cells measuring not less than 3-inches by 3-inches in cross-section. Walls and cross webs shall be full bedded in mortar. Head (or end) joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells.

3.3 JOINTS

A. Vertical and horizontal joints shall be uniform and approximately 3/8-inch wide. Exterior joints and interior exposed block joints shall be concave-tooled to a dense surface. Special care shall be used in tooling joints so as to match existing construction. Interior or exterior non-exposed masonry shall have flush joints.

3.4 CLEANOUTS

A. Cleanout openings shall be provided at the bottoms of cells to be filled at each lift or pour of grout where such lift or pour is over 4-ft in height. Any overhanging mortar or other obstructions or debris shall be removed from the insides of such cell walls. The cleanouts shall be sealed before grouting

and after inspection. Cleanout openings shall match the finished wall in exposed masonry.

3.5 REINFORCEMENT

A. Deep cut bond beam blocks shall be used where horizontal reinforcing steel is embedded. H-block bond beams may be used at locations other than openings.

B. Knock-out openings shall have no steel or joint reinforcing running through the opening. Head, jambs, and sill blocks shall be used to provide an even finish surface to install windows when blocks are removed. Joints at heads, jambs, and sills shall be stacked and continuous.

C. Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 112 diameters of the reinforcement.

3.6 GROUTING

A. Cells containing reinforcing and bond beam spaces shall be filled solidly with grout unless indicated otherwise. Grouting shall not be started until the wall has cured for 24 hours. Grout shall not be poured in more than 5’-4” lifts.

B. Grout shall be consolidated at time of pouring by puddling or vibrating. If the grouting operation has been stopped for one hour or longer, horizontal construction joints shall be formed by stopping the grout pour 1-1/2 inches below the top of the uppermost unit.

3.7 PIPE OR CONDUITS EMBEDDED IN MASONRY

A. Pipes, conduits, and sleeves passing vertically or horizontally through the masonry shall not be placed closer than 3 diameters on center, nor shall they impair the strength of the construction. Pipes, conduits, and sleeves passing vertically shall not be placed in the same cell as the vertical reinforcing. Pipes, conduits, and sleeves passing horizontally shall not be placed in a bond beam.

3.8 PROTECTION

A. Wall surfaces shall be protected from droppings of mortar or grout during construction.

3.9 FINISHING AND CLEANING

A. Masonry shall not be wet-finished unless exposed to extreme hot weather or hot wind and then only by using a nozzle-regulated fog spray sufficient only to dampen the face but not of such quantity to cause water to flow down over the masonry.

B. Finish masonry shall be cleaned and pointed in a manner satisfactory to the Contracting Officer, based upon the standards established by the approved sample panel.

C. Interior and exterior colored masonry WORK exposed to view shall be cleaned by whip light sandblasting to remove stains and other imperfections.

D. Exposed masonry surfaces of openings and window and door openings such as sills, heads, and jambs shall be finish block surfaces, not formed surfaces, unless indicated otherwise. Closed bottom bond beam blocks shall be used at heads and sills. Pour holes may be used at the sill under window frame and where approved by the Contracting Officer

3.10 MASONRY SEALING

A. Preparation: All surfaces to receive finishes shall be thoroughly dry and dust free, and cleaned of any stains, grease, oil, efflorescence, excess mortar or grout, or contaminants before any sealer is applied. Contractor shall obtain the approval of the Contracting Officer prior to the start of the masonry sealing.

B. Application: Apply with hand held, manual pump, low-pressure sprayer. (Do not use an airless paint sprayer.) Brush or roller application is adequate where appropriate. Substrate should receive an initial light "mist" coat to break the surface tension. This should be followed immediately by a uniform flood coat which allows just enough material to carry about a six-inch rundown from the contact point. Application should be made in an overlapping pattern.

– End of Section –

DIVISION 05 – METALS

SECTION 05 11 00

STRUCTURAL STEEL FRAMING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered by this Section consists of furnishing all equipment and material and performing all labor for fabrication, delivery, and erection of structural steel as shown on the drawings and specified herein.

B. All exposed steel shall be galvanized, unless otherwise noted on the drawings or specified herein.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-In-Place Concrete
Section 03 60 00 – Grouting
Section 05 50 00 – Metal Fabrication
Section 09 90 00 – Painting and Coatings

1.2 REFERENCE STANDARDS

A. AISC Manual of Steel Construction

B. AISC Specification for Structural Steel Buildings

C. AISC Code of Standard Practice for Steel Buildings and Bridges

D. AISC Specification for Structural Joints Using ASTM F3125 Bolts

E. ANSI B18.22.1-Plain Washers

F. ANSI/ASME B46.1-Surface Texture (Surface Roughness, Waviness and Lay)

G. ASCE 7-16 - Minimum Design Loads for Buildings and Other Structures

H. ASTM A6 - General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.

I. ASTM A36 - Standard Specification for Carbon Structural Steel

J. ASTM A53 -Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless

K. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

L. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

M. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

N. ASTM A307 - Standard Specification for Carbon Steel Externally Threaded Standard Fasteners

O. ASTM A325 - Standard Specification for High-Strength Bolts for Structural Steel Joints

P. ASTM A384 - Standard Practice for Safeguarding Against Warpage and distortion During Hot-Dip Galvanizing of Steel Assemblies

Q. ASTM A385 - Standard Practice for Providing High-Quality Zinc Coatings (Hot Dip)

R. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength

S. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

T. ASTM A529 - Standard Specification for Carbon and Alloy Steel Nuts

U. ASTM A563 - Standard Specification for Carbon Allow Steel Nuts

V. ASTM A572 - Standard Specification for Low-Alloy Columbium-Vanadium Structural Steel

W. ASTM A780 - Repair of Damaged Hot-Dip Galvanized Coatings

X. ASTM A992 - Standard Specification for Structural Steel Shapes

Y. ASTM F436 - Standard Specification for Hardened Steel Washers

Z. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

AA. AWS D1.1 - Structural Welding Code

BB. SSPC-SP1 - Solvent Cleaning

CC. SSPC-SP3 - Power Tool Cleaning

DD. SSPC-SP6 - Commercial Blast Cleaning

1.3 SUBMITTALS

A. Certificates of Compliance: Certificates of Compliance shall be furnished for structural steel for bolts and for welder qualification. Certified copies of mill test reports shall be furnished for structural steel. Certification that each welder is qualified in accordance with AWS D1.1 shall be provided.

B. Shop Drawings: Prior to fabrication of structural steel and at least 3 weeks before planned installation, shop drawings for all structural steel fabrications shall be submitted to ENGINEER and shall include the following:

1. Complete details and schedules for fabrication and assembly procedures of structural steel members.

2. Include details of members, cuts, connections, cambers, holes and other pertinent data. Indicated welds by standard AWS symbols and show size, length, and type of each weld. Members and connections for any portion of the structure not shown on the contract drawings shall be detailed by the fabricator and indicated on the shop drawings.

3. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed.

4. Installation/Erection Plans: Installation and erection plan for fabricated steel parts. Include bracing plans for bracing necessary to stabilize embedded steel parts to achieve required accuracy.

5. Shop drawings must be signed and sealed by a professional ENGINEER in the State of Oregon. Fabrication and erection shall not be started until shop drawings have been accepted by ENGINEER.

C. Assembly Design Analyses and Calculations: CONTRACTOR provided assemblies as noted in drawings, provide all design criteria and calculations used in the structural steel assembly design. All analyses must be signed and sealed by a professional ENGINEER registered in the State of Oregon.

1.4 RESPONSIBILITY FOR ERRORS

A. CONTRACTOR shall be responsible for all errors of detailing, fabrication, and for the correct fitting of the structural members.

B. CONTRACTOR shall field verify all dimensions shown on design drawings prior to issuing shop drawings.

1.5 STORAGE

A. Material shall be stored in such manner and location as will prevent damage and minimize contamination and deterioration.

PART 2 – PRODUCTS

2.0 GENERAL

A. Structural steel WORK shall be in accordance with the AISC Specification for Structural Steel Buildings and the AISC Code of Standard Practice for Steel Buildings and Bridges. Welding shall be in accordance with AWS Code D1.1. High-strength bolting shall be in accordance with the AISC Specification for Structural Joints Using ASTM A325 or A490.

B. All structural steel and hardware shall be hot dip galvanized in accordance with ASTM A123 and A153 unless otherwise noted.

2.1 MATERIALS

A. Structural Steel: Structural steel shapes shall conform to ASTM A992 GR 50.

B. Structural steel angles, channels and plates shall conform to ASTM A36.

C. High-Strength Bolts: High-strength bolts shall conform to ASTM A325.

D. Carbon Steel Bolts: Carbon steel bolts shall conform to ASTM A307, Grade A.

E. Anchor Bolts: Anchor bolts shall conform to ASTM A307, as applicable.

F. Nuts: Heavy hex nuts shall conform to ASTM A563.

G. Washers: Hardened washers shall conform to ASTM F436.

H. Welding Electrodes: Welding electrodes shall be in accordance with AWS D1.1 with a minimum tensile strength of 70,000 psi.

I. Plain Washers: Plain washers, other than those in contact with high-strength bolt heads and nuts, shall conform to ANSI B18.22.1, Type B.

J. Steel Pipe: Steel pipe shall conform to ASTM A53 Type S, Grade B.

K. Structural Tubing: Structural tubing shall conform to ASTM A500 Grade B.

2.2 FINISHES

A. Structural steel shall be coated in accordance with Section 09 90 00 – Painting and Coatings.

B. Hot-Dip Galvanizing:

1. Galvanizing shall be performed in accordance with ASTM A123, ASTM A153 and ASTM A385. Coating shall be a minimum of 2 ounces per square foot of surface area.

2. Hex-headed connection bolts including nuts and washers for remain-in-place steel form fabrication shall conform to ASTM A325.

3. Precautions shall be taken when galvanizing items to minimize distortion and twisting of members in accordance with ASTM A384.

4. Field welding of galvanized metals shall be repaired using the specified galvanized repair paint (See Section 09 90 00 – Painting and Coatings). The area to be painted shall be thoroughly cleaned and coated in accordance with the Supplier's application instructions.

PART 3 – EXECUTION

3.0 FABRICATION AND CONNECTIONS

A. Connections:

1. In general, shop connections shall be welded and field connections shall be bolted.

2. All bolted connections for structural framing shall be made using ASTM A325 bolts. Bearing-type connections shall be used, unless noted otherwise on the drawings.

3. Welded connections shall be completed in accordance with AWS D1.1.

B. Fabrication:

1. Fabrication shall be in accordance with the applicable provisions of the AISC Specification and with the approved shop drawings. Fabrication and assembly shall be done in the shop to the greatest extent possible. Structural steel WORK, except contact surfaces of within two inches of any field weld location, shall be prepared for painting in accordance with the AISC Specification and primed with paint materials in accordance with Section 09 90 00 – Painting and Coatings.

2. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame-cut holes or enlarge holes by burning. Drill holes in bearing plates.

3. Any damaged coating shall be repaired in accordance with ASTM A780 and in accordance with Section 09 90 00 – Painting and Coatings.

4. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.

5. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

6. Provide fabricated steel parts to the tolerances As Shown, or if not specified, to accepted industry standards.

C. Erection:

1. General: Erection of structural steel shall be in accordance with the applicable provisions of the AISC Specification. Accurately place metal fabrications in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

2. Confirm all connections fit accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade surfaces after completion of hot-dip galvanizing.

3. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads as needed and as required by shop drawings. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

4. Connections: Anchor bolts and other connections between the structural steel and the concrete structure shall be provided and shall be properly located and embedded.

5. Setting Bases and Bearing Plates: Clean concrete bearing surfaces of bond- reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.

    a. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.

    b. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.

c. Dry pack grout between bearing surfaces and bases or plates to ensure no voids remain. Refer to Section 03 60 00 – Grouting.

6. Column base plates for columns and bearing plates for beams, girders, and similar members shall be provided. Base plates and bearing plates shall be provided with full bearing after the supported members have been plumbed and properly positioned. Separate setting plates under column base plates will not be permitted.

7. Field-Welded Connections: Field-welded structural connections shall be completed in accordance with AWS D1.1 and inspected and accepted by ENGINEER before load is applied.

8. Correction of Errors: Minor misfits may be corrected by moderate amounts of reaming, chipping or cutting, and the drawing of elements into line through the use of drift pins. Errors which cannot be corrected by these means or which require major changes in member configuration shall be reported immediately to ENGINEER. Thermal cutting shall not be permitted unless authorized by ENGINEER.

9. Field Priming: After erection and inspection by ENGINEER, the field bolt heads and nuts, field welds, and any abrasions in the shop coat shall be cleaned and primed with paint of the same quality for the shop coat. See Section 09 90 00 – Painting and Coatings for painting details.

– End of Section –

SECTION 05 21 00

STEEL JOIST FRAMING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. WORK Included:

1. Provide open web steel joists, long span steel joists, and bridging.
2. Provide steel joist girders.
3. All accessories per Steel Joist Institute requirements.

1.1 RELATED SECTIONS

Section 05 11 00 – Structural Steel Framing
Section 05 31 00 – Steel Roof Deck
Section 09 90 00 – Painting and Coatings

1.2 REFERENCES

A. American Welding Society (AWS): D1.1: 2020 - Structural Welding Code - Steel.

B. ASTM International (ASTM):

1. A529-05 - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
2. A572/A572M-06 - Standard Specification for High Strength Low Alloy Columbium-Vanadium Steels of Structural Quality.

C. Society for Protective Coatings (SSPC) - Painting Manual, 2005.

D. Steel Deck Institute (SDI) - Manual of Construction with Steel Deck.

E. Steel Joist Institute (SJI) - Standard Specifications and Load Tables for Steel Joists and Joist Girders.

F. American Institute of Steel Construction (AISC) – Manual of Steel Construction.

G. Steel Joist Institute (SJI) Technical Digest #9 - Handling and Erection of Steel Joists and Joist Girders.

1.3 SUBMITTALS

A. Submittals for Review:

1. Submittal shall conform to 2022 Oregon Structural Specialty Code with Amendments (OSSC) section 2207.

2. Steel Joist Placement Drawings shall conform to 2022 OSSC section 2207.4: In addition, the following shall be shown: joist identification numbers, joist types, joist locations and spacing, bridging, joist accessories, field splice assembly instructions either on the drawing or in subsequent documents. Erection drawings do not require the seal and signature of the joist manufacturer's design professional per 2022 OSSC 2207.4.

3. Bridging shall meet SJI requirements.

4. Calculations: Joist manufacturer will submit joist and joist girder calculations with a cover letter bearing the seal and signature of the joist manufacturer's registered design professional in accordance to 2022 OSSC section 2207.3.

5. Design for special joists and joist girders:

    a. Special joists and joist girders shall be designed for the load designations specified on the structural drawings, including roof equipment hatch, safety tie off impact load, and conduit loading. Designs shall properly account for the distribution of concentrated loads, live loads, and for the effects of openings. Designs methods are to meet requirements of the latest version of the SJI specifications.

    b. Joists and joist girders shall meet the following deflection criteria per SJI. Maximum live load deflection shall not exceed: L/240 for roofs; L/360 for floors where L=span length, center to center of bearing.

    c. Designs shall include the net wind uplift.

    d. Provide joist girder bottom chord bracing to meet SJI slenderness ratio criteria. Bracing shall not develop continuity in the joist system unless continuity has been provided for the joists.

B. Include the following for submission of sustainable design submittals. Sustainable Design Submittals:

1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content, show cost of products containing recycled content, and certify recycled content information source.

2. Regional Materials: Certify that materials have been harvested, extracted, recovered, or manufactured within 500-mile radius of Project site.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years' experience in WORK of this Section.

B. Welder Qualifications: AWS D1.1 and D1.3.

C. Steel joist and joist girder manufacturer member of Steel Joist Institute.

D. Steel joists and joists girders: SJI approved.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store joists off ground. Prevent corrosion and damage.

B. Storage and handling of steel joists to conform to SJI Technical Digest #9.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. Vulcraft – a Division of Nucor Corporation or approved equal.

2.1 MATERIALS

A. Steel Shapes:

1. ASTM A529-00, Grade 50.
2. ASTM A572-00, Grade 50.
3. ASTM A36.
4. ASTM A500-99, Grade C, or B with minimum 50 ksi yield strength.

2.2 ACCESSORIES

A. Bolts, Nuts, and Washers: ASTM A307, ASTM A325, ASTM A490, ASTM A563, ASTM F436.

B. Touch-Up Paint consistent with shop coat.

C. Welding Materials: AWS D1.1 and D1.3; type required for materials being welded.

2.3 FABRICATION OF JOISTS

A. Fabricate joists in accordance with manufacturer's Information and Design Manual and approved Placement Drawings.

B. Final approval from the specifying design professional required prior to fabrication.

C. Splicing of joist chords and webs shall be in accordance to SJI specifications.

D. Top and Bottom Chord Members: Two equal sized angles with minimum yield strength of 50,000 PSI.

E. Web Members: Round rod, crimped or un-crimped angles, minimum yield strength of 50,000 PSI.

F. Welding materials and methods to conform to SJI requirements.

G. Apply manufacturer's standard gray primer except where noted on contract documents.

PART 3 – EXECUTION

3.0 ERECTION OF JOISTS

A. Erection shall be in accordance with OSHA 29 CFR Part 1926.757.

B. Erect joists and accessories in accordance with manufacturer's instructions, SJI Specifications, approved Placement Drawings, and SJI Technical Digest #9.

C. Verify completed construction will permit and support steel joist and joist girder erection.

D. Lift and support joists in the upright position during unloading and erection.

E. Place joists plumb, at elevations, lines, and spacing indicated on approved Steel Joist Placement Drawings.

F. Complete joist attachment to supporting members before placing decking. Complete joist and decking attachments in each bay prior to applying construction loads.

G. Provide minimum bearing length for K-Series joists of 2-1/2 inches on steel, 4 inches on masonry or concrete, and for LH-Series and Joist Girders of 4 inches on steel, 6 inches on masonry, or per approved Steel Joist Placement Drawings.

H. Install horizontal bridging as indicated on approved Steel Joist Placement Drawings prior to installing decking. Terminate horizontal bridging rows with X-bridging or positive anchorage to wall prior to placing decking.

I. Provide for distribution of concentrated loads incurred during erection.

J. Fielding welding to conform to contract document requirements.

K. Provide supplemental framing at openings where indicated on approved Steel Joist Placement Drawings.

L. Report any discrepancies immediately to the joist manufacturer. Do not make corrections or alterations to joists without manufacturer's approval. All joist modifications that affect the strength of steel joists or joist girders must be approved by the project structural ENGINEER of record per OSHA 29 CFR Part 1926.757.

3.1 FIELD QUALITY CONTROL

A. Testing Laboratory Services:

1. Inspect joists for conformance to specified requirements:

a. Verify placement including location, alignment, and bearing.

b. Inspect joist-to-seat and seat-to-support welds.

B. Inspection and Repair:

1. Before steel roof deck placement, the joists shall be inspected for tears, dents, or other damage that will affect structural performance.

a. Inspections: In accordance with 2022 OSSC, 1705.2.3.

3.2 ADJUSTING

A. Clean welds and abrasions after erection.

B. Touch up painted surfaces with same primer as originally applied.

– End of Section –

SECTION 05 31 23

STEEL ROOF DECK

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The work covered by this Section consists of furnishing all equipment and material and performing all labor for fabrication, delivery, and erection of steel roof decking as shown in the drawings and specified herein.

1.1 REFERENCES

A. American Iron and Steel Institute (AISI)

1. AISI S100 - AISI S310 - North American Specification for the Design of Cold-Formed Steel Structural Members
2. AISI S310 - North American Standard for the Design of Profiled Steel Diaphragm Panels
3. AISI D310 - Design Examples for the Design of Profiled Steel Diaphragm Panels

B. Steel Deck Institute (SDI)

1. ANSI/SDI-RD - Standard for Steel Roof Deck
2. ANSI/SDI-NC - Standard for Non-Composite Form Deck
3. ANSI/SDI-QA/QC - Standard for Quality Control and Quality Assurance for Installation of Steel Deck
4. SDI DDM04 - Diaphragm Design Manual; 4th Edition
5. SDI DDP - Deck Damage and Penetrations
6. SDI MOC3 - Manual of Construction with Steel Deck (3rd Edition)

C. American Welding Society (AWS)

1. AWS D1.1/D1.1M - Structural Welding Code - Steel
2. AWS D1.3 - Structural Welding Code - Sheet Steel

D. ASTM International (ASTM)

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

2. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
3. ASTM A 1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
4. ASTM A1063/A1063M - Standard Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process
5. ASTM A 1039/A1039M - Standard Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
6. ASTM C1513 - Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections
7. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials
8. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection

E. FM Global (FM)

1. FM Data Sheet 1-28 Wind Design
2. FM Data Sheet 1-29 Roof Deck Securement and above-deck roof components
3. FM 4451 - Approval Standard for Profiled Steel Panels for Use as Decking in Class 1 Insulated Roof Construction

F. International building Code (IBC)

1. IBC Chapter 7 - Fire and Smoke Protection Features
2. IBC Chapter 22 - Steel
3. IBC 1704 - Structural Tests and Special Inspections
4. IBC 1705 - Statement of special inspections

G. Underwriters Laboratories (UL)

1. UL Fire Resistance - Fire Resistance Directory

1.2 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Contractor Submittals.

1. Shop Drawings: Layout of decks, anchoring, reinforcing, openings, joints, accessories, and attachments details.

2. Product Data For each type of product specified, include dimensions, components, profiles, and finishes.
    a. Accessories
    b. Deck Units
    c. Mechanical Fasteners
    d. Welding Equipment
    e. Welding Rods and Accessories
    f. Recycled Content of Steel Products (LEED)
    g. Domestic Steel Content
3. Samples (only if required by contract):
    a. Metal Roof Deck Units
    b. Cellular Metal Floor Deck Units
    c. Flexible Closure Strips
    d. Acoustical Material
4. Design Data:
    a. Evaluation Reports:
        i. Standard Deck: IAPMO UES ER-2018
        ii. Dovetail Deck: IAPMO UES ER-0423
    b. Load Tables (ASD/LRFD):
        i. Vertical Loads
            1) Gravity
            2) Wind
        ii. Diaphragm Loads
5. Certificates:
    a. Powder-Actuated Tool Operator
    b. Welder Qualifications
    c. Welding Procedures
    d. Fire Safety
    e. Wind Storm Resistance
    f. Manufacturer's Certificate

1.3 QUALITY ASSURANCE

A. Deck Units: Manufacturer Qualifications: All primary products specified in this section shall be supplied by a single manufacturer with a minimum of ten years' experience in the manufacture of steel deck. Manufacturer offering deck products must be a member of the Steel Deck Institute.

B. Installer Qualifications: Minimum two years' experience installing similar products.

C. Certification of Powder-Actuated Tool Operator: Provide manufacturer's certificate attesting that the operators are authorized to use the low velocity powder-actuated tool.

D. Qualifications for Welding Work: Follow Welding Procedures of AWS D1.3/D1.3M for sheet steel and AWS D1.1/D1.1M for stud welding. Submit qualified Welder Qualifications in accordance with AWS D1.3/D1.3M for sheet steel and AWS D1.1/D1.1M for stud welding, or under an equivalent approved qualification test. Submit manufacturer's catalog data for Welding Equipment and Welding Rods and Accessories.

E. Regulatory Requirements:

1. Testing Agency Qualifications per ASTM E 329: For testing indicated.

2. Wind Storm Resistance: Provide roof construction assembly capable of withstanding a nominal uplift pressure of (MFRWS) 74 pounds per square foot (psf). (CnC) Zone 1: 80 psf, Zone 2: 92 psf, Zone 3: 140 psf in accordance with steel roof deck in FM Global's "Approval Guide, Building Materials" and/or FM Global’s Roof-nav program http://www.roofnav.com.

3. Fire Safety: Steel deck listed as fire classified in the UL Fire Resistance directory or listing as Class I construction in the FM APP GUIDE, and so labeled. Alternatively, provide steel deck/assembly rating determined by calculation in accordance with Chapter 7 of IBC/CBC.

F. Fabrication Drawings: Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, cant strips, ridge and valley plates, metal closure strips, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver products with bundle tag bearing the brand name and manufacturer's identification until ready for installation.

B. Store products in accordance with SDI MOC3 in a clean, dry, sheltered area off the ground until ready for use.

C. Protect products from exposure to direct sunlight and rain.

1. Protect steel deck from exposure to sunlight and rain. Store steel deck on the jobsite off the ground and covered with waterproof material to prevent exposure to rain or condensation.

2. Protect and ventilate acoustical insulation to maintain insulation free of moisture.

D. Handle materials to avoid damage.

1.5 DESIGN REQUIREMENTS FOR ROOF DECK

A. Properties of metal roof deck sections must comply with engineering design by the provisions of AISI S100, AISI S310, AANSI/SDI-R, ANSI/SDI-C and IAMPO ES.

B. Allowable loads:

1. Indicate required uniform dead and live load for detailing purposes

2. Indicate required diaphragm loads for detailing purposes

3. Indicate design methodology (ASD or LRFD)

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Acceptable Manufacturer: Verco Decking, Inc, a Nucor company - Vulcraft/Verco Group.

B. Substitutions: Approved equal.

C. Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

D. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

2.1 PERFORMANCE REQUIREMENTS

A. Structural Characteristics: Calculated per AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

B. Fire-Resistance Ratings per Chapter 7 of IBC, ASTM E 119 or UL 263. (if required).

1. Indicate design designations from IBC Chapter 7

a. Indicate rating and design designation/Calculations on the Drawings.

2. Indicate design designations from UL's "Fire Resistance Directory."

a. Indicate rating and design designation on the Drawings

3. Indicate design designations from a qualified testing agency (if required)

a. Indicate rating and design designation on the Drawings

C. Factory Mutual Approval Ratings per FM Standard 4451 (if required).

2.2 ROOF DECK, STEEL

A. Profile: B-Deck (1.5" Deep - 36" cover)

1. Type PLB-36

B. Profile: N-Deck (3" Deep - 32" cover)

1. Type PLN3-32

2.3 ROOF DECK FINISH

A. Standard Deck (B, N-24, N-3)

1. Finish: Galvanized G60

2.4 SIDELAP ATTACHMENT

A. VSC2 connection made on interlocking deck sidelaps with the Verco PunchLok II Tool at spacing designated on the approved installation drawings.

2.5 DECK ATTACHMENT TO SUPPORTS

A. Deck attachment pattern will be as indicated on drawings. Attachment pattern will provide sufficient strength to resist shear due to lateral loading and wind uplift.

B. Hilti Fasteners:

1. Substrate Thickness: 1/8 in (3 mm) ≤ 3/8 in (10 mm)

a. Hilti X-HSN 24 Fastener

2. Substrate Thickness: ≤ 1/4 in (6 mm)

a. Hilti X-ENP-19 L15 Fastener

2.6 ACCESSORIES

A. Miscellaneous Sheet Metal Items Conforming to ANSI/SDI RD:

1. Sump Pans, Sump Plates, Valley Strips, Eave Strips, Edge Closures, Cell Closures: Fabricated of metal of same type and finish as deck. Galvanized unpainted steel may be used in lieu of primer painted accessories with primer painted steel deck.

B. Profile Closures: As shown on the design drawings.

PART 3 – EXECUTION

3.0 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, CONTRACTOR and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

3.1 EXAMINATION

A. Do not install roof deck until supporting construction is in place.

B. Examine support framing and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section.

C. If supporting construction is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Verify that surfaces to receive roof deck are free of debris.

B. Place deck in accordance with approved installation drawings.

C. Locate deck bundles to prevent overloading of support members.

3.3 INSTALLATION

A. Install and fasten deck and accessories in accordance with the Contract Documents, approved installation drawings, manufacturer's documented instructions and requirements of SDI MOC-3, ANSI/SDI-RD or ANSI/SDI NC as applicable.

1. Welds shall comply with AWS D1.3.

B. Place deck panels on structural supports and adjust to final position with ends aligned. Attach firmly to the supports immediately after placement in order to form a safe working platform.

C. Cut and neatly fit and reinforce deck units and accessories around openings and other work projecting through or adjacent to the decking as shown on the construction drawings.

D. End Bearing: Install deck ends over supports with a minimum end bearing as shown on the installation drawings.

E. Deck End Laps: Where specified on the plans install deck end laps as shown on the installation drawings.

F. Side Closures: Fasten to supporting structure and deck in accordance with the Contract Documents, approved installation drawings, and requirements of ANSI/SDI RD or ANSI/SDI C as applicable.

G. Ridge and valley plates, flat plates at changes of deck direction and sump pans, if required shall be fastened to the deck in accordance with the Contract Documents, approved installation drawings and requirements of ANSI/SDI RD or ANSI/SDI C as applicable.

H. Reinforce steel deck openings per contract documents and approved shop drawings.

I. Trades that subsequently cut unscheduled openings through the deck are responsible for reinforcing the openings.

J. Acoustical Batt Insulation: Supplied by the deck manufacturer and installed by the roofing CONTRACTOR prior to installation of roof insulation.

3.4 FIELD QUALITY CONTROL

A. Do not use deck units as a working platform or storage area until units are in position and permanently attached to the structure.

B. Construction loads must not exceed load carrying capacity of the deck.

3.5 INSPECTION AND REPAIR

A. Before roof insulation placement, the deck shall be inspected for tears, dents, or other damage that will affect structural performance.

B. Inspections:

1. In accordance 2022 OSSC, 1705.2.2.

3.6 PROTECTION

A. Protect installed products until completion of project.

– End of Section –

SECTION 05 50 00

METAL FABRICATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered by this Section consists of furnishing all equipment and material and performing all labor for installing embedded and nonembedded miscellaneous metal items as shown on the drawings and specified herein. These items include ladder assemblies, staircase assemblies, ladders, walkways, platforms, and all accessory materials required for a complete assembly, such as connections, grating, guardrails (pedestrian), toe boards and post caps.

B. All exposed and embedded miscellaneous ferrous metals shall be hot-dipped galvanized in accordance with ASTM 123, except as noted on the drawings or herein.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-In-Place Concrete
Section 09 90 00 – Painting and Coatings

1.2 REFERENCE STANDARDS

A. AISC Manual of Steel Construction

B. AISC Specification for Structural Steel Buildings

C. AISC Code of Standard Practice for Steel Buildings and Bridges

D. AISI Code of Standard Practice for Steel Buildings and Bridges

E. AISI Type 304 - Stainless Steel

F. ANSI B18-22.1 - Plain Washers

G. ASTM A6 - General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use

H. ASTM A36 - Structural Steel

I. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless

J. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

K. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware

L. ASTM A307 - Carbon Steel Externally and Internally Threaded Standard Fasteners

M. ASTM A563 – Standard Specification for Carbon and Alloy Steel Nuts

N. ASTM A569 - Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot- Rolled Sheet and Strip, Commercial

O. ASTM A1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

P. ASTM A780 - Standard Practice for Repair for Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

Q. ASTM A786 - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates

R. ASTM A992 - Standard Specification for Structural Steel Shapes

S. NAAMM-Metal Bar Grating Manual

T. OSHA Regulations Part 1910 – Occupational Safety and Health Standards

1.3 DESIGN CRITERIA

A. All metal fabrications shall be designed in accordance with OSHA Part 1910.

B. Provide maximum shop assembly for all materials.

C. Shop connections shall be welded connections. Field connections shall be assembled in accordance with the AISC Specification for Structural Joints using bolts.

D. Grating: The maximum allowable deflection for all grating is ¼ inch. Unless otherwise noted the uniform live load is 100 psf.

E. Guardrails (Pedestrian): Shall be provided for platforms as shown on drawings. Standard railing shall consist of a top rail, intermediate rail, posts and toe boards.

1. Design for a 200 lb. concentrated load on any point of the rail and post, or 50 lbs/ft uniform load along either the top or bottom rail.

2. All rail and posts shall be standard steel pipe of 1-1/2 inches nominal diameter with posts spaced not more than 6 feet on centers, unless noted otherwise.

3. The nominal vertical height of the upper surface of the top rail to the surface of the platform shall be 42 inches.

4. Kickplates are required at exterior railings at elevated platforms and as shown on drawings. Kickplates shall have a nominal vertical height of 4 inches, a maximum clearance above floor level of 1/4 inch, and no openings of greater than 1 inch.

F. Ladders:

1. Shall be designed for a minimum single concentrated live load of 300 lb. The live loads imposed by persons occupying the ladder shall be considered to be concentrated at such points as will cause the maximum stress in the structural member being considered.

2. The distance between rungs, cleats, and steps shall not exceed 12 inches and shall be uniform throughout the length of the ladder.

3. Bar rungs shall have a minimum diameter of 3/4 inch and a minimum clear length of 16 inches.

G. Stairs:

1. Shall be provided at locations as shown on drawings. Staircases shall consist of rises, stair treads, nosings, standard railings, and landings.

2. Shall be designed to carry a load of five times the normal live load or a moving concentrated load of 1,000 pounds, whichever is greater.

3. The minimum stairway width is 22 inches.

4. All treads shall have a slip resistant nosing.

5. Stairway rise/trend dimensions shall be in accordance with Table D-1 of OSHA Part 1910.25(c)(5).

6. Standard railings shall be provided on all open sides and be designed to the same standards as above in part 1.3.E.

1.4 SUBMITTALS

A. Certificates of Compliance: Material certificates of compliance shall be in accordance with the reference standards.

B. Shop Drawings: Shop drawings showing all details necessary for fabrication and installation of miscellaneous metal items shall be submitted to ENGINEER for review in accordance with Section 01 33 00 – Contractor Submittals. Fabrication and erection shall not be started until shop drawings have been reviewed and approved by ENGINEER. Include the following information as a minimum:

1. All dimensions, sizes, material finishes, clearances, and tolerances.

2. Bills of material.

3. Complete details of all connections, bolted and welded. Bolt layouts and sizes and weld sizes and symbols per AWS A2.0.
4. Storage and handling requirements.
5. Preparation and installation instructions.

1.5 QUALITY ASSURANCE

A. QUALIFICATIONS

1. Fabricator shall comply with applicable provisions of the most current addition of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. All welders shall be certified by the Washington Association of Building Officials and/or the American Welding Society or by a City approved certification.
3. All weld procedures and welder qualifications shall be available in the CONTRACTOR'S field office for review.
4. All welding shall be coordinated to allow for field inspection. CONTRACTOR shall notify the City three (3) days in advance of welding activity.
5. Concrete Anchor Systems Manufacturers shall have experience on at least three (3) similar projects within the last three (3) years.
6. Concrete Anchor Systems Installers shall be trained and certified by manufacturer.

B. GALVANIZED COATING APPLICATOR

1. Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

1.6 RESPONSIBILITY FOR ERRORS

A. CONTRACTOR shall be responsible for all errors of detailing, fabrication and for the correct fitting of members and pieces.

B. CONTRACTOR to field verify all dimensions prior to issuing shop drawings.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Preparation for shipment:

1. Insofar as practical, factory-assemble items specified herein.

2. Package and clearly tag parts and assemblies that are of necessity shipped unassembled, in a manner that will protect materials from damage, and facilitate identification and field assembly.

3. Supply estimated weight with shipping documents for components over 5,000-pounds.

B. Storage:

1. Material shall be stored in such manner and location as will minimize and prevent damage, contamination, and deterioration.

2. Store epoxy cartridges on pallets or shelving in a covered storage area. Control temperature above 60°F and dispose of cartridges if shelf life has expired.

PART 2 – PRODUCTS

2.0 MATERIALS

A. General: All exposed and embedded miscellaneous ferrous metals shall be hot-dipped galvanized in accordance with ASTM 123, unless otherwise noted.

B. Structural Steel: Wide-Flange Shapes shall conform to ASTM A992, Grade 50.

C. Steel Plate, Other Shapes (M, S, C, MC, L) and Threaded Rods: Conform to ASTM A36.

D. Steel Pipe: Steel pipe for handrails shall conform to ASTM A53.

E. Steel Grating: Steel grating shall conform to NAAMM MBG 531.

F. Carbon Steel Bolts: Carbon steel bolts shall conform to ASTM A307.

G. High-Strength Bolts: A325, Type 3, plain uncoated

H. Galvanized Steel Bolts and Notes: A307 or A36, with A153 Zinc Coating, and ANSI B1.1 and Grade 5 hex bolt with A325 nut and hard-ended washer (Area 2)

I. Plain Washers: Plain washers shall conform to ANSI B18.22.1, Type B.

J. Welded Anchor Studds: A108, Grade C-1010 thru C-1020

K. Headed Concrete Anchors: ASTM A108, Grade 1015 or 1020, cold-finished carbon steel with dimensions complying with AISC Specifications.

L. Welding Electrodes: Welding electrodes shall be in accordance with AWS D1.1 with a minimum tensile strength of 70,000 psi.

M. Expansion Anchors:

1. Adhesive-type anchors shall be Hilti HVA adhesive anchor system (Type-HAS) as manufactured by Hilti, or approved equal. Minimum embedment shall be as recommended by manufacturer's literature or as noted on the drawings, whichever is greater.

2. Study-type anchors shall be Hilti Kwik Bolt TZ2 (Stainless Steel) as manufactured by Hilti, or approved equal.

N. Personnel Grating: Grating shall be, steel pressure locked grating, 1½ inch x 3/16-inch standard galvanized unless otherwise noted. Exterior locations shall be serrated grating.

O. Steel Stair Treads: Stair treads shall be serrated steel pressure locked treads with cast iron abrasive nosing as manufactured by Harsco Industrial IKG, or approved equal.

P. Embedded Stair Nosings: Embedded stair nosings shall be heat treated extruded aluminum alloy with aluminum oxide abrasive filler in an epoxy matrix as manufactured by American Safety Tread Company, Type WP3C.

Q. Guardrail System:

1. Guardrail pipes shall be smooth and straight. Bent pipe required by design shall not show kinks nor shall the pipe be flattened. Intersections of horizontal and vertical members shall be joined by coping or mitering and by welding.

2. Guardrail pipe shall be of welded construction. Welding procedure and performance qualification shall be in accordance with AWS B2/1.

3. Guardrail surfaces shall be free from burrs or other roughness and all welds shall be neatly finished, and ground where necessary.

4. Corners of rails shall be smoothly curved, not mitered, with a 2-inch minimum and a 4-inch maximum radius.

5. Guardrails shall be fabricated with rails and posts shop welded into the maximum practicable shipping sections, to minimize field welding. Field splices shall have interior sleeves and shall be located in the rails and not at the posts.

6. Guardrail gripping surface shall be continuous without interruption by newel posts or other.

R. Ladders:

1. Ladder assembly shall be of welded construction. Welding procedure and performance qualification shall be in accordance with AWS B2/1.

2. Ladder surfaces shall be free from burrs or other roughness and all welds shall be neatly finished, and ground where necessary.

S. Stairs Treads:

1. Stair treads shall be serrated steel, pressure locked treads with 1-1/4 x 3/16 in. bearing bars at 1-3/16 in. center to center spacing (Type B) with cast iron abrasive nosing, and a tread depth of 10-15/16 in.

PART 3 – EXECUTION

3.0 FABRICATION

A. Fabrication and assembly shall be done in the shop to the greatest extent possible.

B. All permanently exposed items shall be galvanized unless otherwise noted in accordance with Section 09 90 00 – Painting and Coatings.

C. Galvanizing shall conform to ASTM A53, ASTM A123, or ASTM A153 as applicable. Any damaged coating shall be repaired in accordance with ASTM A780.

3.1 INSTALLATION

A. Installation of miscellaneous metal items shall be in accordance with manufacturer's shop drawings and recommendations, applicable provisions of the AISC Specification and the NAAMM Metal Bar Grating Manual, and OSHA Regulations where applicable.

B. All members requiring fasteners in field shall be shop drilled prior to galvanizing.

C. All expansion anchors shall be installed in accordance with manufacturer's instructions. All expansion anchors shall be stud-type anchors unless otherwise noted on the drawings.

D. All embedded frames and materials shall be installed as shown on the drawings.

– End of Section –

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Extruded polystyrene insulation board (XPS) and Z-girts.

B. Mineral wool board and Z-girts.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 60 00 – Product Requirements
Section 03 30 00 – Cast-in-Place Concrete
Section 04 20 00 – Concrete Block Masonry
Section 07 41 13 – Metal Roof Panels
Section 07 62 00 – Sheet Metal Flashing and Trim

1.2 REFERENCES

A. ASTM C 578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.

D. CAN/ULC-S701 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Contractor Submittals.

B. Product Data: Submit insulation manufacturer's product data, building code compliance reports or test reports and the insulation manufacturer's printed installation guidelines.

1. Submit product literature or a letter from the insulation manufacturer indicating approval of products not manufactured by the specified insulation manufacturer.

2. If a letter is submitted, it shall include a statement that materials are compatible with adjacent materials proposed for use.

1.4 QUALITY ASSURANCE

A. Installer qualifications:

1. Installer of each of XPS and mineral wool insulation board shall have experience with installation of insulation board; and installation shall be in accordance with insulation manufacturer's installation guidelines.

2. Minimum 5-year experience installing similar products.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation board to the project site in original packaging, labeled with manufacturer's information, product name, and date of manufacture, and instructions for storage.

B. Store insulation board in its original undamaged packaging or in a clean, dry, protected location and within temperature range required by insulation manufacturer. Protect stored materials from direct sunlight.

C. Handling: Handle materials to avoid damage.

1.6 PROJECT CONDITIONS

A. Temperature: Install insulation board within range of ambient and substrate temperatures recommended by the insulation manufacturer. Do not apply insulation board to a damp or wet substrate.

B. Field Conditions: Do not install insulation board in snow, rain, fog, or mist. Do not install insulation board or auxiliary materials when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the insulation and auxiliary material manufacturers.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

B. Review requirements for sequencing of installation of the insulation board with installation of windows, doors, louvers and flashing materials to ensure a weather-tight air barrier assembly.

C. Schedule installation of exterior cladding within one month of installation of the insulation board.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: Basis of Design product Kingspan Insulation LLC or comparable product by, but not limited to, one of the following:

1. Kingspan Insulation LLC
2. GAF Commercial Roofing Products
3. Carlisle
4. Johns Manville
5. R-Max
6. Owens Corning
7. Dow

B. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00 – Product Requirements.

2.1 EXTRUDED POLYSTYRENE INSULATION BOARD (XPS)

A. Material Performance: Provide extruded polystyrene insulation board (XPS) that meets the requirements of ICC-ES AC12, "Acceptance Criteria for Foam Plastic Insulation", ASTM C 578, Type IV, Type VI and Type VII, and CAN/ULC-S701, Type 4.

B. Extruded Polystyrene Insulation Board (XPS): Subject to compliance with requirements described in Section 1.2 provide one the following:

1. Roof insulation meeting minimum listed R-value on drawing set.
2. Soffit insulation meeting minimum listed R-value on drawing set.

2.2 MINERAL WOOL BOARD

A. Material Performance: Mineral-wool board for continuous insulation, unfaced: ASTM C612, Types IA, IB, II, III, IVA, or IVB; Categories 1 or 2; with maximum flame-spread and smoke-developed indices of 15 and zero, respectively, per ASTM E84; passing ASTM E136 for combustion characteristics.

1. Applications include:
    a. Continuous exterior wall insulation meeting R-value on drawing set.
2. Thermal performance:

a. R-value: Minimum 4.2/inch

b. Thermal conductivity: Not greater than 0.24 BTU in./h sq. ft deg. F/inch at 75 deg F.

3. Nominal density: 4 lb/cu ft minimum and 6 lb/cu ft maximum.

4. Fiber color: Dark color.

2.3 ACCESSORIES

A. Kingspan GreenGuard Standard Seam Tape and / or Custom Seam Tape.

B. Kingspan GreenGuard Butyl Flashing and / or Kingspan GreenGuard SuperStretch Butyl Flashing.

C. SMARTci GreenGirt Z-Girt and associated clips and fasteners, for mineral wool.

D. Z-girts for XPS roof insulation, as needed.

E. Adhesives, Sealants and Primers: Adhesives, sealants and primers shall be compatible with the insulation board. Adhesives, sealants and primers referenced in the Kingspan Insulation LLC TB-011 and other products approved by the insulation manufacturer shall be acceptable.

F. Cover boards at roof – Densdeck roof boards.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine substrates, areas, and conditions under which the insulation board will be applied, with installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing WORK of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Review requirements for sequencing of installation of all wall assembly components as demonstrated in the mock-up wall assembly.

3.1 INSTALLATION – ROOF SYSTEM INSULATION

A. Examine the roof deck for suitability to receive insulation board. Verify that the substrate is dry, clean and free of foreign materials that may damage insulation or impede installation.

B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with the Contract Documents and approved submittals.

C. Start of installation indicates that the installer accepts the conditions of the roof deck surfaces.

D. Do not proceed with WORK during inclement weather or install insulation board over wet surfaces.

E. Install only as much insulation board as can be covered by the roofing materials in the same day.

F. Install the insulation board in accordance with the manufacturer's installation guidelines for attachment, using the applicable fasteners and spacing.

G. Install the roof covering materials in accordance with the manufacturer's installation guidelines and the applicable UL LLC or FM Approvals roof system listings.

3.2 INSTALLATION – EXTERIOR WALL INSULATION

A. Examine the exterior substate for suitability to receive insulation board. Verify substrate is dry, clean, and free of foreign materials that may damage insulation or impede installation.

B. Verify windows, doors, louvers, and all mechanical, plumbing, and electrical penetrations, and weather resistive barrier are installed in accordance with the Contract Documents and approved submittals.

C. Start of installation indicates installer acceptance of conditions of wall surfaces.

D. Do not proceed with WORK during inclement weather or install insulation board over wet surfaces.

E. Installed insulation board and Z-girts to be protected from the weather at the end of each day’s work.

F. Install the insulation board in accordance with the manufacturer's installation guidelines for attachment, using the applicable fasteners and spacing.

3.3 FIELD QUALITY CONTROL

A. OWNER's Inspection252424: Cooperate with OWNER's testing agency. Allow access to work areas and staging. Notify OWNER's testing agency in writing of schedule for WORK of this section to allow sufficient time for testing and inspection. Daily inspection and testing may be required. Do not cover WORK of this section until testing and inspection is accepted.

3.4 CLEANING AND PROTECTION

A. Protect insulation board from damage during installation and remainder of construction period, according to manufacturer's written instructions:

1. Coordinate with installation of insulation board to ensure exposure periods do not exceed the manufacturer's recommendations

– End of Section –

SECTION 07 26 00

VAPOR RETARDER

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Reinforced vapor retarders.

B. Tape to seal joints and repair vapor retarder.

C. Pipe boots for sealing penetrations.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-in-Place Concrete
Section 07 41 13 – Metal Roof Panels

1.2 REFERENCES

A. ASTM International (ASTM)

1. ASTM D 882 - Tensile Properties of Thin Plastic Sheeting.
2. ASTM D 1709 - Impact Resistance of Plastic Film by the Free-Falling Dart Method.
3. ASTM D 2582 - Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting.
4. ASTM D 3776 - Mass Per Unit Area (Weight) of Woven Fabric.
5. ASTM D 4833 - Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
6. ASTM E 84 - Surface Burning Characteristics of Building Materials.
7. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
8. ASTM E 1643 - Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
9. ASTM E 1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

B. National Fire Protection Association (NFPA)

1. NFPA 701 - Fire Tests for Flame-Resistant Textiles and Films.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Contractor Submittals.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Samples: Submit manufacturer's samples of reinforced vapor retarders.

D. Verification Samples: For each product specified, two samples, minimum size 5 inches (125 mm) square, representing actual product.

1.4 QUALITY ASSURANCE

A. Preinstallation Meeting: Convene a preinstallation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this section, including Contractor, Architect, and installer. Review installation, protection, and coordination with other work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:

1. Store products in manufacturer's unopened packaging until ready for installation.

2. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Handling: Protect materials during handling and installation to prevent damage.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: Basis of Design product Griffolyn or comparable product by, but not limited to, one of the following:

1. WR Meadows

2. Carlisle Coatings and Waterproofing

3. Approved equal

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.1 MATERIALS

A. Reinforced Vapor Retarder for use under concrete slabs complying with ASTM E 1745 Class A.

1. Material: 4-ply laminate, combining 2 layers of high-density polyethylene and a high-strength non-woven cord grid with a layer of non-woven geotextile fiber.

2. Weight: 73 lb/1,000 sq ft (35.7 kg/100 sq m), when tested in accordance with ASTM D 3776.

3. Puncture Propagation Tear: 55 lb (245 N), when tested in accordance with ASTM D 2582.

4. Permeance (Perm): 0.038 grains/hr-sq ft-in Hg (2.18 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.

5. Drop Dart: 2300 g, when tested in accordance with ASTM D 1709.

6. Tensile Strength: 160 lb/1,350 psi (710 N/9.3 MPa), when tested in accordance with ASTM D 882, 3 inch (76 mm) wide specimen.

7. Puncture Strength: 60 lb (265 N), when tested in accordance with ASTM D 4833.

8. Classification: Class A, when tested in accordance with ASTM E 1745.

9. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).

10. Application: Use under concrete slabs, over aggregate fill.

11. Application: Use under concrete slabs, under aggregate fill.

B. Vapor Retarder complying with ASTM E 1745 Class A.

1. Material: Extruded polyethylene film

2. Weight: 49 lbs/1,000 sq ft (23.9 kg/100 sq m), when tested in accordance with ASTM D 3776.

3. Puncture Propagation Tear: 34 lb (150 N), when tested in accordance with ASTM D 2582.

4. Permeance (Perm): 0.027 grains/hr-sq ft-in Hg (1.549 ng/(Pa-s-sq m)), when tested in accordance with ASTM E 96.
5. Drop Dart: 2270 g, when tested in accordance with ASTM D 1709.
6. Tensile Strength (1" Tensile) : 44 lb/4400 psi (195 N/30.3 MPa), when tested in accordance with ASTM D 882, .
7. Puncture Strength: 24 lb (107 N), when tested in accordance with ASTM D 4833.
8. Usable Temperature Range: Minus 25 to 170 degrees F (minus 32 to 77 degrees C).
9. Application(s):
    a. Roofing underlayment.
    b. Use on exterior walls on inside face of framing.
    c. Use under concrete slabs, over aggregate fill.
    d. Use under concrete slabs, under aggregate fill.

2.2 ROOFING UNDERLAYMENT - EXTENDED HIGH TEMPERATURE.

A. Basis of Design: Self-Adhering Sheet Membrane Roof Underlayment: Provide Ultra by GCP Applied Technologies, Inc with the following characteristics:

1. Cold applied, self-adhering membrane composed of a high strength polyethylene film coated on one side with a layer of butyl rubber adhesive and interwound with a disposable release sheet. An embossed, slip resistant surface is provided on the polyethylene.
2. Color: Gray-black.
3. Membrane Thickness: 30 mil (0.76 mm) ASTM D3767 method A.
4. Tensile strength, Membrane: 250 psi (1720 kN/m^2) ASTM D412 (Die C modified).
5. Elongation, Membrane: 250% ASTM D412 (Die C modified).
6. Low Temperature Flexibility: Unaffected @ -20°F (-29°C) ASTM D1970.
7. Adhesion to Plywood: 3.0 lbs/in width (525 N/m) ASTM D903.
8. Permeance (max): 0.05 Perms (2.9 ng/m^2s Pa) ASTM E96.
9. Material Weight Installed (max): 0.22 lb/ft^2 (1.1 kg/m^2) ASTM D461.

10. Service Temperature: 300 degrees F (148.8 degrees C) per ASTM D1204

11. Primer: Water-based Perm-A-Barrier WB Primer by GCP Applied Technologies, Inc.

12. Code and Standards Compliance: Ultra meets the following requirements:

    a. ICC ESR-1677 approval according to AC-48 Acceptance Criteria for Self-Adhered underlayments used as Ice Barriers

    b. Underwriters Laboratories, Inc. R13399 Class A fire classification under fiberglass shingles and Class C under organic felt shingles.

    c. Underwriters Laboratories, Inc. Classified Sheathing Material Fire Resistance Classification Design Numbers P225, P227, P230, P237, P259, P508, P510, P512, P514, P701, P711, P717, P722, P723, P732, P734, P742, P824.

B. Manufacturer: GCP Applied Technologies, Inc, 62 Whittemore Avenue, Cambridge, MA 02140, Toll Free 866-333-3726, www.gcpat.com.

C. Or Approved Equal

2.3 ACCESSORIES

A. General: Ensure accessories are from same manufacturer as reinforced vapor retarders.

B. Mastic Tape: Griffolyn Fab Tape. RI Part Number: 60-0002.

1. Description: Black, double-sided, asphaltic, pressure-sensitive, mastic tape.

2. Weight: 3.75 pounds per 100 feet (1.7 kg per 30 m).

3. Thickness: 35 mils (0.9 mm).

4. 3 Inch Seam Shear: 35 pounds (156N).

C. Self-Adhesive Repair Tape: Griffolyn Sealant Tape RI Part Number: 60-0153.

1. Description: Reinforced white backing with Gray Adhesive.

2. Weight: 3.0 lbs for 4 inch x 50 foot roll.

3. Thickness: 26 mils (0.65 mm).

4. 3 inch Seam Shear: 30 lbs (134 N)

D. Pipe Boots: Griffolyn pipe boots, factory-fabricated.

E. Batten Strips: Manufacturer's standard for required application.

F. Fasteners: Manufacturer's standard for required application.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine surfaces and areas to receive reinforced vapor retarders. Notify Architect in writing of defects of work and other unsatisfactory site conditions that would cause defective installation of vapor retarders. Do not begin installation until unacceptable conditions have been corrected.

B. Verify site dimensions.

C. Commencement of work will imply acceptance of substrate.

3.1 INSTALLATION

A. Install reinforced vapor retarders in accordance with manufacturer's instructions.

B. Install reinforced vapor retarders in accordance with manufacturer's instructions and ASTM E 1643 at concrete slabs.

C. Install vapor retarders continuously at locations as indicated on the drawings. Ensure there are no discontinuities in vapor retarder at seams and penetrations.

D. Install vapor retarders in largest practical widths.

E. Ensure surface beneath vapor retarder is smooth with no sharp projections.

F. Join sections of vapor retarder and seal penetrations in vapor retarder with mastic tape. Ensure vapor retarder surfaces to receive mastic tape are clean and dry.

G. Immediately repair holes in vapor retarder with self-adhesive repair tape.

H. Seal around pipes and other penetrations in vapor retarder with pipe boots in accordance with manufacturer's instructions.

3.2 CLEANING AND PROTECTION

A. Protect reinforced vapor retarders from damage until covered by roof insulation.

B. Protect reinforced vapor retarders from damage until covered by wall finish.

C. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab.

D. Immediately repair damaged vapor retarder in accordance with manufacturer's instructions.

3.3 WARRANTY

A. Provide manufacturer’s standard warranty, minimum two (2) years from date of substantial completion.

– End of Section –

SECTION 07 27 26

FLUID APPLIED MEMBRANE AIR BARRIER

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Vapor permeable, fluid applied air barriers.

1.1 RELATED SECTIONS

Section 04 20 00 – Concrete Block Masonry
Section 07 41 13 – Metal Roof and Wall Panels

1.2 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and WORK scheduling that covers air barriers.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Contractor Submittals.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Instructions for evaluation, preparing, and treating each substrate; technical data; dry film thickness; and tested physical and performance properties of products.

C. Shop drawings: For air-barrier assemblies.

1. Show locations and extents of air-barrier materials, accessories, and assemblies specific to project conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of the air barrier.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Apply air barrier to exterior wall assembly, min 150 SF, incorporating backup wall construction, door frame and sill, penetrations, and flashing to demonstrate surface preparation, joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.

a. Mockups may be in situ and if accepted by OWNER's Representative may become part of the WORK. If mockups are in situ and not accepted, they must be removed and re-built until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents unless OWNER's Representative specifically approves such deviations in writing as part of the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight and observe manufacturer storage instructions for storage.

C. Protect substrates from environmental conditions affecting air-barrier performance.

D. Do not apply air barrier to damp or wet substrate or during snow, rain, fog, or mist.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Source limitations: Obtain primary air-barrier materials and air-barrier accessories from a single source from a single manufacturer.

B. VOC content: 100 g/L or less.

2.1 PERFORMANCE REQUIRMENTS

A. Air-barrier performance: air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies to be capable of accommodating substrate movements and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-barrier assembly air leakage: Maximum 0.04 cfm/SF of surface area at 1.57 lbs/SF, when tested according to ASTM E2357.

2.2 MANUFACTURERS: AIR BARRIERS, VAPOR RETARDING

A. Vapor-retarding air barrier: synthetic polymer material with an installed dry film thickness, according to manufacturer's written instructions, of 15 to 30 mils over substrates.

1. Manufacturer: Basis of Design product is PROSOCO, Inc, CAT 5. Subject to compliance with requirements, provide it or product by one of the following:
    a. Carlisle Coasting and Waterproofing.
    b. Tremco Commercial Sealants and Waterproofing. WR Meadows.
    c. Or equivalent.
2. Physical and performance properties:
    a. Air permeance: Maximum 0.004 cfm/SF or surface area at 1.57 lbf/SF pressure difference; ASTM E2178.
    b. Vapor permeance: Maximum 0.1 perm.
    c. Ultimate elongation: Minimum 350 percent; ASTM D412, Die C.

d. Adhesion to substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D4541.

e. Fire propagation characteristics: Passes NFPA 285 testing as part of an approved assembly.

f. UV resistance: Can be exposed to sunlight for 180 days according to manufacturer's written instructions.

2.3 ACCESSORY MATERIALS

A. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate parching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal

B. Primer: liquid water-borne primer recommended for substrate by air-barrier material manufacturer.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine substrates, areas, and conditions with installer present, for compliance with requirements and other conditions affecting the performance of the WORK.

1. Verify substrates are sound and free of oil, grease, dirt excess mortar, or other contaminants.

2. Verify substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.

3. Verify substrates are visibly dry and free of moisture. Test concrete substrates for capillary moisture by plastic sheet method according to ASTM D4263.

B. Proceed with installation only after satisfactory conditions have been achieved.

C. Start of installation indicates approval of surfaces.

3.1 PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Masking off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetration contaminants for film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching material.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.2 ACCESSORIES INSTALLATION

A. Install accessory materials according to air-barrier manufacturer's written instructions and details to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.

2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate.

3. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

4. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

B. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

C. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.

D. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

E. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip or preformed silicone extrusion so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of full contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

2. Preformed Silicone Extrusion: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.

F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air-barrier material with foam sealant.

G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.

H. Seal top of through-wall flashings to air barrier with an additional 6-inch-wide, transition strip.

I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches beyond repaired areas in strip direction.

3.3 PRIMARY AIR-BARRIER MATERIAL INSTALLATION

A. Apply air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions and details. Apply air-barrier material within manufacturer's recommended application temperature ranges.

1. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

2. Limit priming to areas that will be covered by air-barrier material on same day. Reprime areas exposed for more than 24 hours.

3. Where multiple prime coats are needed to achieve required bond, allow adequate drying time between coats.

B. Medium-Build Air Barriers: Apply continuous unbroken air-barrier material to substrates according to the following thickness. Apply an increased thickness of air-barrier material in full contact around protrusions such as masonry ties.

1. Vapor-Permeable, Medium-Build Air Barrier: Total dry film thickness as recommended in writing by manufacturer to comply with performance requirements, applied in one or more equal coats. Apply additional material as needed to achieve void- and pinhole-free surface, but do not exceed thickness on which required vapor permeability is based.

2. Do not cover air barrier until it has been tested and inspected by testing agency.

3. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: OWNER will engage a qualified testing agency to perform inspections.

B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.

2. Air-barrier dry film thickness.

3. Continuous structural support of air-barrier system has been provided.
4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
5. Site conditions for application temperature and dryness of substrates have been maintained.
6. Maximum exposure time of materials to UV deterioration has not been exceeded.
7. Surfaces have been primed, if applicable.
8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
9. Termination mastic has been applied on cut edges.
10. Strips and transition strips have been firmly adhered to substrate.
11. Compatible materials have been used.
12. Transitions at changes in direction and structural support at gaps have been provided.
13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
14. All penetrations have been sealed.

C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

E. OWNER's testing agency will prepare inspection reports.

3.5 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed WORK using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

C. Remove masking materials after installation.

– End of Section –

SECTION 07 41 13

METAL ROOF AND WALL PANELS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Metal roofing, including flashing and accessories.

B. Metal wall and fascia panels.

C. Metal soffit panels.

1.1 RELATED SECTIONS

Section 07 62 00 – Sheet Metal Flashing and Trim
Section 07 92 00 – Joint Sealants

1.2 REFERENCES

A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2001a.

B. ASTM A792 / A792M - Standard Specification for Steel Sheet, 55 percent Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

C. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2001.

D. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 1991 (Reapproved 1999).

E. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000.

F. ASTM E 408/C - 1371: Standard Test Method for Total Normal Emittance of Surfaces Using inspection - Meter Techniques.

G. ASTM E 903/C - 1549: Standard Test Method for Solar Absorptance, using Integrating Spheres.

H. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference; 1995.

I. ASTM E 1680 - Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems; 1995.

J. Dade County (Florida) Acceptance Report Numbers: 01-1106-01 and 01-1106-02.

K. FM - Tests Requirements for Class 1 Panel roofs, Factory Mutual Research Corporation.

L. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; 1994.

M. UL2218: Class 4 Impact Resistance Rating.

N. SMACNA (ASMM) - Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association; 1993.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 – Contractor Submittals.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors and textures.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

G. Operation and Maintenance Data: Include methods for maintaining installed products and precautions relating to cleaning materials and methods that might be detrimental to finishes and performance.

H. Close Out: Warranty documents specified herein.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer with documented experience in performing WORK of this section who has specialized in the installation of WORK similar to that required for this project.

B. Pre-Installation Meeting: Conduct pre-installation meeting to acquaint installers of roofing and related WORK with project requirements, substrate conditions, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging with identification labels intact until ready for installation.

1. Store materials protected from exposure to harmful conditions. Store material in dry, above ground location.

2. Stack pre-finished material to prevent twisting, bending, abrasion, scratching, and denting. Elevate one end of each skid to allow moisture to run off.

3. Prevent contact with material that may cause corrosion, discoloration, or staining.

4. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside the manufacturer’s absolute limits.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: Basis of Design product AEP standing seam roof and wide batten wall panels or comparable product by, but not limited to, one of the following:

1. PAC-Clad, A Carlisle Company

2. Western States Metal Roofing

3. Approved equal.

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 – Product Requirements.

2.1 SHEET METAL ROOFING

A. General: Factory fabricated panels; panels fabricated on site using portable roll former are prohibited.

1. Performance Requirements: Provide sheet metal roofing that has been manufactured, fabricated and installed to achieve the following performance without defects, damage, failure or infiltration of water.

a. Wind Uplift: Provide UL 580 Class 90 rated assembly.

b. FM: Test Requirements for Class 1 panel roofs.

c. Static Air Infiltration: 0.06 cu ft/min/sq ft (1.1 cu m/h/sq m) at 6.24 lb/sq ft (300 Pa) air pressure differential, maximum, when tested in accordance with ASTM E 283 or ASTM E 1680.

d. Water Infiltration: No evidence of water penetration at inward static air pressure differential of 12.0 lb/sq ft (575 kPa), when tested in accordance with ASTM E 331 or ASTM E 1646.

e. Thermal Movement: Accommodate movement expected due to ambient and surface temperature ranges likely to occur at project site.

2. Panel Lengths: As indicated on drawings; panels 55 feet (16.76 m) and less fabricated in one continuous length.

3. Texture: Smooth texture, dull matte specular gloss 25 to 35 percent at 60 degrees F (15.5 degrees C).

4. Finish: Factory applied finish:

a. Topside: Full-strength fluoropolymer, 70 percent Kynar 500 or Hylar resin, 1.0 mil (0.025 mm) total dry film thickness.

b. Underside: Wash coat of 0.3 to 0.4 mil (0.076 to 0.1 mm) dry film thickness.

c. Color: As selected by Architect from manufacturer's standard colors.

5. Panel Fasteners: Non-penetrating type, as required to achieve wind uplift rating or otherwise as recommended by manufacturer.

B. Roof Panels: AEP Span Panels; tension-leveled panels with 2 inch (50 mm) high mechanically crimped standing seams.

1. Seam Style: Double-folded to 90 degrees.

2. Seam Style: Triple-folded to 180 degrees (Tite-Loc Plus).

3. Material: 24 gage, 0.024 inch (0.61 mm) ASTM A792 /A792M Galvalume steel, structural quality.

4. Panel Width: 18 inch (457 mm), center to center.

5. Eave Notching: Factory produced eave notching for trimmed eave panels.

6. Sealant Bead: Factory applied sealant bead.

C. Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed; fabricated as recommended in SMACNA Architectural Sheet Metal Manual.

1. Material: 24 gage, 0.024 inch (0.61 mm) ASTM A 653/A 653M A792 /A792M Galvalume steel, structural quality.

2. Finish: To match roof panels.

3. Color: To match roof panels.

2.2 METAL WALL PANELS

A. General: Factory fabricated panels; panels fabricated on site using roll former are prohibited.

1. Performance Requirements: Provide factory-formed metal wall panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners. Include accessories required for weathertight installation.

a. Thermal movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculation of surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

b. Temperature change (range): 120 deg F, ambient; 180 deg F, material surfaces.

2. Texture: Smooth texture, dull matte specular gloss 25 to 35 percent at 60 degrees F (15.5 degrees C).

3. Finish: Factory applied finish:

a. Topside: Full-strength fluoropolymer, 70 percent Kynar 500 or Hylar resin, 1.0 mil (0.025 mm) total dry film thickness.

b. Underside: Wash coat of 0.3 to 0.4 mil (0.076 to 0.1 mm) dry film thickness.

c. Color: As selected by Architect from manufacturer's standard colors.

4. Panel Fasteners: Concealed type, as required to achieve wind uplift rating or otherwise as recommended by manufacturer.

B. Wall panels: AEP Wide Batten panels and battens.

1. Material: 24 gage, 0.024 inch (0.61 mm) ASTM A792 /A792M Galvalume steel, structural quality.

2. Panel Width: 17 ¼" inch (457 mm), center to center.

C. Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed; fabricated as recommended in SMACNA Architectural Sheet Metal Manual.

1. Material: 24 gage, 0.024 inch (0.61 mm) ASTM A 653/A 653M A792 /A792M Galvalume steel, structural quality.

2. Finish: To match wall panels.

3. Color: To match wall panels.

2.3 ACCESSORY MATERIALS

A. Insulation: Per Section 07 21 00 – Thermal Insulation.

B. Sealant: Per Section 07 92 00 – Joint Sealants.

C. Touch-Up Paint: Approved by panel manufacturer.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Verify that substrates are acceptable for roofing installation in accordance with manufacturer's instructions.

B. Do not begin installation until the substrates have been properly prepared.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate metal roofing with other WORK, including but not limited to drainage, flashing and trim, deck substrates, parapets, copings, walls, and other adjoining WORK.

C. Install metal roofing panels to profiles, patterns and drainage indicated, in accordance with manufacturer's instructions, and as necessary to achieve specified performance and a leak-free Installation. Allow for structural and thermal movement.

D. Separate dissimilar metals using bituminous coating to prevent galvanic action.

E. Use fasteners recommended by panel manufacturer; conceal fasteners wherever possible; cover and seal exposed fasteners.

F. Provide uniform, neat seams; provide sealant-type joint where indicated and form joints to conceal sealant.

3.2 FIELD QUALITY CONTROL

A. Post Installation Testing: OWNER reserves right to perform post installation testing of installed sheet metal roofing.

3.3 CLEANING AND PROTECTION

A. Remove temporary coverings and protection of adjacent WORK areas.

B. Touch-up, repair or replace damaged products.

C. Clean in accordance with manufacturer's instructions prior to Substantial Completion.

D. Remove construction debris from project site and legally dispose of debris.

E. Protect installed products until completion of project.

F. Touch-up, repair or replace damaged products before Substantial Completion.

3.4 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's standard warranty document executed by authorized company official covering finish, including color, fade, chalking and film integrity.

B. Warranty Period: 20 years commencing on Date of Substantial Completion.

– End of Section –

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Formed roof-drainage sheet metal fabrications:

1. Gutters.
2. Downspouts.

B. Formed roof sheet metal fabrications:

1. Base flashing.
2. Counterflashing.
3. Flashing receivers.
4. Cold pipe roof-penetration flashing.
5. Hot pipe roof-penetration flashing.

C. Formed wall sheet metal fabrications:

1. Trim at perimeter and in field of facade and siding panels.

D. Formed equipment support flashing.

E. Underlayment Materials:

1. Self-Adhering, high-temperature sheet flashing membrane.

F. Miscellaneous materials for sheet metal flashing and trim.

1.1 RELATED REQUIREMENTS

Section 04 20 00 – Concrete Block Masonry
Section 07 41 13 – Metal Roof and Wall Panels
Section 07 72 33 – Roof Hatches
Section 07 92 00 – Joint Sealants
Section 08 11 13 – Hollow Metal Doors, Windows, and Frames

1.2 REFERENCES

A. Reference Standards:

1. SMACNA (Sheet Metal and Air Conditioning Contractors' National Association) Architectural Sheet Metal Manual.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim:

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of roof-penetration flashing.
8. Include details of edge conditions, including the following and others as applicable:
    a. Roof edge flashings.
    b. Counterflashings.
9. Include details of special conditions.
10. Include details of connections to adjoining work.

11. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Verification: For each type of exposed finish:

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.

2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.

3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. Shop shall be listed as able to fabricate required details for following:

a. Roof Edge Flashings.

b. Door flashings: header, sill

c. Roof vent flashings

d. Roof hatch flashings

e. Counterflashings

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.8 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.0 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standards:

1. For Flashings: Comply with requirements indicated in the following publications for dimensions and profiles shown unless more stringent requirements are indicated.

a. NRCA's The NRCA Roofing Manual.

b. SMACNA's Architectural Sheet Metal Manual.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275).

1. Surface Texture:

a. Smooth, flat.

2. Surface Finish or Coating:

a. Coil-Coated Paint Finishes: Metallic-coated steel sheet prepainted by coil-coating process to comply with ASTM A 755/A 755M.

i. Exposed Surface Finish:

1) Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

ii. Exposed Surface Color: To match roof panels, 07 41 13 Metal Roof Panels

iii. Concealed Surface Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.2 UNDERLAYMENT MATERIALS

A. See 07 26 00 – Vapor Barrier.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete

sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Zinc-Coated (Galvanized) and Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:

1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm to 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

2. Use lapped expansion joints only where indicated on Drawings.

D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

G. Seams: Shop fabricate nonmoving seams with flat-lock seams and seal as follows:

1. Metallic-Coated Steel Sheet:

a. With Coil-Coated Painted Finish: Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

H. Do not use graphite pencils to mark metal surfaces of the following:

1. Aluminum-zinc alloy-coated steel sheet.

2.5 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters. Shop-fabricated interior and exterior corners.

1. Gutter Profile: As indicated on Drawings according to cited sheet metal standard.

2. Expansion Joints: Butt type with cover plate.

3. Gutters with Girth 16 to 20 Inches (410 to 510 mm): Fabricate from the following materials:

a. Galvanized Steel: 0.028 inch (0.71 mm) thick.

b. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from the same material as downspouts and anchors. Shop fabricated elbows.

1. Fabricated Hanger Style: As indicated on Drawings according to SMACNA's Architectural Sheet Metal Manual.

2. Fabricate from the following materials:

a. Galvanized Steel: 0.022 inch (0.56 mm) thick.

b. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

2.6 ROOF SHEET METAL FABRICATIONS

A. Counterflashing: Shop fabricated interior and exterior corners. Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch (0.56 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

B. Flashing Receivers: Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch (0.56 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

C. Cold Pipe Roof-Penetration Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

2.7 WALL SHEET METAL FABRICATIONS

A. Provided by Metal Panel Manufacturer.

B. Trim at Perimeter and in Field of exterior metal wall panels: Fabricate top, bottom, side, and similar trim to frame and overlap edges of panels. Fabricate vertical and horizontal joint trim to cover gap between panels; fabricate horizontal joint trim to shed water from backside to front face of panel. Fabricate inside and outside corner trim to cover gap between panels and to frame panel edges. Extend back leg of trim not less than 2 inches (50 mm) behind panel. Leg framing panel edges must extend to front face of panel unless indicated otherwise on Drawings. Fabricate from the following materials:

1. Galvanized Steel: 0.022 inch (0.56 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch (0.56 mm) thick.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch (0.71 mm) thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch (0.71 mm) thick.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.

2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

3. Verify that air-or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.

4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.

5. Torch cutting of sheet metal flashing and trim is not permitted.

6. Do not use graphite pencils to mark metal surfaces of the following:

    a. Aluminum-zinc alloy-coated steel sheet.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of flashing and trim fabricated from the following sheet metal(s) with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install following underlayment(s).

    a. Self-Adhering, high-temperature sheet.

C. Expansion Provisions:

1. Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

    a. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

    b. Use lapped expansion joints only where indicated on Drawings. Apply sealant tape concealed in joint.

2. Conceal where possible in exposed work.

3. Locate to minimize possibility of leakage.

4. Cover and seal anchors as required for a tight installation.

D. Fasteners:

1. Size: Use fastener sizes that:

a. Penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

b. Penetrate other substrates not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

2. Conceal where possible in exposed work.

3. Locate to minimize possibility of leakage.

4. Cover and seal as required for a tight installation.

E. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 to 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).

2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 – Joint Sealants.

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder the following:

a. Metallic-coated steel sheet with coil-coated painted finish.

2. Do not use torches for soldering.

3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

G. Rivets:

1. Where necessary for strength, rivet field joints if riveting is permitted for shop fabricated joints.

2. Do not rivet soldered joints unless otherwise indicated.

3. Rivets heads exposed to view must closely match color of sheet metal finish.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Gutters:

1. General:

a. Sealant seal section joints for the following:

i. Metallic-coated steel sheet with clear acrylic finish.

ii. Metallic-coated steel sheet with coil-coated painted finish.

b. Provide for thermal expansion.

c. Attach gutters at eave or fascia to firmly anchor them in position.

d. Provide end closures and seal watertight with sealant. Slope to downspouts.

2. Anchor gutter with gutter brackets spaced not more than 30 inches (760 mm) apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.

3. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet (15.24 m) apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch (38 mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1,500 mm) o.c.

2. Provide elbows at base of downspout to direct water away from building.

3. Connect downspouts to underground drainage system.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where

possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

1. Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.

C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 FORMED WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Flashings at Openings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend beyond wall openings as indicated on Drawings.

C. Trim at perimeter and in field of metal wall panels: Installation as indicated on Drawings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm to 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

A. Clean the following exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

– End of Section –

SECTION 07 72 33

ROOF HATCHES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Roof hatch access covers.

B. Roof hatch insulated curb.

1.1 RELATED SECTIONS

Section 05 11 00 – Structural Steel Framing
Section 07 41 13 – Metal Roof and Wall Panels
Section 07 62 00 – Sheet Metal Flashing and Trim

1.2 COORDINATION

A. Coordinate layout and installation of roof access covers and insulated curbs with standing seam metal roofing and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

C. Locate as indicated on Drawings. Verify position above pump will allow future removal.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Provide shop drawings showing layout, profiles, and product components, including anchors, hardware, and finishes. Include dimensioned plan drawings, applicable materials specifications, and section detailing mounting and connections.

1. Contractor to provide manufacturer with field measurements for shop drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof access cover hatches to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer must demonstrate a minimum of five (5) years of experience in design and manufacture of similar. Manufacturer to provide supporting evidence including list of installations including descriptions, building/project names, and associated contact information.

B. Minimum Qualifications: Manufacturer must demonstrate compliance and certification of a Quality Management System administered by the International Organization for Standardization (ISO). Documentation of current certification to be provided upon request.

C. Welder Qualifications: Welders certified according to American Welding Society Procedures for applicable material used in production of specified product.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in unopened packaging container with identification intact until ready for installation.

B. Protect materials from exposure to moisture during storage.

C. Store materials in a dry, warm, ventilated, weather-protected location. If outdoor storage is required, block materials to store at an incline to prevent pooling. Cover materials with tarp to protect from precipitation and avoid condensation and allow ventilation.

D. Use caution when handling and unloading to prevent damage including but not limited to bending, denting, and crushing.

E. When using forklifts, use forks of proper length to fully support product.

1.7 WARRANTY

A. Manufacturer's Standard Warranty: Product to be free from defects in material and workmanship for a period of five (5) years from date of installation.

PART 2 – PRODUCTS

2.0 ROOF HATCH

A. Basis of design: RCS Removable Roof Access Cover, manufacture by RCS Fabrication Inc., 800-683-5848.

1. Or approved equal.

B. Insulated Roof Access Cover Hatches: Metal roof access cover with lifting ring, with weatherstripping to prevent entry of dust, debris, and moisture. Place atop insulated curb with flat mounting surface. Roof access hatch designed for specific loads and will transfer to adjacent structure. Curb to be anchored firmly. Provide rectangular curb opening with square corners to facilitate easy passage.

C. Type and Size: Roof access cover hatch, size as indicated on the Drawings.

D. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 20-lbf/sq. ft. (0.95-kPa) internal uplift load.

E. Hatch Material: Zinc-coated (galvanized) Aluminum-zinc alloy-coated steel sheet.

1. Thickness: Manufacturer's standard thickness for hatch size indicated.

2. Finish: Factory prime coating.

F. Curb Construction:

1. Insulation: Polyisocyanurate board.

a. R-Value: 10.0 according to ASTM C 1363.

2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.

3. Fabricate curbs to minimum height indicated on drawings.

2.1 METAL MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation and mill phosphatized for field painting where indicated.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).

B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).

2.2 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

C. Verify dimensions of roof openings for roof hatches.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 INSTALLATION

A. General: Install roof hatches according to manufacturer's written instructions.

1. Install roof hatches level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.

2. Anchor roof hatches securely in place so they are capable of resisting indicated loads.

3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof hatches and fit them to substrates.

4. Install roof hatches to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Underlayment: Where installing roof hatches directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.

C. Roof-Hatch Installation:

1. Verify that roof hatch access cover can be removed. Install in accordance with manufacturer’s installation instructions, approved Construction Drawings, shipping and handling instructions, storage instructions, and product carton instructions.

2. Install square and rigid,

3. Tolerances: All dimensional requirements to be in accordance with manufacturer’s instructions and approved Construction Drawings.

4. Verify anchorage is in accordance with manufacturer’s installation instructions and data sheets.

5. Inspect weatherseal for damage, wear, and loss of adhesion. Replace compromised weatherseals.

3.2 REPAIR AND CLEANING

A. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 90 00 – Painting and Coatings.

B. Clean all sealing surface and exposed surfaces according to manufacturer's written instructions.

C. Clean off excess sealants.

D. Replace roof hatches that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

E. Protect installed products through project completion.

– End of Section –

SECTION 07 92 00

JOINT SEALANTS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Polyurethane sealants.

B. Primers for polyurethane sealants.

C. Acrylic latex joint sealants.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-in-Place Concrete
Section 04 20 00 – Concrete Block Masonry
Section 08 11 13 – Hollow Metal Doors, Windows, and Frames

1.2 REFERENCES

A. ASTM International (ASTM)

1. ASTM C510 - Standard Test Method for Staining and Color Change of Single- or Multicomponent Joint Sealants.
2. ASTM C639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants.
3. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
4. ASTM C679 - Standard Test Method for Tack-Free Time of Elastomeric Sealants.
5. ASTM C719 - Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).
6. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants.
7. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.

8. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
9. ASTM C1382 - Standard Test Method for Determining Tensile Adhesion Properties of Sealants When Used in Exterior Insulation and Finish Systems (EIFS) Joints.
10. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
11. ASTM D2240 - Standard Test Method for Rubber Property - Durometer Hardness.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data:

1. Manufacturer's data sheets on each product to be used.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations. Typical installation methods.
4. Verification Samples: Two representative units of each type, size, pattern and color.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing WORK of this section with minimum two years documented experience with projects of similar scope and complexity.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up

as acceptable to Architect and provide temporary foundations and support.

1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
3. Retain mock-up during construction as a standard for comparison with completed WORK.
4. Do not alter or remove mock-up until WORK is completed or removal is authorized.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: Basis of Design product Sherwin Williams or comparable product by, but not limited to, one of the following:

1. Sherwin-Williams
2. Tremco Sealants
3. Sika USA
4. DAP Global, Inc.

2.1 POLYURETHANE JOINT SEALANTS

A. Exterior: Basis of Design: LOXON H1; as manufactured and supplied by Sherwin Williams. One component, low modulus, high performance, high movement, fast-curing, non-sag, gun-grade, moisture cure, hybrid sealant.

1. Standards Compliance: Meets or exceeds the following:

   a. ASTM C920, Type S, Grade NS, Class 50, Use: NT, A, M, and O.

   b. TT-S-00230 C, Type 11, Class A, Non-Sag.

   c. TT-S-001543A, Type II, Class A, Non-Sag.

2. Properties, Uncured:

   a. Tack free Time per ASTM C679: 90 minutes.

   b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: 2 to 7 days depending on bead size. Varies with relative humidity.

   c. Flow, Sag or Slump per ASTM C639: Passes.

   d. Staining per ASTM C510: Passes.

3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).

   a. Hardness (Shore A) per ASTM C661: 16, plus or minus 2.

   b. Tensile Strength per ASTM D412: 140-180 psi (965.3 to 1241 kPa).

   c. Elongation per ASTM D412: 800-1,000 percent.

   d. Adhesion in Peel per ASTM C794: 35 pli.

   e. Stain and Color Change per ASTM C510: Passes.

   f. Ozone Resistance: Good.

   g. Joint Movement Capability per ASTM C719: Plus or minus 50 percent.

h. Substrate: Primed mortar, unprimed glass, aluminum.

i. Extension per ASTM C1382: 100 percent.

j. UV Resistance per ASTM C793: Good.

4. Substrates: EIFS, cementitious board, masonry, stucco, concrete, wood, vinyl, aluminum, steel, ceramics, clay and concrete roof tiles, and stone.

5. Shelf Life: 15 months from date of manufacturer when stored at room temperature.

6. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons and extremes in temperature.

7. Joints accommodate 100 percent total joint movement while not affecting the seal or adhesion bond.

8. Joints properly designed and sealed will extend and compress a total of 100 percent of installation width with no more than 50 percent movement in a single direction.

9. Cured sealant can be painted with emulsion or synthetic enamel paints.

10. Unaffected by contact with water after cure on non-porous substrates.

11. Porous Substrates: Priming is recommended if sealant will be subjected to sporadic periods of immersion. Not intended for continuous immersion.

12. Color: To be selected from manufacturer's standard color.

B. Self Leveling: Basis of Design: LOXON SL1; as manufactured and supplied by Sherwin Williams. One component, self-leveling, moisture cure, elastomeric polyurethane sealant.

1. Standards Compliance: Meets or exceeds the following:

a. ASTM C920, Type S, Grade P, Class 25, Use: NT, A, M, O, and T.

b. TT-S-00230C, Type I, Class A.

c. CAN/CGSB-19.13-M87.

2. Properties, Uncured:

   a. Tack free Time per ASTM C679 and TT-S-00230C: Passes; less than 72 hours.

   b. Curing Time at 75 Degrees F (23.9 degrees C) and 50 Percent RH: Skins less than 24 hours. Full Cure: Approximately one week.

3. Properties, After Full Cure. At 75 degrees F (23.9 degrees C) and 50 percent RH. The physical properties will remain relatively unchanged over a temperature range of minus 40 to 180 degrees F (minus 40 to 82.2 degrees C).

   a. Hardness (Shore A) per ASTM D2240/ASTM C661: 25, plus or minus 2.

   b. Tensile Strength per ASTM D412: 300 psi (kPa).

   c. Elongation per ASTM D412: 800 percent.

   d. Ozone Resistance: Good.

   e. Joint Movement Capability per TT-S-00230C/ASTM C719/ASTM C793: Plus or minus 25 percent.

   f. UV Resistance per ASTM C793: Good.

4. Color: To be selected from manufacturer’s standard color.

5. Substrates: Concrete and metal.

6. Shelf Life: 12 months from date of manufacturer when stored at room temperature.

7. Excellent weatherability when exposed to ultraviolet radiation, atmospheric hydrocarbons, and extremes in temperature.

8. Joints accommodate 50 percent total joint movement while not affecting the seal or adhesion bond.

9. Joints properly designed and sealed will extend and compress a total of 50 percent of installation width with no more than 25 percent movement in a single direction.

10. Cured sealant can be painted with emulsion or synthetic enamel paints.

11. Unaffected by contact with water after cure on non-porous substrates.

12. Porous Substrates: Priming is recommended if sealant will be subjected to prolonged periods of immersion.

2.2 ACRYLIC LATEX JOINT SEALANTS

A. Basis of Design: 950A Siliconized Acrylic Latex Caulk; as manufactured and supplied by Sherwin Williams. For no/low movement areas, gap filling, paintable.

1. In accordance with ASTM C834, Type OP and C, Grade NF.

B. Basis of Design: Power House Siliconized Acrylic Latex Caulk; as manufactured and supplied by Sherwin Williams. For low/medium movement areas, wood trim, interior/exterior, and paintable.

1. In accordance with:

a. ASTM C834, Type OP and C, Grade NF.

b. ASTM C920, Class 12.5.

C. Basis of Design: Sher-Max Urethanized Elastomeric Sealant; as manufactured and supplied by Sherwin Williams. For high movement areas, crown molding, interior/exterior, paintable.

1. In accordance with:

a. ASTM C834, Type OP and C, Grade NF.

b. ASTM C920, Class 35.

2.3 JOINT SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance, and type indicated below except where approved otherwise in writing by joint-sealant manufacturer for joint application indicated:

1. Location, Exterior:
    a. Exposure, Wet:
        i. Position, Vertical:
            1) Type C (closed cell material with a surface skin).
            2) Type B (bicellular material with a surface skin).
        ii. Position, Horizontal:
            1) Type C (closed cell material with a surface skin).
            2) Type B (bicellular material with a surface skin).
    b. Exposure, Dry:
        i. Position, Vertical: Type B (bicellular material with a surface skin).
        ii. Position, Horizontal: Type B (bicellular material with a surface skin).
2. Location, Interior:
    a. Exposure, Wet:
        i. Position, Vertical:
            1) Type C (closed cell material with a surface skin).
            2) Type B (bicellular material with a surface skin).
        ii. Position, Horizontal:
            1) Type C (closed cell material with a surface skin).
            2) Type B (bicellular material with a surface skin).
    b. Exposure, Dry:
        i. Position, Vertical:

1) Type O (open-cell material)

2) Type B (bicellular material with a surface skin).

ii. Position, Horizontal: Type B (bicellular material with a surface skin).

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints

PART 3 – EXECUTION

3.0 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.1 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.3 FIELD QUALITY CONTROL

A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.4 CLEANING AND PROTECTION

A. Clean products in accordance with the manufacturer’s recommendations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.5 WARRANTY

A. Manufacturer's standard limited warranty unless indicated otherwise.

– End of Section –

DIVISION 08 – OPENINGS

SECTION 08 11 13

HOLLOW METAL DOORS, WINDOWS, AND FRAMES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Hollow steel doors and frames.

B. Hollow window frames and glazing.

1.1 RELATED SECTIONS

Section 08 71 00 – Door Hardware
Section 09 90 00 – Painting and Coatings

1.2 REFERENCES

A. American National Standards Institute (ANSI)/Steel Door Institute (SDI)

1. A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finished Painted Steel for Steel Doors and Frames.
2. A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frame Anchors and Hardware Reinforcing.
3. A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
4. A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. A250.11 - Recommended Erection Instructions for Steel Frames.

B. ASTM International (ASTM)

1. A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
2. A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
3. A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
4. C518 - Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

5. E413 - Classification for Rating Sound Insulation.

C. National Fire Protection Association (NFPA) 80 - Standard for Fire Doors and Fire Windows.

D. Steel Door Institute (SDI) 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.

E. Underwriters Laboratories (UL)

1. 10B - Standard for Fire Tests of Door Assemblies.

2. 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.

1.3 SUBMITTALS

A. Submittals for Review:

1. Shop Drawings: Show locations, elevations, dimensions, model designations, fire ratings, preparation for hardware, and anchoring details.

2. Product Data: Show elevations, dimensions, gages of metal, hardware reinforcing gages and locations, and anchor types.

B. Quality Control Submittals:

1. Certificates of Compliance: Certification that products furnished comply with ANSI/SDI A250.3, ANSI/SDI 250.4, and ANSI/SDI A250.10.

1.4 QUALITY ASSURANCE

A. Doors: ANSI/SDI A250.8.

1. Grade: II - Heavy Duty

2. Model: 1 - Full Flush.

B. Frames: ANSI/SDI A250.8, Grade II - Heavy Duty.

C. Installed by qualified tradesmen with no less than 2 years of experience in installing similar doors.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Ship door frames with removable angle spreader; do not remove until frame is installed.

B. Store doors upright in protected, dry area, off ground or floor, with at least 1/4-inch space between individual units.

C. Do not cover with non-vented coverings that create excessive humidity.

D. Remove wet coverings immediately.

1.6 CLOSEOUT DELIVERABLES

A. Closeout Deliverables for Doors and Frames:

1. Drawings and specifications updated to show changes that occurred during construction.
2. Shop drawings updated to show changes that occurred during construction.
3. Operation and maintenance information.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Acceptable manufacturers frames and doors:

1. Curries
2. Ceco
3. Steelcraft
4. Or equivalent

B. Acceptable manufacturers (glazing):

1. AIT Smartgard Security Glazing BP1000 insulated glazing units
   a. With 3M films to achieve SHGC of 0.40 or less.
2. Or equivalent.

C. Substitutions: Prior approved per Division 01

2.1 MATERIALS

A. All steels used to manufacture doors, door and window frames, anchors, and accessories shall meet at least one or more of the following requirements:

1. Cold rolled steel shall conform to ASTM designations A1008, Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability and A568, Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for accessories.

B. Frames:

1. Interior frames:
    a. Level 3 for door model [1] 0.053″ minimum steel thickness for frames.
2. Exterior frames:
    a. Level 3 for door model [1] 0.053″ minimum steel thickness for frames.
    b. Minimum one inch bite for window frames, with thermal break.

C. Doors:
1. Interior and exterior doors shall meet the following requirements:
    a. Level 3 – Extra heavy-duty 1-3/4″, Model 1 – Full flush
        i. Face steel sheet 0.053″ (1.3 mm) minimum thickness.

D. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

E. Glazing: Polycarbonate security glazing

2.2 FABRICATION

A. Fabricate doors and frames in accordance with ANSI/SDI A250.8.
1. Accurately form to required sizes and profiles.
2. Grind and dress exposed welds to form smooth, flush surfaces.
3. Do not use metallic filler to conceal manufacturing defects.
4. Fabricate with internal reinforcement for hardware specified in Section 08 71 00 – Door Hardware; weld in place.

B. Doors:
1. Full Flush, each door face shall be formed from a single sheet of steel of a thickness as defined above. There shall be no visible seams on the surface of the faces. A full height vertical seam is permitted on door edges.
2. All doors to be factory prepared to receive hardware per approved schedule, Section 08 71 00 – Door Hardware.

3. Door edges shall be fabricated utilizing Beveled Edge – standard bevel is 1/8″ (3.2 mm) in 2″ (50.8 mm) – narrow side of door is in contact with stop of frame when door is closed.

    a. Core: See ANSI/SDI A250.8,

    b. Door edge design: See ANSI/SDI A250.8

4. Minimum hardware reinforcing gages shall comply with Table 4 of ANSI/SDI A250.8, Specifications for Standard Steel Doors and Frames (SDI-100).

5. Fully insulated so that assembly has a U-factor of 0.37 maximum.

C. Frames:

1. Preformed shapes fabricated in thickness indicated above, 2″ face, depth as indicated on Drawings and as required to properly fit wall configurations.

2. Provide self-aligning tabs and slots to hold corners in alignment.

3. Frames shall be full profile weld type.

4. Provide frames~~,~~ other than slip-on drywall type with a minimum of three anchors per jamb suitable for the adjoining wall construction. Provide anchors of not less than 0.042″ (1.0 mm) in thickness or 0.167″ (4.2 mm) diameter wire.

5. Base anchors shall be provided, other than slip-on drywall type, with minimum thickness of 0.042″ (1.0 mm).

6. All frames shall be fully prepared for hardware per Section 08 71 00 – Door Hardware.

7. Minimum hardware reinforcing gages shall comply with Table 4 of ANSI/SDI A250.8, Specifications for Standard Steel Doors and Frames (SDI-100).

D. Design Clearances:

1. The clearance between the door and frame head and jambs shall be 1/8″ in the case of both single swing and pairs of doors.

2. The clearance at the bottom shall be 5/8″.

3. The clearance between the face of the door and doorstop shall be 1/16″ to 1/8″.

4. All clearances shall be, unless otherwise specified, subject to a tolerance of ± 1/32″.

E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.

2. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

3. Provide loose stops and moldings on inside of hollow-metal work.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

F. Manufacturing Tolerances: In accordance with SDI-117.

2.3 FINISHES

A. Dress tool marks and surface imperfections to smooth surfaces.

B. Clean and chemically treat steel surfaces.

C. Touch up damaged metallic coatings.

D. Apply manufacturer's standard rust inhibiting primer paint, air-dried, or baked on, meeting requirements of ANSI/SDI A250.10.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Frames shall be installed plumb, level, rigid and in true alignment as recommended in ANSI/SDI A250.11, Recommended Erection Instructions for Steel Frames. All frames other than slip-on types shall be fastened to the adjacent structure so as to retain their position and stability.

B. Grouting is required in masonry installations. Frames shall be braced or fastened in such a way that will prevent the pressure of the grout from deforming the frame members. Grout shall be mixed to provide a 4" (102 mm) maximum slump consistency, hand troweled into place. Grout mixed to a thin "pumpable" consistency shall not be used.

C. Doors shall be installed and fastened to maintain alignment with frames to achieve maximum operational effectiveness and appearance. Doors shall be adjusted to maintain perimeter clearances as specified in Section 2.1.8. Shimming shall be performed by the installer as needed to assure the proper clearances are achieved.

D. Installation of hardware items shall be in accordance with the hardware manufacturer's recommendations and templates. ANSI/SDI A250.6, Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames shall be consulted for other pertinent information.

E. Set plumb and level.

F. Secure to adjacent construction using fastener type best suited to application.

G. Install hardware in accordance with Section 08 71 00 – Door Hardware.

H. Glazing: Comply with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches O.C. and not more than 2 inches O.C. from each corner.

3.1 ADJUSTING

A. Touch up minor scratches and abrasions in primer paint to match factory finish.

3.2 CLEANING AND PROTECTION

A. Contractor to properly maintain the doors and frames in accordance with SDI-124, "Maintenance of Standard Steel Doors and Frames.".

3.3 WARRANTY

A. Provide 10-year manufacturer's warranty on doors and frames.

– End of Section –

SECTION 08 36 13

SECTIONAL OVERHEAD DOORS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Insulated Steel Sectional Overhead Doors.

B. Aluminum Sectional Overhead Doors.

C. Hardware.

D. Electric Operators and Controls.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-in-Place Concrete
Section 04 20 00 – Concrete Block Masonry
Section 09 90 00 – Painting and Coating

1.2 REFERENCES

A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

1.3 DESIGN / PERFORMANCE REQUIREMENTS

A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Structural Drawings.

2. Testing: According to ASTM E 330 or DASMA 108 for garage doors and complying with the acceptance criteria of DASMA 108.

3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.

a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.

b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.

4. Operability under Wind Load: Design overhead sectional doors to remain operable under design wind load, acting inward and outward.

C. Seismic Performance: Sectional doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor: 1.0.

1.4 SUBMITTALS

A. Submit under provisions of Section – 01 33 00 Contractor Submittals.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.

3. Installation methods.

C. Shop Drawings: Clearly show and describe in detail, detailed door assemblies and adjacent construction, including elevations, sections and details of door, track, hardware and operating components, dimensions, gauges, finishes and relationship of door, track, hardware, and operating components to adjacent construction.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

F. Operation and Maintenance Data.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc./ULC acceptable to authority having jurisdiction as suitable for purpose specified.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.7 PROJECT CONDITIONS

A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Source Limitations: Obtain sectional doors from single source from single manufacturer.

1. Obtain operators and controls from sectional door manufacturer.

2.1 INSULATED STEEL SECTIONAL OVERHEAD DOORS

A. Steel Sectional Door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Wayne-Dalton Corp Thermospan 150 overhead door, or: Amarr Garage Doors.

a. Approved equal.

2. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

B. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.

C. Installed R-Value: 7.0 deg F x h x sq. ft./Bt

D. Steel Sections:

1. Zinc-coated (galvanized) steel sheet with following coating thickness: G60.
2. Section Thickness: Minimum 1-1/2 inches.
3. Exterior-Face, Steel Sheet Thickness: 0.064-inch- nominal coated thickness.
    a. Surface: Flat.
4. Insulation: Foamed in place.
5. Interior Facing Material: Zinc-coated (galvanized) steel sheet with a nominal coated thickness of manufacturer's recommended dimension to comply with performance requirements.

E. Track Configuration: As indicated on Drawings.

F. Weatherseals: Fitted to bottom and top and around entire perimeter of door.

G. Roller-Tire Material: Case-hardened steel.

H. Counterbalance Type: Torsion spring.

I. Electric Door Operator:

1. Usage Classification: Light duty, up to 10 cycles per hour.
2. Operator Type: Manufacturer's standard for door requirements.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure:
    a. At Interior Areas with Dry Exposures: Interior, clean, and dry
    b. At Interior Areas with Wet Exposures: Exterior, dusty, wet, or humid.
5. Emergency Manual Operation: Chain type.
6. Obstruction-Detection Device: Automatic photoelectric sensor.
7. Control Station: Interior-side mounted, unless indicated otherwise on Drawings.

J. Door Finish:

1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.

2. Finish of Interior Facing Material: As indicated in Section 09 90 00 Painting and Coatings.

2.2 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application**.**

2.3 STEEL DOORS

A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.

1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.

2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.

B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch- nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch- thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.

C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile.

D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.

E. Provide reinforcement for hardware attachment.

F. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free polyurethane insulation, foamed in place to completely fill interior of section and pressure bonded to face sheets to prevent delamination under wind load, and with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according

to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.

G. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated thickness.

H. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints and free of warp, twist, and deformation

2.4 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.

1. Galvanized Steel: ASTM A 653/A 653M, minimum zinc coating G60.

2. Track Depth: 2 inches.

3. Slope tracks at an angle from vertical or design tracks to ensure tight closure at jambs when door unit is closed.

4. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.

a. For Vertical Track: Continuous reinforcing angle attached to track and attached to wall with jamb brackets.

b. For Horizontal Track: Continuous reinforcing angle from curve in track to end of track, attached to track and supported at points by laterally braced.

B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated

2.5 HARDWARE

A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

1. Provide stainless steel hardware at door in areas of wet exposure.

B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch-nominal coated thickness at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping fasteners where access to nuts is impossible. Provide double-end hinges where required, for doors more than 16 feet wide unless otherwise recommended by door manufacturer.

C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Extend roller shaft through both hinges where double hinges are required. Provide 2-inch- diameter roller tires and 2-inch- wide track.

2.6 COUNTERBALANCE MECHANISM

A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.

B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft. Provide one additional midpoint bracket for shafts up to16 feet long and two additional brackets at one-third points to support shafts more than 16 feet long unless closer spacing is recommended by door manufacturer.

C. Cables: Galvanized steel, multistrand, lifting cables with cable safety factor 7 to 1.

D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.

E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.

F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.7 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles"

requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.

1. Jackshaft/Hoist, Side Mounted: Jackshaft/hoist operator mounted on the inside front wall on right or left side of door and connected to torsion shaft with an adjustable coupling or drive chain.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.

1. Electrical Characteristics:
    a. Phase: Single phase.
    b. Volts: 120 V.
    c. Hertz: 60.
2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
3. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
4. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.
5. Use adjustable motor-mounting bases for belt-driven operators.
6. Interior-Mounted Units.

E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.

G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."

1. Interior-Mounted Units, Dry Locations: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.

H. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 35 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

2.8 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 STEEL AND GALVANIZED STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Do not begin installation until openings have been properly prepared.

B. Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.

C. Verify electric power is available and of correct characteristics.

D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.1 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install doors, tracks and operating equipment complete with necessary hardware, weather-stripping, anchors, hangers, brackets and accessories, in accordance to manufacturer's printed instructions.

C. Assemble and erect work plumb, true, square, straight, level and accurate as per Drawings and reviewed shop drawings.

D. Isolate metals where necessary to prevent corrosion due to contact with dissimilar metals and between metals, masonry and concrete. Use bituminous paint or butyl tape or as recommended, in writing, by the door manufacturer.

3.3 ADJUSTMENT AND DEMONSTRATION

A. Lubrication: Upon completion of erection of units and operating equipment, lubricate moving parts before operation. Grease sprockets, bearings, cables, link chains and guides. Use lubricant as recommended by the manufacturer.

B. Demonstration: Test-operate and adjust doors to perform smoothly, free from warp, twist or distortion. Demonstrate the operation to the satisfaction of the Architect at the same time of acceptance of the completed work.

3.4 CLEANING AND PROTECTION

A. Do not permit construction traffic through overhead door openings after adjustment and cleaning.

B. Protect installed products until completion of project.

C. Touch-up damaged coatings and finishes and repair minor damage before Substantial Completion.

3.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Structural failures including, but not limited to, excessive deflection.

    b. Failure of components or operators before reaching required number of operation cycles.

    c. Faulty operation of hardware.

    d. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use; rust through.

    e. Delamination of exterior or interior facing materials.

2. Warranty Period: Two years from date of Substantial Completion.

– End of Section –

SECTION 08 71 00

DOOR HARDWARE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Door hardware for doors specified in "Hardware Sets" and required by actual conditions. Include screws, bolts, expansion shields, electrified door hardware, and other devices for proper application of hardware.

B. Products supplied but not installed under this Section:

1. Final replacement of cylinder cores shall be installed by Owner.

1.1 RELATED SECTIONS

Section 08 11 13 – Hollow Metal Doors, Windows, and Frames
Section 08 36 13 – Sectional Overhead Doors

1.2 REFERENCES

A. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI)

1. ANSI/BHMA A156.1 Butts & Hinges (2006).
2. ANSI/BHMA A156.2 Bored & Preassembled Locks & Latches (2011).
3. ANSI/BHMA A156.3 Exit Devices (2008).
4. ANSI/BHMA A156.4 Door Controls - Closers (2008).
5. ANSI/BHMA A156.5 Cylinders and Input Devices for Locks (2010).
6. ANSI/BHMA A156.6 Architectural Door Trim (2010).
7. ANSI/BHMA A156.7 Template Hinge Dimensions (2009).
8. ANSI/BHMA A156.8 Door Controls - Overhead Stops and Holders (2010).
9. ANSI/BHMA A156.10 Power Operated Pedestrian Doors (2011).
10. ANSI/BHMA A156.12 Interconnected Locks & Latches (2005).
11. ANSI/BHMA A156.13 Mortise Locks & Latches (2005).
12. ANSI/BHMA A156.14 Sliding & Folding Door Hardware (2007).
13. ANSI/BHMA A156.15 Closer Holder Release Devices (2011).
14. ANSI/BHMA A156.16 Auxiliary Hardware (2008).

15. ANSI/BHMA A156.17 Self Closing Hinges & Pivots (2010).
16. ANSI/BHMA A156.18 Materials & Finishes (2006).
17. ANSI/BHMA A156.19 Power Assist & Low Energy Power Operated Doors (2007).
18. ANSI/BHMA A156.21 Thresholds (2009).
19. ANSI/BHMA A156.22 Door Gasketing Systems (2012).
20. ANSI/BHMA A156.23 Electromagnetic Locks (2010).
21. ANSI/BHMA A156.24 Delayed Egress Locks (2003).
22. ANSI/BHMA A156.25 Electrified Locks (2007).
23. ANSI/BHMA A156.26 Continuous Hinges (2006).
24. ANSI/BHMA A156.28 Keying Systems (2007).
25. ANSI/BHMA A156.29 Exit Locks and Alarms (2007).
26. ANSI/BHMA A156.30 High Security Cylinders (2007).
27. ANSI/BHMA A156.31 Electric Strikes (2007).
28. ANSI/BHMA A156.32 Integrated Door Assemblies (2008).
29. ANSI/BHMA A156.36 Auxiliary Locks (2010).
30. ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames (2006).
31. ANSI/BHMA A156.115W Hardware Preparation in Wood Doors with Wood or Steel Frames (2006).
32. ANSI/BHMA A250.13 Testing and Rating of Severe Windstorm Resistant Components for Swinging Door Assemblies (2003).

B. International Code Council/American National Standards Institute (ICC/ANSI)/ADA
   1. ICC/ANSI A117.1 Standards for Accessible and Usable Buildings and Facilities 2017.
   2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

C. Underwriters Laboratories, Inc. (UL)
   1. UL 10C Positive Pressure Fire Test of Door Assemblies.
   2. UL 1784 Air Leakage Test of Door Assemblies.
   3. UL/ULC Listed.

D. Door and Hardware Institute (DHI)

1. DHI Publication - Keying Systems and Nomenclature (1989).
2. DHI Publication - Abbreviations and Symbols.
3. DHI Publication - Installation Guide for Doors and Hardware.
4. DHI Publication - Sequence and Format of Hardware Schedule (1996).

E. National Fire Protection Agency (NFPA)

1. NFPA 70 National Electrical Code 2005.
2. NFPA 70 National Electrical Code 2008.
3. NFPA 70 National Electrical Code 2011.
4. NFPA 80 Standard for Fire Doors and Other Opening Protective's 1999.
5. NFPA 80 Standard for Fire Doors and Other Opening Protective's 2007.
6. NFPA 80 Standard for Fire Doors and Other Opening Protective's 2010.
7. NFPA 101 Life Safety Code 2003.
8. NFPA 101 Life Safety Code 2006.
9. NFPA 101 Life Safety Code 2012.
10. NFPA 105 Standard for the Installation of Smoke Door Assemblies 2003.
11. NFPA 105 Standard for the Installation of Smoke Door Assemblies 2007.
12. NFPA 105 Standard for the Installation of Smoke Door Assemblies 2010.

F. Building Codes

1. Oregon Structural Specialty Code 2022.
2. Local Building Code.

1.3 SUBMITTALS

A. Submit in accordance with Conditions of the Contract and provisions of Section 01 30 00 - Administrative Requirements.

B. Shop Drawings: Hardware schedule shall be organized in vertical format illustrated in DHI Publications Sequence and Formatting for the Hardware

Schedule. Include abbreviations and symbols page according to DHI Publications Abbreviations and Symbols. Complete nomenclature of items required for each door opening as indicated

1. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of hardware.

C. Submit manufacturer's catalog sheet on design, grade and function of items listed in hardware schedule. Identify specific hardware item per sheet, provide index, and cover sheet.

D. Coordination: Distribute door hardware templates to related divisions within fourteen days of receiving approved door hardware submittals.

E. Maintenance Tool and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, removal and replacement of door hardware.

F. Closeout Submittals: Submit to Owner in a three-ring binder or electronically if requested.

1. Warranties.
2. Maintenance and operating manual including list of maintenance tools.
3. Maintenance service agreement.
4. Record documents.
5. Copy of approved hardware schedule.
6. Copy of approved keying schedule with bitting list.
7. Door hardware supplier name, phone number and fax number.

1.4 QUALITY ASSURANCE

A. Door hardware shall conform to ICC/ANSI A117.1. Handles, Pulls, Latches, Locks and operating devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

B. Door hardware shall be certified to ANSI/BHMA standards as noted, participate and be listed in BHMA Certified Products Directory.

C. Pre-installation Meeting: Comply with requirements in Division 1 Section "Project Meetings".

1. Convene meeting seven days before installation. Participants required to attend:

a. Contractor, installer, material supplier, Owner.

2. Include in conference decisions regarding proper installation methods and procedures for receiving and handling hardware.

3. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.

D. Within fourteen days of receipt of approved door hardware submittals contact Owner with representative from hardware supplier to establish a keying conference. Verify keyway, visual key identification, number of master keys and keys per lock. Provide keying system per Owner's instructions.

E. Installer Qualifications: Specialized in performing installation of this Section and shall have five years minimum documented experience.

F. Hardware Schedule is intended to establish a type and grade.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Provide a clean, dry, and secure room for hardware delivered to Project but not yet installed.

B. Furnish hardware with each unit marked and numbered in accordance with approved finish hardware schedule. Include door and item number for each type of hardware.

C. Pack each item complete with necessary parts and fasteners in manufacturer's original packaging.

D. Deliver permanent key, cores, and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to Owner shall be established at "Keying Conference."

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. Manufacturer: Basis of Design product: Hager Companies or comparable product by one of the following:

1. Schlage
2. Ives
3. LCN
4. Von Duprin
5. Approved equal
6. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.1 HINGES

A. Hinges, including electric hinges and self-closing hinges when scheduled, shall be of one manufacturer as listed for continuity of design and consideration of warranty and shall be certified and listed by the following:

1. Butts and Hinges: ANSI/BHMA A156.1
2. Template Hinge Dimensions: ANSI/BHMA A156.7
3. Self-Closing Hinges: ANSI/BHMA 156.17

B. Butt Hinges:

1. Hinge weight and size unless otherwise indicated in hardware sets:
   a. Doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of .134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
   b. Width of hinge is to be minimum required to clear surrounding trim.
2. Base material unless otherwise indicated in hardware sets:
   a. 304 Stainless Steel
   b. Stainless Steel ball bearing hinges shall have stainless steel ball bearings. Steel ball bearings are unacceptable.
3. Quantity of hinges per door unless otherwise stated in hardware sets:

a. Doors 60 inches (1524 mm) up to 90 inches (2286 mm) in height provide 3 hinges.

4. Hinge design and options unless otherwise indicated in hardware sets:

a. Hinges are to be of a square corner five-knuckle design, flat button tips and have ball bearings unless otherwise indicated in hardware sets.

b. Out-swinging exterior doors shall have non-removable pins (NRP) to prevent removal of pin while door is in closed position.

c. When full width of opening is required, use hinges that are designed to swing door completely from opening when door is opened to 95 degrees.

d. When shims are necessary to correct frame or door irregularities, provide metal shims only.

2.2 LOCKS AND LATCHES (GRADE 1 CYLINDRICAL)

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be certified and listed by following:

1. ANSI/BHMA A156.2 Series 4000 Certified to Grade 1.

2. ANSI/BHMA A250.13 Certified for a minimum design load of 1150lbf (100psf) for single out swinging doors measuring 36 inches (914 mm) in width and 84 inches (2134 mm) in height.

3. UL10C/UBC 7-2 Positive Pressure Rated.

4. ICC/ANSI A117.1.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:

1. Lock and Latch chassis to be Zinc dichromate for corrosion resistance.

2. Keyed functions to be of a freewheeling design to help resists against vandalism.

3. Non-handed, field reversible.

4. Thru-bolt mounting with no exposed screws.

5. Levers shall be Zinc cast and plated to match finish designation in hardware sets.

6. Roses shall be of solid Brass or Stainless-Steel material.

C. Latch and Strike:

1. Stainless Steel latch bolt with minimum of 1/2 inch (13 mm) throw and deadlocking for keyed and exterior functions. Provide 3/4 inch (19 mm) latch bolt for pairs of fire rated doors where required by door manufacture. Standard backset to be 2-3/4 inches (70 mm) and faceplate shall be adjustable to accommodate a square edge door or a standard 1/8 inch (3 mm) beveled edge door.

2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4 inches (32 mm) by 4-7/8 inches (124 mm) with proper lip length to protect surrounding trim.

3. Provide knurled levers on entry side of doors.

2.3 LOCKS AND LATCHES (GRADE 1 MORTISE)

A. Locks and latches shall be of one manufacturer as listed for continuity of design and consideration of warranty. Product to be certified and listed by following:

1. ANSI/BHMA A156.13 Series 1000 Certified to Grade 1 for Operational and Security.

2. UL/cUL Labeled and listed up to 3 hours for single doors up to 48 inches (1219 mm) in width and up to 96 inches (2438 mm) in height.

3. UL10C/UBC 7-2 Positive Pressure Rated.

4. ICC/ANSI A117.1.

B. Lock and latch function numbers and descriptions of manufacturer's series as listed in hardware sets. Material and Design:

1. Lock cases from fully wrapped, 12 gauge steel, Zinc dichromate for corrosion resistance.

2. Non-handed, field reversible without opening lock case.

3. Break away spindles to prevent unlocking during forced entry or vandalism.

4. Levers are to be Zinc cast, Forged Brass or Stainless Steel and plated to match finish designation in hardware sets.

5. Sectional Roses are to be of solid Brass or Stainless Steel material and have a minimum diameter of 2-7/16 inches (62 mm).

6. Escutcheons are to be of solid Brass or Stainless Steel material.

7. Armor fronts are to be self-adjusting to accommodate a square edge door or a standard 1/8 inch (3 mm) beveled edge door.

C. Latch and Strike:

1. Stainless Steel latch bolt with minimum of 3/4 inch (19 mm) throw and deadlocking for keyed and exterior functions.

2. Strike is to fit a standard ANSI A115 prep measuring 1-1/4 inches (32 mm) by 4-7/8 inches (124 mm) with proper lip length to protect surrounding trim.

3. Deadbolts to be 1-3/4 inches (44.5 mm) total length with a minimum of a 1 inch (25 mm) throw and 3/4 inch (19 mm) internal engagement when fully extended and made of Stainless Steel material.

4. Doors requiring lead line protection provide locks with 1/16 inch (1.5 mm) lead applied to lock and 1/16 inch (1.5 mm) lead wrapped around latch bolt.

5. Provide knurled levers on entry side of doors that are potentially dangerous to visually impaired persons.

2.4 CYLINDERS AND KEYING

A. Cylinders shall be of one manufacturer as listed for continuity of design and consideration of warranty.

B. Standards: Manufacturer shall meet the following:

1. Auxiliary Locks: ANSI/BHMA A156.5

2. DHI Handbook "Keying systems and nomenclature" (1989)

C. Cylinders:

1. Manufacturer's standard tumbler type, seven-pin IC core and seven-pin conventional core supported by the Hager H1 keyway.

2. Shall be furnished with cams/tailpieces as required for locking device that is being furnished for project.

D. Keying:

1. Copy of Owners approved keying schedule shall be submitted to Owner and Architect with documentation of which keying conference was held and Owner’s sign-off.

2. Provide a bitting list to Owner of combinations as established and expand to twenty five percent for future use or as directed by Owner.
3. Key into Owner's existing keying system if applicable.
4. Keys to be shipped to Owner's representative, individually tag per keying conference.
5. Provide visual key control identification on keys.
6. Provide interchangeable cores with construction cores as required per hardware schedule.
7. Single seven-pin key shall operate both conventional cores and SFIC small format interchangeable cores.

2.5 CLOSERS (CAST IRON BODY GRADE 1)

A. Closers shall be product of one manufacturer. Unless otherwise indicated on hardware schedule, comply with manufacturer's recommendation for size of closer, depending on width of door, frequency of use, atmospheric pressure, ADAAG requirements, and fire rating. Manufacturer to be certified and or listed by the following:

1. BHMA Certified ANSI A156.4 Grade 1.
2. ADA Compliant ANSI A117.1.
3. UL/cUL Listed up to 3 hours.
4. UL10C Positive Pressure Rated.
5. UL10B Neutral Pressure Rated.

B. Material and Design:

1. Provide cast iron non-handed bodies with full plastic covers.
2. Closers shall have separate staked adjustable valve screws for latch speed, sweep speed, and backcheck.
3. Provide Tri-Pack arms and brackets for regular arm, top jamb, and parallel arm mounting.
4. One-piece seamless steel spring tube sealed in hydraulic fluid.
5. Double heat-treated steel tempered springs.
6. Precision-machined heat-treated steel piston.
7. Triple heat-treated steel spindle.
8. Full rack and pinion operation.

C. Mounting:

1. Out swing doors shall have surface parallel arm mount closers.

2. In swing doors shall have surface regular arm mount closers except where noted on hardware schedule.

3. Provide brackets and shoe supports for aluminum doors and frames to mount fifth screw.

4. Furnish drop plates where top rail conditions on door do not allow for mounting of closer and where backside of closer is exposed through glass.

D. Size closers in compliance with requirements for accessibility (ADDAG). Comply with following maximum opening force requirements. Interior hinged openings: 5.0 lbs (2.25 Kg) Fire rated and exterior openings shall have minimum opening force allowable by authority having jurisdiction.

E. Fasteners: Provide self-reaming and self-tapping wood and machine screws and sex nuts and bolts for each closer.

2.6 PROTECTIVE TRIM

A. Size of protection plate: Single doors, size two inches (51 mm) less door width (LDW) on push side of door, and one inch (25 mm) less on pull side of door. Kick plates 10 inches high or sized to door bottom rail height. Manufacturer shall meet requirements for:

1. Architectural Door Trim: ANSI/BHMA A156.6.

B. Material and Design:

1. .050 inch (1.3 mm) gage stainless steel.

2. Corners shall be square. Polishing lines or dominant direction of surface pattern shall run across the door width of plate.

3. Bevel top, bottom and sides uniformly leaving no sharp edges. Edges shall be de-burred.

4. Countersink holes for screws. Screws holes shall be spaced equidistant eight inches (203 mm) CTC, along a centerline not over 1/2 inch (13 mm) in from edge around plate. End screws shall be a maximum of 0.53 inch (1.35 mm) from corners.

5. UL label stamp required on protection plates when top of plate is more than 16 inches (406 mm) above bottom of door on fire rated openings. Verify door manufacturers UL listing for maximum height and width of protection plate to be used.

2.7 STOPS AND HOLDERS

A. Wall Stops: Provide door stops wherever necessary to prevent door or hardware from striking an adjacent partition or obstruction. Provide wall stops when possible.

2.8 DOOR GASKETING AND WEATHERSTRIP

A. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing where indicated on hardware schedule. Provide non-corrosive fasteners for exterior applications.

1. Perimeter gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting stile gasketing: Fasten to meeting stiles, forming seal when doors are in closed position.
3. Door bottoms: Apply to bottom of door, forming seal with threshold or floor when door is in closed position.
4. Sound Gasketing: Cutting or notching for stop mounted hardware not permitted.
5. Drip Guard: Apply to exterior face of frame header. Lip length to extend 4 inches (102 mm) beyond width of door.

B. Standards: Manufacturer shall meet requirements for:

1. Door Gasketing and Edge Seal Systems: ANSI/BHMA A156.22.
2. Shall be BHMA certified for door sweeps, door bottoms, and adhesive applied gasketing. (721).

2.9 THRESHOLDS

A. Set thresholds for exterior and acoustical openings in full bed of sealant with lead expansion shields and Stainless Steel machine screws complying with requirements specified in Division 7 Section "Joint Sealants". Notched in field to fit frame by hardware installer. Refer to Drawings for special details. Manufacturer to be certified by the following:

1. Thresholds: ANSI/BHMA A156.21.
2. Americans with Disabilities Act Accessibility Guidelines (ADAAG).

2.10 SIGNAGE

A. Shall be of one manufacturer as listed for continuity of design and consideration of warranty. Manufacturer shall meet requirements for:

Signage: ANSI/BHMA A156.16. Grade 2 Braille Translation conforming to section 4.3 requirements.

B. Materials and Design: Provide 0.125 inch (3 mm) thick plastic. Size of sign to be 6 inches by 8 inches (152 mm by 203 mm) fastened with double-sided pressure sensitive tape.

2.11 FINISHES

A. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if within range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples.

B. Comply with base material and finish requirements indicated by ANSI/BHMA A156.18 designations in hardware schedule.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 INSTALLATION

A. Install hardware per manufacturer's instructions and in compliance with the following as applicable:

1. NFPA 80; NFPA 105; ICC/ANSI A117.1; ANSI/BHMA A156.115 Hardware Preparation in Steel Doors and Steel Frames; DHI Publication - Installation Guide for Doors and Hardware; UL10C/UBC7-2; Local building code.
2. Approved shop drawings.
3. Approved finish hardware schedule.

B. Do not install surface mounted items until finishes have been completed on substrates involved. Set unit level, plumb and true to line location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

3.2 FIELD QUALITY CONTROL

A. Material supplier to schedule final walk through to inspect hardware installation ten business days before final acceptance of Owner. Material supplier shall provide a written report detailing discrepancies of each opening to General Contractor within seven calendar days of walk through.

3.3 CLEANING AND PROTECTION

A. Cleaning: Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no cost to Owner.

B. Leave the manufacturer's protective film intact and provide proper protection for all other finish hardware items that do not have protective material from the manufacturer until the Owner accepts the Project as complete.

3.4 ADJUSTMENT

A. Adjustment: Adjust and check each opening to ensure proper operation of each item of finish hardware. Replace items that cannot be adjusted to operate freely and smoothly or as intended for application at no cost to Owner.

B. Demonstration: Conduct a training class for building maintenance personnel demonstrating the adjustment, operation of mechanical and electrical hardware. Special tools for finished hardware to be turned over and explained usage at this meeting.

3.5 HARDWARE SET SCHEDULE

A. Guide: Door hardware items have been placed in sets which are intended to be a guide of design, grade, quality, function, operation, performance, exposure, and like characteristics of door hardware, and may not be complete. Provide door hardware required to make each set complete and operational.

B. Hardware schedule does not reflect handing, backset, method of fastening and like characteristics of door hardware and door operation.

C. Review door hardware sets with door types, frames, sizes, and details on drawings. Verify suitability and adaptability of items specified in relation to details and surrounding conditions.

SET	QTY	DESCRIPTION	MFR	MODEL	FINISH	NOTES
H-1	3	Hinges	Hager	BB1199 4.5x4.5 NRP	626	
	1	Mortise Latch	Hager	3856S-US26D-WTN-SCAF		See Note 1
	1	Panic Bar	Hager	4501R Grade-1	US26D	
	1	Surface Closer	Hager	5100	ALUM	See Note 2
	2	Kickplate	Hager	194S	630	
	1	Weather Strip	Hager	726S	Charcoal	
	1	Door Bottom	Hager	770S	Charcoal	
	1	Overhead Drip Guard	Hager		810S	Black
	1	Threshold	Hager	424S	MIL	
H-2	3	Hinges	Hager	BB1199 4.5x4.5 NRP	626	
	1	Mortise Latch	Hager	3856S-US26D-WTN-SCAF	626	See Note 1
	1	Surface Closer	Hager	5100	ALUM	See Note 2
	2	Kickplate	Hager	194S	630	
	1	Door Bottom	Hager	770S	Charcoal	
	1	Threshold	Hager	424S	MIL	

Note 1. Corridor (F13) function – Latchbolt retracted by lever from either side. Deadbolt thrown or retracted by key outside or thumbturn side. Throwing deadbolt locks outside lever. Turning inside lever simultaneously retracts deadbolt and latchbolt and unlocks the outside lever.
Note 2. (HDCS) Extra Heavy-Duty Cushion Stop Arm.

3.6 WARRANTY

A. General Warranty: Owner may have under provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by Contractor under requirements of the Contract documents.

B. Special Warranty: Warranties specified in this article shall not deprive Owner of other rights. Contractor, hardware supplier, and hardware installer shall be responsible for servicing hardware and keying related problems.

1. Ten years for manual door closers.

2. Five years for mortise, auxiliary and bored locks.

3. Five years for exit devices.

C. Products judged defective during warranty period shall be replaced or repaired in accordance with manufacturer's warranty at no cost to Owner.

– End of Section –

DIVISION 09 – FINISHES

SECTION 09 28 13

CEMENTITIOUS BACKING BOARD

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Cementitious Backer Panel.

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.2 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.3 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's requirements for environmental requirements for installation.

B. Do not install panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture-damaged, or mold damaged.

PART 2 – PRODUCTS

2.0 CEMENTITIOUS BACKER PANEL

A. Basis of Design:

1. Subject to compliance of project requirements, Hardi Backer Board 500 Cement Board; 0.42 thickness

2. Or equivalent.

B. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

C. Complying with ANSI A118.9, ASTM 108.11, and ASTM 1325.

D. Mold resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.1 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws comply with ASTM C 1002 for fastening panels to steel members less than 0.033 inch thick (20 ga. ST).

2. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

C. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

E. Thermal Insulation: As specified in Section 07 21 00 – Thermal Insulation.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Isolate perimeter of cementitious backer board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2 inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

G. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

H. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.2 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 (System XIII: Control (Expansion) Joints) and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. LC-Bead: Use at panel edges where edge is exposed to view.
3. L-Bead: Use at panel edges stopping short of another material or abutting another material, where edge is not exposed to view, and where panel face is exposed to view.
4. U-Bead: Use at panel edges receiving sealant, and where face of panel is not exposed to view.
5. Provide closures to prevent intrusion of insects.

6. Level 4:
    a. At following locations:
        i. At panel surfaces that will be exposed to view unless otherwise indicated.
    b. Primer and its application to surfaces are specified in Section 09 90 00 – Painting and Coatings.

3.3 PROTECTION

A. Protect adjacent surfaces during installation. Repair surfaces stained, marred, or otherwise damaged during application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
    1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
    2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

– End of Section –

SECTION 09 65 13

RESILIENT WALL BASE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Resilient Wall Base.

1.1 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide resilient wall base materials manufactured in the United States of America by a firm with a minimum of 10 years' experience with resilient rubber materials of type equivalent to those specified.

B. Provide resilient wall base, flooring materials, adhesives, accessories, and subfloor preparation products from one manufacturer to ensure color matching and compatibility.

C. Manufacturer shall be capable of providing technical training and technical field service representation.

1.2 RELATED WORK

A. Installer must be professional, licensed, insured and acceptable to manufacturer of resilient flooring materials. Project Managers or Field Supervisors must be INSTALL (International Standards & Training Alliance) certified CFI (Certified Floorcovering Installers) Certified and/or an FCICA (The Flooring Contractors Association) CIM (Certified Installation Manager) for the requirements of the project or equivalent.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within the range recommended by Flexco of 55 degrees F (13 degrees C) and 85 degrees F (29 degrees C).

1.4 PROJECT CONDITIONS

A. Install resilient products after other finishing operations, including painting, have been completed.

B. Maintain ambient temperatures within range of (± 10 degrees F) 65 degrees (18 degrees C) and 85 degrees F (29 degrees C) in the spaces to receive the resilient products during:

1. 48 hours before installation.

2. During installation.

3. 48 hours after installation.

C. Maintain relative humidity between 40% and 65% during installation.

D. Avoid conditions in which dew point causes condensation on the installation surface.

1.5 WARRANTY

A. Provide manufacturer's standard limited commercial warranty to cover manufacturing defects.

PART 2 – PRODUCTS

2.0 MANUFACTURER

A. Basis-of-Design: Flexco Floors | 1401 East 6th Street | Tuscumbia, AL 35674 | P: (800) 633-3151

B. Substitutions: Under provisions of Section 01 60 00 Product Requirements.

2.1 PRODUCTS

A. Traditional Wall Base:

1. Meets the performance requirements for the following Industry Standards:

a. ASTM F1861, Standard Specification for Resilient Wall Base, Type TP (rubber, thermoplastic), Group 2 (layered), Style A&B(straight, cove).

b. ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A.

c. ASTM E648 (NFPA 253), Standard Test Method for Critical Radiant Flux, Class 1, >0.45 W/cm^2.

d. ASTM E662 (NFPA 258), Standard Test Method for Smoke Density, Passes, <450.

e. ASTM F137, Standard Test Method for Flexibility of Resilient Flooring Materials protocols, Passes.

f. ASTM F386, Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces, Passes.

g. ASTM F925, Standard Test Method for Resistance to Chemicals of Resilient Flooring, Excellent.

h. ASTM F1515, Standard Test Method for Measuring Light Stability of Resilient Flooring protocols, Passes National Fire Protection Association (NFPA).

i. NFPA 253, Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source.

j. NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials.

k. NFPA 258, Test Method for Specific Density of Smoke Generated by Solid Materials.

B. Rubber Wall Base:

1. Flexco Base 2000, or approved substitution.

2. 4" height.

3. Coved.

4. Color selected by OWNER.

2.2 INSTALLATION AND MAINTENANCE MATERIALS

A. Substrate/Background Preparation Products:

1. Adhesives: Adhesives should be selected based on the site conditions and use of the space being installed.

B. Recommended Adhesive Products:

1. Excelsior WB-600 Acrylic Wall Base Adhesive by Flexco.

2. Excelsior C-630 Contact Adhesive by Flexco.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Verification of Conditions: Inspect all substrates/backgrounds to ensure they are clean, smooth, permanently dry, structurally sound and without voids. Confirm all areas are properly sealed and acclimated per manufacturer's requirements.

B. Verification of Products: In accordance with manufacturer's installation requirements, visually inspect material for size, style, color, or visual defects prior to installing. Any material that is incorrect or visually defective shall not be installed.

3.1 SUBSTRATE/BACKGROUND PREPARATION

A. General: All work required ensuring substrate/background meets manufacturers' guidelines are the responsibility of the general CONTRACTOR.

B. Preparation: Ensure substrate/background meets the requirements of ASTM F1861 for resilient wall base and/or manufacturer's Technical Data Sheets.

1. Substrates/backgrounds must be free of visible water or moisture, dust, sealers, paint, residual adhesives and adhesive removers, solvents, wax, oil, grease, mold, mildew and any other extraneous coating, film, material or foreign matter.

2. Acclimate all products to be used during the installation and the installation environment prior to installation according to the manufacturers written instructions.

3. Fill cracks, holes, depressions and irregularities in the substrate/background to prevent transferring through to the surface of the resilient wall base.

3.2 INSTALLATION

A. General: Follow all relevant guidelines detailed in Division 01, as well as wall base and adhesive manufacturer's technical data sheets.

B. Resilient Vinyl Wall Base: Install material in accordance with manufacturer's recommendations.

1. Select the appropriate adhesive for the application and job site conditions.
2. Install material according to roll sequence or with like run numbers.
3. Ensure material is rolled appropriately into the adhesive using a hand roller.

3.3 CLEANING AND MAINTENANCE

A. General: Clean up installation area and vacuum dust or wipe material to remove any dirt, dust, or debris.

B. Initial Maintenance: Conduct initial maintenance per the manufacturer's recommended procedures stated in the Maintenance Documents.

C. Regular Maintenance: Conduct maintenance on regular intervals as needed. Insufficient cleaning will reduce the wear life of the wall base and alter the aesthetic properties of the wall base. The amount of maintenance depends directly upon the amount of dirt and particulates the area is subjected to.

– End of Section –

SECTION 09 90 00

PAINTING AND COATINGS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The WORK covered by this Section consists of furnishing all equipment and material, and performing all labor for preparing and finishing the new structures in accordance with the requirements as specified herein and shown on the drawings.

B. The WORK covered by this Section also includes galvanizing of miscellaneous metal parts as shown on the drawings and as listed in Tables P-1 and P-2.

1.1 REFERENCES

A. SSPC - Steel Structures Painting Council - Systems and Specifications current edition.

B. Federal Specification - TT-P-00641 - Primer Coating, Zinc Dust-Zinc Oxide (for galvanized surfaces).

C. Sheen Levels: As defined by MPI except this specification uses common names defined below rather than numbered levels:

1. Flat or Matte: Gloss Level 1
2. Velvet: Gloss Level 2
3. Eggshell: Gloss Level 3
4. Satin: Gloss Level 4
5. Semi-gloss: Gloss Level 5
6. Gloss: Gloss Level 6
7. High Gloss: Gloss Level 7

D. VOC Ranges: As defined by MPI.

1.2 QUALITY ASSURANCE

A. Products used in the WORK of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of successful production acceptable to ENGINEER and OWNER.

B. CONTRACTOR shall provide at least one person who shall be present at all times during execution of the WORK, who shall be thoroughly familiar with the specified requirements and the materials and methods needed for their execution, and who shall direct all WORK performed under this Section.

C. CONTRACTOR shall provide adequate numbers of workmen skilled in the necessary crafts and properly informed of the methods and materials to be used, and all current safety procedures as specified by OSHA.

D. CONTRACTOR shall undertake the following to ensure acceptable paint coordination:

1. Ensure compatibility of prime coats and finish coats.
2. Review other Sections of this Specification as required, verifying the prime coats used.
3. Provide barrier coats over non-compatible primers, or remove the primer and re-prime as required.
4. Notify ENGINEER in writing of anticipated problems in using the specified coating systems over prime coating supplied under other Sections.

1.3 PRODUCT HANDLING

A. Delivery of materials: All materials shall be delivered to the job site in original, new and unopened containers bearing the manufacturer's name and label showing the following information:

1. Name or title of material.
2. Federal Specification number, if applicable.
3. Manufacturer’s stock number.
4. Manufacturer’s name.
5. Contents by volume for all constituents.
6. Thinning instructions.
7. Application instructions.
8. Applicable MSDS sheets.
9. Safety precautions.

B. CONTRACTOR shall provide proper storage to prevent freezing and damage to and deterioration of paint materials, and shall use all means necessary to protect the materials of this Section before, during and after installation and to protect the WORK and materials of other trades.

C. In the event of damage, CONTRACTOR shall immediately make all repairs and replacements necessary for the acceptance of the ENGINEER at no additional cost to OWNER.

1.4 JOB CONDITIONS

A. Weather conditions: Paint shall not be applied in snow, rain, fog or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces unless otherwise permitted by the manufacturer's printed instructions as accepted by ENGINEER. Applications may be continued during inclement weather within the temperature limits specified by the paint manufacturer during application and drying periods. CONTRACTOR shall provide protection for the WORK against inclement weather conditions.

1.5 EXTRA STOCK

A. Upon completion of the WORK of this Section, CONTRACTOR shall deliver to OWNER an extra stock equaling a minimum of 5 percent of each color, type, and gloss of paint used in the WORK. Each container shall be new, unopened and be tightly sealed and clearly labeled with the contents and location used.

PART 2 – PRODUCTS

2.0 PROTECTIVE COATING SYSTEMS

A. All surfaces shall be protected in accordance with the coating systems specified on Tables P-1 and P-2, and in accordance with the coating manufacturer's instructions. Where there is a discrepancy between the coating manufacturer's instructions and this specification, the former shall govern. The coating materials and systems as specified are intended to establish the minimum quality of the material and system for the environmental conditions imposed. CONTRACTOR may utilize a different material or system for which he has preference, provided that a written request detailing the alternative material or system shall be made to ENGINEER and that ENGINEER agrees with such a request in writing. CONTRACTOR shall be fully responsible for the preparation and cleaning of all surfaces; the selection and application of all coating materials and systems; the cutting of all coatings; and other items required for satisfactory protective coating of the WORK.

B. The coating system shall be used for the following material:

1. Metal grating (interior and exterior) – SP1

2. Structural Steel (platforms, HVAC support)
3. Drum Screen Track – Partly Submerged – Per manufacturer
4. Steel Piping – Polyethylene Tape Coating – See Section 40 46 16
5. Steel Joists – Per manufacturer, coated
6. Ladders – Galvanized
7. Steel doors – Per manufacturer, powder coated
8. Window Frames – Per manufacturer
9. Cementitious Backing Board (interior walls) – Latex

2.1 PAINT MATERIALS

A. General: The paint material shall be as specified herein unless otherwise accepted by ENGINEER. Materials not displaying the manufacturer's identification as a standard best- grade product will not be acceptable.

B. Durability: Paints of durable and washable quality shall be provided. Paint materials which will withstand normal washing as required to remove pencil, oil, grease marks, ink, ordinary soil, and similar materials without showing discoloration, loss of gloss, staining, or other damage shall be used.

C. Colors and Glosses: ENGINEER shall select colors to be used in the various types of paint specified and will be the sole judge of acceptability of the various glosses obtained from materials proposed to be used by CONTRACTOR.

D. Undercoats and Thinners: Undercoat paint shall be produced by the same manufacturer as the finish coat. CONTRACTOR shall use only the thinners recommended by the paint manufacturer, and only to the recommended limits. Insofar as practicable, undercoat, finish coat, and thinner material shall be used as parts of a unified system of paint finish.

E. Paint materials containing lead shall not be used.

PART 3 – EXECUTION

3.0 PREPARATION

A. Surface Conditions:

1. Inspection: Prior to commencing the WORK of this Section, CONTRACTOR shall carefully inspect the installed WORK of all other trades and verify that all such WORK is complete to the point where this WORK may properly commence. He shall verify that painting may

be completed in strict accordance with the original design and with the manufacturer's recommendations as accepted by ENGINEER.

2. Discrepancies: CONTRACTOR shall not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

B. Surface Preparation:

1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as accepted by ENGINEER.

2. Remove all removable items not scheduled to receive paint finish, or provide surface-applied protection prior to surface preparation and painting operations.

3. Coordinate painting work with cleaning and preparation work so that dust and other contaminants do not fall on newly painted, wet surfaces.

4. After completion of painting in each space or area, reinstall the removed items by using workmen skilled in the necessary trades.

5. Clean each surface to be painted prior to applying paint or surface treatment.

6. Remove oil and grease with clean cloths and cleaning solvents of low toxicity and a flash point in excess of 100° F, prior to the start of mechanical cleaning.

7. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet, newly painted surfaces.

C. Surface Preparation – Metals:

1. CONTRACTOR shall use one or a combination of any of the following methods of surface preparation to achieve the degree of preparation required for the protective coating system involved. The surface preparation for each protective coating system shall be considered as a minimum requirement and shall be improved if so dictated by paint manufacturer, ENGINEER or OWNER.

a. Sandblast Cleaning to "Near White" Metal:

i. Surfaces requiring "Near White" metal cleaning shall be sandblasted in accordance with SSPC Specification SP10 with a 2-mil profile.

ii. The sand shall be quartz sand, washed, clean, dry, and gypsum free. Sea sand shall not be used.

iii. Heavy deposits of oil or grease shall be removed by solvent prior to blast cleaning. Small quantities of grease or oil may be removed by the blasting process; however, the abrasive shall not be reused if it contains sufficient oil or grease to render it unsuitable for blast-cleaning purposes.

iv. Blast-Cleaned surfaces shall be kept under cover in a heated area and shall not be exposed to the weather elements under any circumstances. If rusting has occurred on any sandblast surface prior to application of primer, CONTRACTOR shall reblast the surface.

b. "Commercial" Sandblast Cleaning:

i. Surfaces requiring "Commercial" metal cleaning shall be sandblasted in accordance with SSPC Specification SP 6 with a 2-mil profile. The general requirements specified for blast cleaning in subsection a. above, shall also apply to "Commercial" metal cleaning.

c. Power Tool Cleaning:

i. When power tool cleaning is specified, surface preparation shall be in accordance with SSPC Specification SP-3 to remove loose rust, mill scale, and other foreign material. As an alternative to power tool cleaning, CONTRACTOR may use "Commercial" sandblast cleaning in accordance with SSPC Specification SP 6.

d. Final Cleaning:

i. For all coating systems and prior to primer application, loose dirt, blasting sand or other foreign material shall be removed from the surface with clean brushes, compressed air or vacuum cleaner. Care shall be taken in the removal of such debris from joints, angles and corners. Grease or oil shall be removed by solvent cleaning. On primed surfaces that have deteriorated, power tool cleaning shall be carried out as in subsection c. above before application of the finish coatings. Under normal conditions prior to final

coating, the surfaces shall be solvent cleaned as required.

2. Paint shall be applied immediately following final cleaning of the surfaces. Under no circumstances shall the elapsed time between commencement of the surface cleaning operation and application of primer, finish coats exceed a period of six hour or according to paint, manufacturer specification, whichever is less.

D. Materials Preparation – General:

1. Painting materials shall be mixed and prepared in strict accordance with the manufacturer's recommendations as accepted by ENGINEER.

2. Materials not in actual use shall be stored in tightly covered containers.

3. Containers used in storage, mixing and application of paint shall be maintained in a clean condition, free from foreign materials and residue.

4. Stirring: All materials shall be stirred before application to produce a mixture of uniform density, and as required during the application of materials. Stir/mix according to manufacturer's specification. Do not stir into the material any film which may form on the surface. Remove the film and, if necessary, strain the material before using.

E. Surface Preparation – Concrete:

1. Cure concrete at 75°F for at least 28 days.

2. Moisture test per ASTM F1869-98 by use of Calcium Chloride or ASTM D4263 Plastic Sheet Method.

3. Remove all grease, dirt, paint, oil, laitance, efflorescence, loose material and cement.

4. Fill imperfections per paint manufacturer's recommendations.

5. Remove hardeners, sealers, form release agents and curing compounds.

3.1 PAINT APPLICATION – GENERAL

A. Following surface preparation, CONTRACTOR shall complete all painting in accordance with the requirements specified herein, together with those recommended by paint manufacturer.

B. Paint shall be applied only under conditions of humidity and of surface and ambient air temperatures that encourage evaporation and do not encourage condensation. Surfaces to be coated shall be completely dry and shall be at a minimum temperature of 50°F and at least 5°F above the dew point of the surrounding air. The atmosphere around the surface to be painted shall not contain excessive dust.

C. Newly cleaned or painted surfaces shall be protected from moisture, condensation, contamination, and freezing temperatures until the paint is thoroughly cured. Care shall be taken to prevent contamination of surfaces between coats of paint.

D. Instructions from the paint manufacturer shall be followed in conjunction with the requirements specified herein. Thinners shall not be added to any paint except as recommended by the paint manufacturer. Paint thinners, if used, and solvents, shall be compatible with the paint materials being supplied.

E. Apply finish to completely cover surfaces with uniform appearance without brush marks, runs, sags, laps, ropiness, holidays, spotting, cloudiness, or other surface imperfections.

1. Before applying finish coats, apply a prime coat of material recommended by manufacturer, unless the surface has been prime coated by others; where evidence of suction spots or unsealed areas in first coat appear, recoat primed and sealed surfaces to ensure finish coat with no burn through or other defects due to insufficient sealing.

2. If manufacturer's instructions recommend sanding to produce a smooth, even surface, sand between coats.

3. Before applying next coat vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

F. Paint with a pot life specified shall be discarded whenever that life is exceeded and the painting equipment cleaned before starting a new batch. No batch shall be mixed in a quantity greater than is expected to be used within the specified pot life.

G. All paint shall be thoroughly mixed before each use, and the pigment shall not be allowed to settle during application.

H. For site painting, CONTRACTOR shall provide adequate illumination and ventilation during application of the paint. Each coat shall be thoroughly dried and cured before application of succeeding coats. CONTRACTOR shall

provide all necessary scaffolds, ladders, drape cloths, masking tape, wipers, and other supplies and materials to carry out the WORK. CONTRACTOR shall provide all necessary mechanical paint mixing equipment. CONTRACTOR shall take all precautions necessary to protect personnel and equipment from overspray and noxious fumes and against all fire hazards. Signs shall be posted by CONTRACTOR to prevent grinding, welding, smoking, and other unsafe activities from being performed in the painting areas.

3.2 APPLICATION OF PAINT – SPRAY

A. Spray application shall be performed with airless spray equipment. Spray-painting equipment shall be of ample capacity for the WORK and shall at all times be kept clean and in good working order. Spray guns shall be suited to the kind of paint being used and shall be operated with orifices, nozzles, and air pressure suited to the kind of paint and its consistency. Paint pots shall be equipped with means of controlling air or liquid pressure on the pot independently of the pressure at the gun.

B. Air lines shall be equipped with water traps for positive removal of condensed moisture.

3.3 APPLICATION OF PAINT – BRUSH

A. Brush application of prime coats shall be avoided except as otherwise specified and/or recommended by the paint manufacturer. Brush application of any subsequent coats shall not be applied unless previous coat is accepted by ENGINEER. Paint materials shall be applied in flowing coats; each coat shall be of uniform coverage, and well brushed out leaving no defects, runs or streaks.

B. On all surfaces which are inaccessible for brushes and where spraying cannot be employed, the paint shall be applied by sheepskin daubers specifically constructed for the purpose.

3.4 APPLICATION OF PAINT – ROLLER

A. Roller application of coating systems shall be avoided wherever possible, except as recommended by the paint manufacturer. Should the use of rollers become essential, the coating material so applied shall be in uniform and even coats, without defects. The second coat shall be applied at right angles to the first coat. Interior angles and other areas inaccessible to rollers shall be coated by brush and sheepskin daubers.

3.5 SURFACES NOT TO BE PAINTED

A. The following surfaces shall not be painted:

1. Corrosion-resistant steel surfaces (i.e., stainless, anodized aluminum, and chromium plate).
2. Faying surfaces on connections designed for high strength bolts; however, if primer is of the zinc-rich type, faying surfaces shall be prime coated.
3. Surfaces within 2 inches of field welds, prior to welding.
4. Areas of embedded parts which will be in contact with concrete (these surfaces shall be cleaned of all rust and scale.
5. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this Section except as may be specified herein.
6. Labels or equipment identification, performance rating, name, or nomenclature plates.
7. Machine finished or similar surfaces; however, such surfaces shall be protected with a corrosion preventive compound.
8. Concrete.
9. Penstock external surfaces that are encased in anchor blocks. Except that the paint coating shall extend 3 inches into the anchor blocks.

3.6 CURING SCHEDULE

A. Curing schedules as recommended by the paint manufacture for each coating system shall be followed. Surface temperatures shall be used in determining curing schedules. Allow sufficient curing time between coats, minimum of 18 or 24 hours, or as required by manufacturer.

B. Accelerated curing may be employed, but only as recommended by the paint manufacturer and whenever surface temperatures are such that proper curing cannot be accomplished within a reasonable time. Accelerated curing shall have the prior written agreement of ENGINEER and OWNER.

C. Oil-base and oleo-resinous, solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

3.7 FILM THICKNESS

A. For minimum requirements, unless otherwise specified herein or by the manufacturer, prime coats shall be 1.5 to 2 mils thick when dry, and intermediate and finish coats of paint shall have a dry film thickness of at least 1.5 mils per coat. No portion of the paint film shall be less than the specified film thickness. Film thicknesses shall not be so great that either the appearance, curing, or service life of the paint will be detrimentally affected.

B. The wet film thickness shall be checked at the time the paint is being applied and the dry film thickness then calculated using the volatile matter content of the paint. After all coats are applied, the dry film thickness shall be checked using magnetic gages in accordance with SSPC-PA2-73T.

3.8 PAINT INSPECTION

A. Protective coating systems shall not be applied until the surface preparation has been inspected and accepted by ENGINEER and OWNER. Surface preparation and coating application shall not be undertaken until the area involved has been accepted by ENGINEER and OWNER. The standard of inspection will be in accordance with the SSPC Manual, Volumes 1 and 2. ENGINEER at his option, may employ an electrically operated holiday detector in the inspection of coated surfaces.

B. Each coat, when dried, shall be inspected and accepted by ENGINEER and OWNER before application of succeeding coats, otherwise no credit will be given for the coat. As a result, CONTRACTOR may be required to recoat the surface at no additional cost to OWNER.

C. The coated surface will be evaluated to determine uniformity, continuity, and soundness, and will be rejected if any of the following defects are apparent to ENGINEER:

1. Runs, sags, holidays, mudcracking, peeling, flaking or shadowing caused by inefficient application methods.
2. Evidence of poor coverage at plate, lap joints, crevices, pockets, corners, and reentrant angles.
3. Damage to coating because of handling before the paint is sufficiently dry, or any other contributory cause.
4. Damage because of shipping and handling.

D. Recoating or repair of all cleaned and/or coated surfaces rejected by CONTRACTOR's inspector or ENGINEER shall be CONTRACTOR's responsibility. Small affected areas may be touched up. Another complete

coat shall be applied to large affected areas or areas where sufficient dry film thickness has not been attained. Runs, sags, or paint damaged in handling shall be removed prior to further application, at no cost to OWNER.

E. Protective Coating Systems:

TABLE P1

SYSTEM SYS-1	
COATING SYSTEM TYPE	Hot-dip galvanizing
SERVICE	Enclosed Building: Structural steel unless noted otherwise, All Location: Exposed exterior structural steel (including access platform), (Ferrous) miscellaneous metal, including handrail, ladders, stair treads, grating, and designated structural steel.
SURFACE PREPARATION	Sandblast cleaning to "Commercial" SSPC-SP6 and pickling
PRIMER COAT	Hot-dip galvanized in accordance with ASTM A123, A385, and A386 standards
INTERMEDIATE COAT	--
FINISH COAT	--
TOUCHUP	Hot stick galvanized with zinc-based alloy per supplier's instructions and in accordance with ASTM A780
SYSTEM SYS-2	
COATING SYSTEM TYPE	High solids catalyzed epoxy
SERVICE	Enclosed Building:
SURFACE PREPARATION	Steel pipe interior surface (does not include 30" pipe and mitered pieces),
PRIMER COAT	Steel pipe exterior surfaces
INTERMEDIATE COAT	Wet Well:
FINISH COAT	Steel pipe interior
SYSTEM SYS-3	
COATING SYSTEM TYPE	High solids polyamide epoxy with urethane color coating.
SERVICE	Wet Well:
SURFACE PREPARATION	Exterior ferrous metals,
PRIMER COAT	Steel pipe exterior surface
FIRST INTERMEDIATE COAT	Sandblast cleaning to "near white" SSPC-SP10
SECOND INTERMEDIATE COAT	One coat organic zinc rich primer, TNEMEC, Series 91H20 Hydro-Zinc 2000 with a dry-film thickness of 2.5 to 3.5 mils

FINISH COAT	One coat high solids, amine cured, epoxy coating, TNEMEC, Series 66-Color Hi-Build Epoxoline with a dry-film thickness of 4.0 to 6.0 mils
SYSTEM SYS-4	
COATING SYSTEM TYPE	100% solids polyurethane
SERVICE	Exposed new steel conduit exterior surfaces
SURFACE PREPARATION	Sandblast cleaning to "near white" SSPC-SP10
COATING	Lifelast DuraShield 310-61 (25 mils dry film thickness)
SITE WELDED JOINTS	Lifelast DurasShield 310-61 JARS
SYSTEM SYS-5	
COATING SYSTEM TYPE	100% solids polyurethane
SERVICE	Buried new steel conduit exterior surfaces
SURFACE PREPARATION	Sandblast cleaning to "near white" SSPC-SP10
COATING	Lifelast DuraShield 310-61 (40 mils dry film thickness)
SITE WELDED JOINTS	Canusa Aqua-Shield heat shrink sleeves
SYSTEM SYS-6	
COATING SYSTEM TYPE	Polyamidoamine Epoxy
SERVICE	Enclosed Building: Equipment, Miscellaneous steel not noted in SYS-2 and interior steel
SURFACE PREPARATION	SSPC-SP3 power tool cleaning
PRIMER COAT	TNEMEC Series 135 Chembuild
TOP COAT	TNEMEC Series L69 Hi-Build Epoxoline II
SYSTEM SYS-7	
COATING SYSTEM TYPE	Interior Latex Paint
SERVICE	Interior ducts
SURFACE PREPARATION	As recommended by manufacturer for achieving the best result for the substrate under the project conditions
PRIMER COAT	PPG Pittsburgh Paints Speedhide White 6-4
TOP COAT	PPG Pittsburgh Paints Manor Hall Interior Latex
SURFACE CLEANING	Clean excess coating materials, reinstall all items that have been removed to protect from contact with coatings, and remove protective materials
SYSTEM SYS-8	
COATING SYSTEM TYPE	Door and Frame Paint
SERVICE	Overhead garage doors and steel personnel doors and frames

SURFACE PREPARATION	As recommended by manufacturer for achieving the best result for the substrate under the project conditions
PRIMER COAT	Factory primed
TOP COAT	Factory finish, MPI Gloss Level 5; and touch-up paint as needed

TABLE P-2

PROTECTIVE COATINGS AND COLOR SCHEDULE			
COATING SYSTEM NO.	COATING SYSTEM DESCRIPTION	ITEMS	FINISH COLOR
SYS-1	Hot-Dip Galvanized	Exterior and interior structural steel and (ferrous) misc. metals, including grating, equipment covers, embedded frames, handrails, guardrails, chains, etc.	NA
SYS-2	High Solids Catalyzed Epoxy	New steel conduit interior, submerged and exterior steel surfaces	Note 1
SYS-3	High Solids Polyamide Epoxy with Urethane Color Coating	Exposed exterior ferrous metals not galvanized or stainless steel, includes access platform framing	Note 1
SYS-4	Polyurethane	N/A	Note 1
SYS-5	Polyurethane	Buried new steel conduit exterior surfaces	Note 1
SYS-6	Polyamidoamine Epoxy	Equipment and interior steel	Varies (Note 1)
SYS-7	Interior Latex Paint	Interior ducts, cement board (interior walls) MPI VOC Range: E3; Gloss Level 3	Note 1
SYS-8	Door and Frame Paint	Overhead sectional doors and powerhouse and dam valve house steel personnel doors and frames, window frames	Note 1

Notes:
1. Color to be provided by Owner

– End of Section –

DIVISION 10 – SPECIALTIES

SECTION 10 44 16

FIRE EXTINGUISHERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Portable, hand-carried fire extinguishers.

B. Wall mounting brackets for fire extinguishers.

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function.

1.2 INFORMATION SUBMITTALS

A. Warranty: Sample of special warranty.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to the Los Angeles Fire Department.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

PART 2 – PRODUCTS

2.0 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for mo6unting bracket indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.

b. Larsen's Manufacturing Company.

c. Potter Roemer LLC.

2. Valves: Manufacturer's standard.

3. Handles and Levers: Manufacturer's standard.

4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 2-A:10-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.1 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. J. L. Industries, Inc.; a division of Activar Construction Products Group.

b. Larsen's Manufacturing Company.

c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

a. Orientation: Vertical.

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.1 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

3.2 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fails in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
2. Failure of hydrostatic test according to NFPA 10.
3. Faulty operation of valves or release levers.
4. Warranty Period: Six years from date of Substantial Completion.

– End of Section –

DIVISION 23 – HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 23 34 13

AXIAL HVAC FANS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of HVAC power ventilators or economizers. The CONTRACTOR shall provide HVAC fans and appurtenances, complete and in place, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 26 05 11 – General Electrical Requirements

1.2 REFERENCES

A. Air Movement and Control Association Inc. (AMCA)

1. 99 – Standards Handbook
2. 200 – Publication, Air Systems
3. 201-90 – Publication, Fans and Systems
4. 202-88 – Publication, Troubleshooting
5. 203-90 – Publication, Field Performance Measurement of Fan Systems
6. 211-05 – Publication, Certified Ratings Program – Product Rating Manual for Fan Air Performance

B. Occupational Safety and Health Administration (OSHA)

1. 1910.212 – General requirements for Machine Guarding
2. 1910.219 – General requirements for guarding safe use of mechanical power transmission apparatus

C. Underwriters Laboratories (UL)

1. 507 – Electric Fans
2. 705 – Standard Power Ventilators

1.3 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, Installation, Operation, and Maintenance Manuals.

B. Provide fan curves for each fan at the specified operation point, with the flow, static pressure and horsepower clearly plotted.

C. Provide outlet velocity and fan's inlet sound power readings for the eight octave bands, decibels, and sones.

D. Strictly adhere to QUALITY ASSURANCE requirements as stated in Section 1.4 of this specification.

E. Provide manufacturer's certification that supply and exhaust fans are licensed to bear Air Movement and Control Association (AMCA), Certified Rating Seal for sound and air performance.

F. Installation, Operation, and Maintenance Manual (IOM): Provide manufacturer's installation, operations, and maintenance manual, including instructions on installation, operations, maintenance, pulley adjustment, receiving, handling, storage, safety information and cleaning. A troubleshooting guide, parts list, warranty and electrical wiring diagrams.

1.4 QUALITY ASSURANCE

A. Performance ratings: Conform to AMCA standard 211 and 311. Fans must be tested in accordance with ANSI/AMCA Standard 210-16 and AMCA Standard 300-14 in an AMCA accredited laboratory. Fans shall be certified to bear the AMCA label for air performance seal.

B. Classification for Spark Resistant Construction, levels A, B and C, conform to AMCA 99.

C. Each fan propeller is balanced in order to meet a Balance Grade of 6.3.

D. Comply with the National Electrical Manufacturers Association (NEMA), standards for motors and electrical accessories.

E. The Finite Element Analysis (FEA) is the results from the CFD and it can accurately predict the stress, strain, and deflection resulting from high wind loads.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer, material, products included, and location of installation.

B. Storage: Store materials in a dry area indoor, protected from damage, and in accordance with manufacturer's instructions. For long term storage follow manufacturer's IOM.

C. Handling: Handle and lift fans in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer.

1.6 WARRANTY

A. Manufacturer's Warranty: Submit, for OWNER'S acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights OWNER may have under Contract Documents.

1. The warranty of this equipment is to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturers option when returned to Manufacturer, transportation prepaid.

B. Motor Warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished prove defective during this period, they should be returned to the nearest authorized motor service station.

1.7 MAINTENANCE

A. Refer to IOM, to find maintenance procedures.

PART 2 – PRODUCTS

2.0 MANUFACTURER

A. Greenheck, PO Box 410, Schofield, Wisconsin 54476. Phone (715) 359-6171 Fax (715)355-2399. Website: www.greenheck.com

2.1 MODEL

A. Direct drive sidewall mounted propeller fans – Greenheck model AER.

B. General Description:

1. Fan arrangement shall be either supply or exhaust, see Equipment Schedule.

2. Sidewall mounted applications.

3. Performance capabilities up to 78,600 cubic feet per minute (cfm) and static pressure to 3.4 inches of water gauge.
4. Fans are available in eight sizes with nominal propeller diameters ranging from 20 inches through 60 inches (20-60 unit sizes).
5. Maximum continuous operating temperature 150° Fahrenheit (65° Celsius) with appropriate motor selection.
6. Minimum continuous operating temperature -10° Fahrenheit (-23° Celsius).
7. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual unit serial number.

C. Propeller:

1. Constructed of Cast Aluminum.
2. Securely attached to motor shaft with a standard square key, set screw and tapered bushing.
3. Statically and dynamically balanced in accordance with AMCA Standard 204-05.
4. The propeller and fan inlet will be aligned and shall have precise running tolerances for maximum performance and operating efficiency.
5. Propellers are not coated when fan coatings accessory is selected regardless of material type.

D. Motors:

1. Electronically Commutated Motor:
    a. Motor enclosures: Totally Enclosed Fan Cooled.
    b. Electronic commutation type motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors.
    c. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.

d. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor or integrated variable frequency drive.

e. Motor shall be speed controllable down to 20% of full speed (80% turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.

f. Motors can achieve up to 95% efficiency (model and horsepower dependent).

E. Drive Frame:

a. Drive frames and fan panels shall be bolted construction.

b. Drive frame assemblies and fan panels shall be galvanized steel or painted steel.

c. Drive frame shall be formed steel and fan panels shall have pre-punched mounting holes, formed flanges, and a deep formed inserted venturi.

F. Disconnect Switches:

1. NEMA rated: 1

2. Positive electrical shut-off

3. Wired from fan motor to junction box.

G. Options/Accessories:

1. Dampers:

a. Type: Gravity

b. Prevents outside air from entering back into the building when fan is off.

c. Balanced for minimal resistance to flow.

d. Galvanized frames with pre-punched mounting holes

2. Dampers Guards:

a. Guard material: Galvanized or Aluminum

b. Shall completely enclose the damper or wall opening on the discharge side of the fan.

3. Finishes:

a. Types: Industrial Epoxy

4. Horizontal Mounting:
    a. Allows fan to be mounted in a horizontal configuration.
    b. Location: Motor Bottom, Air Up
5. Wall Housing:
    a. Mounting arrangement: Flush Exterior
    b. Constructed of galvanized steel or painted steel with heavy gauge mounting flanges and pre-punched mounting holes
    c. Housing shall include OSHA approved motor guard.
    d. Reduces installation time and provides maximum installation flexibility.
6. Wall Collar:
    a. Constructed of galvanized steel or painted steel with heavy gauge mounting flanges and pre-punched mounting holes
7. Motor Side Guard:
    a. Guard type: OSHA Guard
    b. Protective guard completely enclose the motor and drive side of the fan.
8. Weatherhood Kit:
    a. Shall shield wall opening and dampers from rain and snow.
    b. Material type: Aluminum or Galvanized
    c. Turndown Angle: 45 degrees
    d. Screen: Birdscreen
    e. Finishes: Industrial Epoxy
9. Variable Frequency Drive:
    a. Factory programed, mounted and wired
    b. Input speed control: 0-10VDC
    c. 24VDC control power output
    d. 4 digital inputs
    e. 2 digital outputs
    f. Bluetooth connectivity with Vari-Green Drive companion app
    g. BACnet/Modbus communication points

h. Motor: (VFD Rated) compatible with induction and permanent magnet motors

i. Parameters of acquainted motor shall be set to include voltage, speed, FLA, acceleration/deceleration time, and minimum and maximum motor frequency

j. R3 Filtering for harmonic mitigation

k. UL Recognized for 3 phase input at 380-480V

l. NEMA 4X Enclosure

m. LED indication for Power, Run, and Fault

PART 3 – EXECUTION

3.0 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data, including technical bulletins, product catalog installation instructions

3.1 EXAMINATION

A. Examine areas to receive fans. Notify the ENGINEER of conditions that would adversely affect installation or subsequent utilization and maintenance of fans. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Ensure wall openings are square, accurately aligned, correctly located, and in tolerance.

3.3 INSTALLATION

A. Install fan system as indicated on the Installation, Operation and IOM and contract drawings.

B. Install fans in accordance with manufacturer's instructions.

3.4 SYSTEM STARTUP

A. Refer to IOM.

3.5 CLEANING

A. Clean as recommended by manufacturer. Do not use material or methods which may damage finish surface or surrounding construction.

3.6 PROTECTION

A. Protect installed product and finished surfaces from damage during construction.

B. Protect installed fans to ensure that, except for normal weathering, fans will be without damage or deterioration at time of substantial completion.

– END OF SECTION –

SECTION 23 81 26.01

SPLIT-SYSTEM AIR CONDITIONERS – INDOOR UNITS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of multiple evaporator, direct expansion (DX), air cooled, variable capacity, split system evaporator units. The CONTRACTOR shall provide split system evaporator units and appurtenances, complete and in place, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 23 81 26.02 – Split-System Air Conditioners - Outdoor Units

1.2 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, Installation, Operation, Equipment Data Sheets, and Maintenance Manuals (IOM).

1.3 QUALITY ASSURANCE

A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.

B. All wiring shall be in accordance with the National Electric Code (NEC).

C. Each combination shall be rated in accordance with Air Conditioning, Heating and Refrigeration Institute's (AHRI) Standard 210/240 and bear the AHRI label.

D. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

E. The outdoor unit will be factory charged with R-410A.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Units shall be stored and handled according to the manufacturer's recommendations.

PART 2 – PRODUCTS

2.0 INDOOR EVAPORATOR UNIT

A. General:

1. Daikin indoor unit FXAQ shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. This compact design with finished white casing shall be provided with a 18,000 Btu/h sensible cooling capacity. Model number FXAQ24PVJU to be connected to outdoor unit model RXTQ48TBVJUA. Two indoor units shall be installed with every, one outdoor unit installation. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC1E73 and BRC2A71. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.

B. Indoor Unit:

1. The Daikin indoor unit FXAQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.

2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. Return air shall be through a resin net mold resistant filter.
5. The indoor units shall be equipped with a condensate pan.
6. The indoor units shall be equipped with a return air thermistor.
7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
8. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.
3. The airflow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.

E. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.
5. A thermistor will be located on the liquid and gas line.

6. A condensate pan shall be located in the unit.

F. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

G. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.

2. The unit shall be compatible with interfacing with a BMS system via optional LonWorks or BACnet gateways.

3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

H. Optional Accessories to be Selected and Included:

1. Remote "in-room" sensor kit KRCS01-1B.

2. A condensate pump (DACA-CP3-1).

2.1 PERFORMANCE

A. Design Basis:

1. The HVAC equipment basis of design is Daikin. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Key General Specifications Alternate Supplier Checklist). In any event the CONTRACTOR shall be responsible for all specified items and intents of this document without further compensation.

2. Daikin provided by Air Reps – contact vincent.griffith@airreps.com

PART 3 – EXECUTION

3.0 INSTALLATION

A. General: Equipment shall be installed in a neat and workmanlike manner, properly aligned, and placed from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and other equipment. Exposed pipes shall afford maximum headroom and

access to equipment, and where necessary," piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. Installation shall be free from defects.

3.1 HVAC EQUIPMENT ALTERNATE (GENERAL INFORMATION)

A. The alternate equipment supplier shall provide to the bidding mechanical CONTRACTOR a complete equipment data package. This package shall include, but is not limited to, equipment capacities at the design condition, power requirements, indoor units CFM/static pressures, fan curves, installation requirements, and physical dimensions. Nominal performance data is not acceptable.

B. The mechanical CONTRACTOR shall request and receive the equipment data package 15 days prior to bid date and submit this package with the alternate bid.

C. The mechanical CONTRACTOR shall list the equipment supplier and submit the required data package with the bid detailing a complete comparison of the proposed alternate equipment to the specified equipment and the associated cost reduction of the alternate equipment. The CONTRACTOR bids an alternate manufacturer with full knowledge that that manufactures product may not be acceptable or approved.

3.2 INSPECTION

A. Finished installations shall be carefully inspected for proper function, supports, anchoring, interferences, and damage to pipe, fittings, and coating. Any damage shall be repaired.

– END OF SECTION –

SECTION 23 81 26.02

SPLIT-SYSTEM AIR CONDITIONERS – OUTDOOR UNITS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of multiple evaporator, direct expansion (DX), air cooled, variable capacity, split system condenser units. The CONTRACTOR shall provide split system condenser units and appurtenances, complete and in place, in accordance with the Contract Documents.

B. The variable capacity, heat pump air conditioning system shall be a Daikin Variable Refrigerant Volume Series split system. The system shall consist of multiple evaporators using PID control, and Daikin VRV IV-S model condensing unit. The RXTQ outdoor units shall be a nominal 4-ton DX, air-cooled heat pump air-conditioning system, inverter driven variable speed compressor, multi-zone split system, using R-410A refrigerant. The outdoor unit may connect an indoor evaporator capacity up to 130% to that of the outdoor condensing unit capacity. All indoor units are each capable of operating separately with individual temperature control.

C. The Daikin outdoor unit shall be interconnected to two indoor unit models FXAQ with a nominal capacity of 24,000 Btu/Hr in accordance with Daikin's engineering data book detailing each available indoor unit. The indoor units shall be connected to the condensing unit utilizing Daikin's REFNET™ specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable.

D. While RXTQ outdoor units are capable of heating and cooling, operation of the system shall permit only cooling of all of the indoor units. Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, an Intelligent Touch Controller (ITC), an Intelligent Touch Manager (ITM) or a BMS interface.

1.1 RELATED SECTIONS

Section 23 81 26.01 – Split-System Air Conditioners - Indoor Units

1.2 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, Installation, Operation, Equipment Data Sheets, and Maintenance Manuals.

1.3 QUALITY ASSURANCE

A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.

B. All wiring shall be in accordance with the National Electric Code (NEC).

C. Each combination shall be rated in accordance with Air Conditioning, Heating and Refrigeration Institute's (AHRI) Standard 210/240 and bear the AHRI label.

D. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

E. The outdoor unit will be factory charged with R-410A.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Units shall be stored and handled according to the manufacturer's recommendations.

PART 2 – PRODUCTS

2.0 OUTDOOR CONDENSING UNIT

A. General: The outdoor unit is designed specifically for use with VRV series components.

1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of a Daikin swing compressor, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separator, service ports and suction line accumulator.
2. Liquid and suction lines must be individually insulated between the outdoor and indoor units.

3. The outdoor unit can be wired and piped with outdoor unit access from the left, right, rear or bottom.

4. The connection ratio of indoor units to outdoor unit shall be permitted up to 130%.

5. The outdoor system shall be able to support the connection of up to 9 indoor units dependent on the model of the outdoor unit.

6. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The outdoor unit shall be capable of operating automatically at further reduced noise during night time.

7. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.

8. The outdoor unit shall allow for side-by-side installation with minimum spacing.

9. The following safety devices shall be included on the condensing unit; high pressure switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.

10. To ensure the liquid refrigerant does not flash when supplying to the various indoor unit units, the circuit shall be provided with a sub-cooling feature.

11. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.

12. The outdoor unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls.

B. Unit Cabinet:

1. The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit fan(s) shall consist of propeller type, direct-drive fan motors that have multiple speed operation via a DC (digitally commutating) inverter.

2. The fan shall be a horizontal discharge configuration with a nominal airflow maximum range of up to 3,740 CFM.

3. Nominal sound pressure levels shall be as shown below.

MODEL NUMBER	SOUND PRESSURE LEVEL DB(A) COOLING / HEATING MODES
RXTQ48TBVJUA	58 / 61

4. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.

5. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.

2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.

3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube.

4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.

E. Compressor:

1. The Daikin inverter scroll compressor shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity shall be controlled to eliminate deviation from target value.

2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed swing type.

3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.

4. The capacity control range shall be 14% to 100%.
5. The compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
6. Oil separators shall be standard with the equipment together with an intelligent oil management system.
7. The compressor shall be mounted on vibration dampening rubber grommets to minimize the transmission of vibration, eliminating the standard need for external spring isolation.
8. Electrical: The power supply to the outdoor unit shall be 208/230 volts, 1 phase, 60 hertz +/- 10%.

POWER SUPPLY VOLTAGE	VOLTAGE RANGE
208-230V/1/60	187V-253V

MODEL	MCA	MOP	COMPRESSOR RLA
RXTQ48TBVJUA	29.1	35	19.0

9. The control voltage between the indoor and outdoor unit shall be 18VDC non-shielded, stranded 2 conductor cable.
10. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.
11. The control wiring lengths shall be as shown below.

	OUTDOOR TO INDOOR UNIT	OUTDOOR TO CENTRAL CONTROLLER	INDOOR UNIT TO REMOTE CONTROL
Control Wiring Length	6,665 ft	3,330 ft	1,665 ft
Wire Type	18 AWG, 2 wire, non-polarity, non-shielded, stranded		

2.1 PERFORMANCE

A. The VRVIV-S RXTQ system performance shall be in accordance with AHRI 210/240 test conditions as shown in the performance table below.

SYSTEM	COMBINED WITH	SENSIBLE COOLING CAPACITY	EER2	SEER2
		Btu/hr	95°F	
RXTQ48TBVJ*	Non-Ducted	36,000	10.30	18.6
	Ducted		7.90	14.6
	Mixed		9.10	16.6

1. Performance Conditions:
   a. Cooling: Indoor temp. of 80°F DB, 67°F WB and outdoor temp. of 95°F DB.
   b. Equivalent piping length: 25ft
2. Operating Range: The operating range in cooling will be 23°F DB to 122°F DB (-5°C – 50°C).
3. Cooling mode indoor room temperature range will be 57°F-85°F WB (14°C – 29.4°C).
4. Refrigerant Piping: Model RXTQ48TBVJUA – The system shall be capable of refrigerant piping up to 230 actual feet (70m) or 295 equivalent feet (90m) from the outdoor unit to the furthest indoor unit, a total combined liquid line length of 984 feet (300m) piping between the condensing unit and indoor units, and with 98 feet (30m) maximum vertical difference between the outdoor unit and indoor units without any oil traps. The system shall be capable of 49 feet (15m) vertical separation between indoor units on the same system.
5. REFNET™ piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.
6. Design Basis: The HVAC equipment basis of design is Daikin. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Key General Specifications Alternate Supplier Checklist). In any event, the CONTRACTOR shall be responsible for all specified items and intents of this document without further compensation.
7. Daikin provided by Air Reps – Contact vincent.griffith@airreps.com

PART 3 – EXECUTION

3.0 INSTALLATION

A. General: Equipment shall be installed in a neat and workmanlike manner, properly aligned, and placed from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and other equipment. Exposed pipes shall afford maximum headroom and access to equipment, and where necessary," piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. Installation shall be free from defects.

3.1 HVAC EQUIPMENT ALTERNATE (GENERAL INFORMATION)

A. The alternate equipment supplier shall provide to the bidding mechanical CONTRACTOR a complete equipment data package. This package shall include, but is not limited to, equipment capacities at the design condition, power requirements, indoor units CFM/static pressures, fan curves, installation requirements, and physical dimensions. Nominal performance data is not acceptable.

B. The mechanical CONTRACTOR shall request and receive the equipment data package 15 days prior to bid date and submit this package with the alternate bid.

C. The mechanical CONTRACTOR shall list the equipment supplier and submit the required data package with the bid detailing a complete comparison of the proposed alternate equipment to the specified equipment and the associated cost reduction of the alternate equipment. The CONTRACTOR bids an alternate manufacturer with full knowledge that that manufactures product may not be acceptable or approved.

3.2 INSPECTION

A. Finished installations shall be carefully inspected for proper function, supports, anchoring, interferences, and damage to pipe, fittings, and coating. Any damage shall be repaired.

– End of Section –

SECTION 23 82 39

HEATING AND VENTILATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of heating and ventilation systems. The CONTRACTOR shall provide heating and ventilation systems, complete and operable, in accordance with the Contract Documents.

1.1 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. WORK shall be in full accordance with the latest rules and regulations or publications of the State Energy Resources Conservation and Development Commission, the State Fire Marshall, the Industrial Safety Orders, the Health and Safety Rules (Air Conditioning Systems), the local Plumbing Code, the local Building Code, Fire Code, and all other local codes. Nothing in the Contract Documents shall be construed to permit WORK in violation of the above codes, rules, and regulations. In the absence of applicable codes, installation and workmanship shall follow the standards set by the American Society of Heating, Refrigeration, and Air Conditioning Engineers.

1.2 SUBMITTALS

A. General

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, Installation, Operation, and Maintenance Manuals (IOM).
3. Equipment Numbers: Equipment is identified by number code for reference and location purposes in the Contract Documents. The appropriate equipment numbers shall be included on the Shop Drawings and on other submittals.

1.3 WARRANTY

A. Heaters, fans, and blowers shall carry the manufacturer's standard warranty, and all such warranties shall be furnished to the Contracting Officer before final acceptance.

PART 2 – PRODUCTS

2.0 GENERAL

A. Quality: All mechanisms and parts shall be amply proportioned for the stresses which may occur during operation and during fabrication and installation. Individual parts which are alike in all units shall be alike in materials workmanship, and design and shall be of the manufacturer's top of the line, Industrial-commercial grade.

B. Supports: Equipment and appurtenances shall be firmly anchored or connected to supporting members. Supports required for the proper installation of the equipment, but not forming an integral part of the building structure, shall be provided by the heating and ventilating subcontractor, unless otherwise indicated. Equipment shall be supported on restrained spring-type vibration isolators.

C. Noise/Vibration Control: The system shall be free of any objectionable vibrations and noise. Flexible connections shall be provided in all ducts and piping connections to fans, compressors, and any other vibrating equipment.

D. Electric Motors: Electric motors shall be provided in accordance with the relevant specification section.

2.1 MISCELLANEOUS ACCESSORIES

A. Supports:

1. Supports for horizontal ducts and plenums shall be galvanized steel angles with hanger rods. Band iron straps shall be allowed for duct sizes recommended by SMACNA. Supports for vertical ducts shall be band iron strap or angle bracket type. Inlet ducts shall be amply braced to withstand maximum negative pressure.

2. Seismic Restraints: Duct supports and restraints shall be designed for static, dynamic, and seismic loads per the International Building Code. Seismic restraints shall not induce stresses in the ductwork caused by thermal expansion and contraction.

B. Bird Screens: Removable bird screens shall be provided on all outside air intakes and exhaust air discharges to outside air. Screens shall be secured in frames made from the same metal as the screens. Bird screens shall be 1/2-inch mesh by 14-gauge and shall be of same material and finish as duct, hood, louver, or equipment to which the screens are mounted.

2.2 CONTROLS

A. General: Heating and ventilating equipment shall be provided with manual or automatic control systems as indicated. Electric unit heaters shall have unit-mounted contactors unless otherwise indicated and shall be controlled from wall-mounted line voltage heating thermostats.

B. Thermostats: Room thermostats shall be as provided by the heating equipment manufacturer.

2.3 FANS

A. General: Location, type, capacity, and motor horsepower shall be as indicated. Fans shall be complete with motors, adjustable motor bases, adjustable drives, safety cages, belt guards, flexible connections to supply and/or suction ducts, vibration isolators, and necessary accessories. Fans shall be suitable for continuous operation.

B. Performance: Fans shall be guaranteed to deliver the quantities of standard air against the respective static pressure without deviating by more than 5 percent. Every fan wheel, regardless of size, shall be statically and dynamically balanced and shall be free from objectionable vibration or noises.

C. Roof Fans: Roof-mounted ventilators and exhaust fans shall include curb, flashing, bird screen, or dampers, as appropriate for installation. Roof fans supplying to or exhausting from rooms directly shall have air diffusers or exhaust, where necessary. All fans shall have integral gravity backdraft dampers.

D. Wall-Mounted Fans: Wall-mounted exhaust fans shall be direct motor-driven unless otherwise indicated and shall be supported on metal frames for mounting, with safety guards. Wall openings and louvers shall be of sufficient size for the fan capacity. All fans shall have integral gravity backdraft dampers

2.4 LOUVERS AND BACK DRAFT DAMPERS

A. Louvers shall be Greenheck Model ESD-435, fabricated from 6063T5 aluminum extrusions of .081" nominal wall thickness. Blades shall be positioned at 35° angles approximately on 6" centers. Louvers shall be supplied with Bird screens. Louvers shall be supplied with a Kynar finish applied following a thorough cleaning and pretreatment of the metal surface. Dry film thickness of the Kynar shall be approximately 1.2 mils after

baking at 450°F. The pressure drop shall be no more than 0.038 INWC at the design flow rate.

B. Back draft dampers shall be Greenheck Model BR-30 (air intake) and EM-31 (air exhaust), fabricated from 6063T5 extruded aluminum blades. Backdraft dampers shall be eccentrically weighted and field adjustable to close shut when the exhaust fan turns off. The maximum start open pressure shall be no more than 0.05 INWC.

2.5 ELECTRIC HEATERS

A. General: Electric unit heaters, room heaters, and strip heaters shall be provided where indicated. Heaters shall be controlled from integral, line-voltage thermostats, unless otherwise indicated. Brackets shall be provided for ceiling or wall mounting as required. Heaters shall have built-in magnetic contactors and safety devices to meet UL listing, National Electrical Code, and local regulations. Heaters shall be as manufactured by Modine, Reznor, QMark, or approved equal.

B. Unit Heaters: Unless otherwise Indicated, unit heaters shall be of the electric, horizontal type, with enameled steel cabinet, mounting bracket, adjustable horizontal louvers, spiral finned, enclosed heating element, automatic reset overheat protection, thermal protected, permanently lubricated fan and motor, fuses, and contactors. Where unit heaters are supplied with wall-mounted low voltage thermostats, the heaters shall be equipped with control transformers. Electrical characteristics shall be in accordance with electric diagrams on Drawings.

PART 3 – EXECUTION

3.0 GENERAL

A. Roughing-In: The CONTRACTOR shall ascertain that all inserts, chassis, shafts, and openings are correctly located; if not, cut new openings as part of the WORK.

B. Installation: Install heating and ventilation equipment in accordance with the manufacturer's written instructions.

C. Checking: The CONTRACTOR shall test and tighten all WORK, furnish all equipment necessary to carry out the tests, and thoroughly clean the system before startup.

– End of Section –

DIVISION 26 – ELECTRICAL

SECTION 26 05 11

GENERAL ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section specifies general requirements for electrical work. Detailed requirements for specific electrical items are specified in other sections but are subject to the general requirements of this section. The electrical drawings and schedules are functional in nature and do not specify exact locations of equipment or equipment terminations.

B. This section covers the furnishing and installation of equipment and materials, including: 600VAC or less power and lighting panels, dry type transformers, lighting, conduit, wiring, and terminations for electrical equipment.

C. This section covers the installation and interconnection of electrical equipment specified under other sections, except electrical items designated to be installed under those sections.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 60 – Facility Startup
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 05 83 – Electrical Equipment Installation
Section 26 24 23 – Low Voltage Motor Control Center
Section 27 10 00 – Building Telecommunications Cabling System
Section 40 61 11 – Instrumentation and Control System

1.2 REFERENCE STANDARDS

A. All work shall be performed, and materials shall be furnished in accordance with the NEC - National Electrical Code, the NESC - National Electrical Safety Code, and the following standards where applicable:

1. ANSI American National Standards Institute
2. ASTM American Society for Testing and Materials
3. AWG American Wire Gauge

4. Fed Spec Federal Specification
5. ICEA Insulated Cable Engineers Association
6. IEEE Institute of Electrical and Electronics Engineers
7. IESNA Illuminating Engineering Society of North America
8. NEIS National Electrical Installation Standards
9. NEMA National Electrical Manufacturers Association
10. NFPA National Fire Protection Association
11. UL Underwriters' Laboratories

B. Electrical equipment and materials shall be listed for the purpose for which they are to be used, by an independent testing agency. Two such organizations are Underwriters Laboratories (UL), Canadian Standards Association (CSA). Independent testing agency shall be acceptable to the inspection authority having jurisdiction.

C. When a product is not available with a testing laboratory listing for the purpose for which it is to serve, the product may be required by the inspection authority to undergo inspection and testing at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price. Before the inspection is conducted, CONTRACTOR shall submit a copy of the inspection procedure to be used.

D. Jurisdiction for this project is the State of Oregon Fire Marshall and the Electrical Inspector for Umatilla County. CONTRACTOR shall verify that equipment provided is in conformance with the listing guidelines per the State of Oregon Fire Marshall and Umatilla County requirements.

1.3 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Additional Submittal Requirements for Electrical:

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph.

2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified

paragraph. The number in the margin shall refer a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

3. Each submittal covered under Division 26 shall be thoroughly reviewed by the CONTRACTOR responsible for Division 26 work. The CONTRACTOR shall provide review comments attached to the submittal identifying compliance or non-compliance with the Division 26 specification section, confirming that he has verified that submittals meet specified requirements. Submittals shall be partitioned by specification section unless otherwise approved by OWNER.

4. Submittal information shall be manufacturer's catalog descriptive literature with identifying arrows pointing to the specific equipment, devices, and materials to be supplied. Catalog information shall include technical specifications and application information, including NEMA and electrical ratings, range, weight, accuracy, etc. Catalog cuts shall be edited to show only the items, model numbers, and information which apply and include all information as described below.

C. Submittal Identification:

1. Information covering all materials and equipment shall be submitted for review in accordance with the Section 01 33 00 – Contractor Submittals. Each sheet of descriptive literature submitted shall be clearly marked to identify the material or equipment as follows:

   a. Equipment and materials descriptive literature and drawings shall show the specification paragraph for which the equipment applies.

   b. Sheets or drawings covering more than the item being considered shall have all inapplicable information crossed out.

   c. A suitable notation shall identify equipment and materials descriptive literature with the Drawings or Specifications.

D. Shop Drawings and Data:

1. Complete assembly, foundation, and installation drawings, together with complete engineering data covering the materials used, parts, devices, and accessories forming a part of the work performed by the CONTRACTOR, shall be submitted in accordance with the Section 01 33 00 – Contractor Submittals. The drawings and data shall include, but shall not be limited to, the following with additional requirements as provided by equipment type below as applicable:

    a. Drawings and data.

    b. Nameplate legends.

    c. Bill of Materials.

    d. Anchoring details.

    e. Samples.

2. Conduit:

    a. CONTRACTOR shall furnish a submittal for all types of conduit to be provided. The submittal shall include the manufacturer and type, and sufficient data to indicate that the conduit meets the specified requirements.

3. Wiring Devices

    a. Submittal for all types of wiring devices to be provided shall include the manufacturer and type and location used and sufficient data to indicate that the device meets the specified requirements. Devices include, but are not limited to, the following:

        i. Conduit boxes and fittings.

        ii. Device Plates.

        iii. Wall Switches.

        iv. Receptacles.

4. Junction Boxes, Pull Boxes and Wiring Gutters:

    a. Submittal for all types of junction boxes, pull boxes and gutters to be provided shall include the manufacturer and type and location used and sufficient data to indicate that the device meets the specified requirements. A list shall be submitted, in addition to manufacturer specifications, that lists

all junction boxes, pull boxes, and wiring gutters with manufacturer and part number.

5. Light Fixtures:

   a. Light fixture descriptive sheets shall show the fixture schedule letter, number, or symbol for which the sheet applies.

6. Lighting and Power Panels:

   a. Submittal for all lighting and power panels to be provided shall include sufficient data, and drawings to indicate that the panel meets specified requirements.

7. Surge Protective Devices:

   a. Surge protective device submittals shall include drawings (including unit dimensions, weights, component and connection locations, mounting provisions, and wiring diagrams), equipment manuals that detail the installation, operation and maintenance instructions for the specified unit(s), and manufacturer's descriptive bulletins and product sheets.

   b. The manufacturer shall provide a minimum Five-Year Limited Warranty from date of shipment against failure when installed in compliance with applicable national/local electrical codes and the manufacturer's installation, operation and maintenance instructions.

8. Control Stations:

   a. Control station submittals shall include drawings with unit dimensions, component, and connection locations, and mounting provisions, wiring diagrams, descriptive bulletins and product sheets. Drawings shall be submitted for each control station as required for the project.

9. Disconnect Switches:

   a. Submittal for all disconnect switches to be provided shall include sufficient data, and drawings to indicate that the disconnect switch meets specified requirements. Applicable fusing data shall be included with the submittal. A list shall be submitted, in addition to manufacturer specifications, that lists all disconnect switches with manufacturer and part number.

10. Transformers:

a. Submittal for all transformers to be provided shall include sufficient data, and drawings to indicate that the transformer meets specified requirements.

E. Record Documents:

1. Contract documents shall be maintained and annotated by the CONTRACTOR during construction, including all recorded drawings.

F. Operation and Maintenance Data and Manuals:

1. Adequate operation and maintenance information shall be supplied. Operation and maintenance manuals shall include the following:

a. Manufacturer's cut sheets, data sheets, specifications, user manuals, installation manuals, and maintenance manuals for all products included in the specification section.

b. Schematics, wiring diagrams, and panel drawings in conformance with construction record.

c. Model numbers and up-to-date cost data for all spare parts.

d. Troubleshooting procedures, with a cross-reference between symptoms and corrective recommendations.

2. The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered.

3. Operation and Maintenance manuals shall be organized with page numbers and table of contents. Furthermore, the O&M manuals shall include section title pages for each section that state what is included in the section. All cutsheets, manuals, and general product literature shall include a label specifying what product it is applicable to.

1.4 GENERAL

A. Electrical apparatus on all equipment shall be installed completely and placed in readiness for proper operation.

B. Electrical materials furnished and installed under this section of the contract shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are approved by OWNER.

C. Seismic Design Requirements:

1. Seismic design requirements for products specified in this contract shall be as indicated on the structural drawings.

D. Coordination:

1. Electrical work shall conform to the construction schedule and the progress of other trades. CONTRACTOR shall ensure all critical path items and submittals for the Division 26 equipment are included in the overall construction schedule as required by Section 01 32 16, Construction Schedule, paragraph 1.1.

2. When manufacturer's field services are provided by the equipment manufacturer, CONTRACTOR shall coordinate the services with the equipment manufacturer. CONTRACTOR shall give OWNER written notice at least fourteen (14) days prior to the need for manufacturer's field services furnished by others.

3. CONTRACTOR shall review equipment submittals and coordinate with the requirements of the Work and the Contract Documents. CONTRACTOR accepts sole responsibility for determining and verifying all quantities, dimensions, and field construction criteria.

E. Anchor Bolts and Expansion Anchors:

1. All anchor bolts, nuts, washers, and expansion anchors shall comply with Anchorage in Division 03 – Concrete, except that smaller than ¾-inch fasteners will be permitted to match NEMA standard size bolt holes on motors and electrical equipment.

F. Drawing Definitions:

1. Elementary or Schematic Diagram: A schematic (elementary) diagram shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement. The schematic diagram facilitates tracing the circuit and its functions without regard to the actual physical size, shape, or location of the component devices or parts.

2. One-Line Diagram: A one-line diagram shows by means of single lines and graphical symbols the course of an electrical circuit or system of circuits and the components, devices or parts used therein. Physical relationships are usually disregarded.

3. Block Diagram: A block diagram is a diagram of a system, instrument, computer, or program in which selected portions are represented by annotated boxes and interconnecting lines.

4. Wiring or Connection Diagram:

a. A wiring or connection diagram includes all the devices in a system and shows their physical relationship to each other including terminals and interconnecting wiring in an assembly. This diagram shall be:

b. In a form showing interconnecting wiring only by terminal designation (wireless diagram), or;

c. In a panel layout diagram showing the physical location of devices plus the elementary diagram.

5. Interconnection Diagram: Interconnection diagrams shall show all external connections between terminals of equipment and outside points, such as motors and auxiliary devices. References shall be shown to all connection diagrams which interface to the interconnection diagrams. Interconnection diagrams shall be of the continuous line type. Bundled wires shall be shown as a single line with the direction of entry/exit of the individual wires clearly shown. Wireless diagrams and wire lists are not acceptable.

6. Each wire identification as actually installed shall be shown. The wire identification for each end of the same wire shall be identical. All devices and equipment shall be identified. Terminal blocks shall be shown as actually installed and identified in the equipment complete with individual terminal identification.

7. All jumpers, shielding and grounding termination details not shown on the equipment connection diagrams shall be shown on the interconnection diagrams. Wires or jumpers shown on the equipment connection diagrams shall not be shown again on the interconnection diagram. Signal and DC circuit polarities and wire pairs shall be shown. Spare wires and cables shall be shown.

8. Arrangement, Layout, and/or Outline Drawings: An arrangement, layout, or outline drawing is one which shows the physical space and mounting requirements of a piece of equipment. It may also indicate ventilation requirements and space provided for connections or the location to which connections are to be made. Supplementing this section, the Drawings indicate locations of equipment and enclosures and provide one line and schematic diagrams regarding the connection and interaction with other equipment. A partial drawing list is provided in the References paragraph above.

1.5 IDENTIFICATION

A. Conduit:

1. Conduits in manholes, handholes, building entrance pull boxes, junction boxes, and equipment shall be provided with identification tags. Identification tags shall be 19 gage stainless steel, with ½-inch stamped letters and numbers as indicated on the Drawings. Identification tags shall be attached to conduits with nylon tie wraps and shall be positioned to be readily visible.

B. Conductors:

1. All conductors in power, control, and instrumentation circuits shall be identified and color coded as described herein.

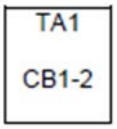
2. Conductor Identification Number. Except for lighting and receptacle circuits, each individual conductor in power, control, and instrumentation circuits shall be provided with wire identification markers at the point of termination.

a. The wire markers shall be heat shrink type, printed, Brady BMP41 Series PermaSleeve such as M-250-1-342 or approved similar.

b. The wire numbers shall be as indicated on the Drawings. If a wire does not appear on the Drawings the wire number shall be as indicated on equipment manufacturer's drawings or any interconnection drawings.

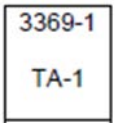
c. Conductor labels shall be provided at each end of the wire termination. The label shall show both wire destination locations on each termination.

d. For example: for a wire that runs between terminal TA-1 and terminal CB1-2 in a common piece of equipment, a wire label would be placed at the connection at TA-1 and at CB1-2 and should read as follows (the order is not important):



e. Each conductor requires two (2) identical labels. These labels will allow a person to know where the termination points are when looking at either end of the wire. The wire labels shall be clearly visible.

f. Cable terminations shall be marked similarly as the conductors. For example, the label for Cable #3369, conductor #1 to terminal TA-1 should read as follows:



g. All wire marker labels shall be wipe resistant, polyolefin material that can withstand ambient temperatures from -50 degrees C to 130 degrees C.

h. The wire markers shall be positioned to be readily visible for inspection.

3. Conductor Color Coding. Power conductors shall be color coded as indicated below. For conductors #6 AWG and smaller, the color coding shall be the insulation finish color. For sizes larger than #6 AWG, the color coding may be by marking tape. The equipment grounding conductor shall be green or green with one or more yellow stripes if the conductor is insulated.

a. The following color-coding system shall be used:

i. 120/240VAC single-phase black, red, and white.

ii. 120/208VAC three-phase black, red, blue, and white.

iii. 120/240VAC three-phase black, orange, blue, and white.

iv. 277/480VAC three-phase brown, orange, yellow, and gray.

b. Where 120/240VAC and 120/208VAC systems share the same conduit or enclosure, the neutral for either the 120/240VAC system or the 208VAC system shall be white with a permanent identifiable violet stripe.

c. Control and instrumentation circuit conductors shall be color coded as indicated in Section 26 05 19 – Conductors and Cables.

C. Motor Starters:

1. All motor starters shall have front cover mounted permanent nameplates that include type, manufacturer's name and catalog number, and horsepower rating. An additional nameplate, engraved or etched, laminated black over white plastic with 1/8-inch letters shall be provided to identify the equipment tag number and equipment description. Both nameplates shall be securely fastened to the enclosure.

D. Control Stations:

1. Control stations shall be provided with nameplates identifying the related equipment. Pilot controls and indicating lights shall have engraved or etched legends ("START", "STOP", etc.) as indicated on the Drawings.

a. Nameplates shall be laminated black over white plastic, with 1/8-inch engraved letters, and shall be securely fastened to the control stations.

E. Panels and Distribution Circuit Breakers:

1. All lighting and distribution panels shall be provided with nameplates, which include panel name and voltage. Nameplates shall be laminated black over white plastic with 3/8-inch engraved letters and shall be securely fastened to the panel exterior.

2. Stand-alone circuit breakers shall be provided with nameplates on the enclosure, identifying related equipment. Nameplates shall be laminated black over white plastic with 1/8-inch engraved letters and shall be securely fastened to the circuit breakers enclosure.

F. Disconnect Switches:

1. All switches shall have front cover mounted permanent nameplates that include switch type, manufacturer's name and catalog number, and horsepower rating. An additional nameplate, engraved or etched, laminated black over white plastic with 1/8-inch letters shall be provided to identify the equipment tag number and equipment description of both the power source and the load equipment. Both nameplates shall be securely fastened to the enclosure. Refer to NEC Article 110.22 for Identification of Disconnecting Means installation criteria.

G. Junction and Pull Boxes:

1. All junction and pull boxes shall have clearly visible nameplates, securely attached and suitable for environment in which the box is installed. Nameplates shall have box tag number.

H. Arc Flash Hazard Labels:

1. Lighting panels, power panels, power centers, meter socket enclosures, disconnect switches, industrial control panels, variable frequency drives, and combination motor starters shall be provided with permanent labels warning the risk of arc flash and shock hazard. Labels shall be designed to meet OWNER’s standard for content as

shown in Figure 1 and Figure 2 below and in accordance with ANSI Z535.

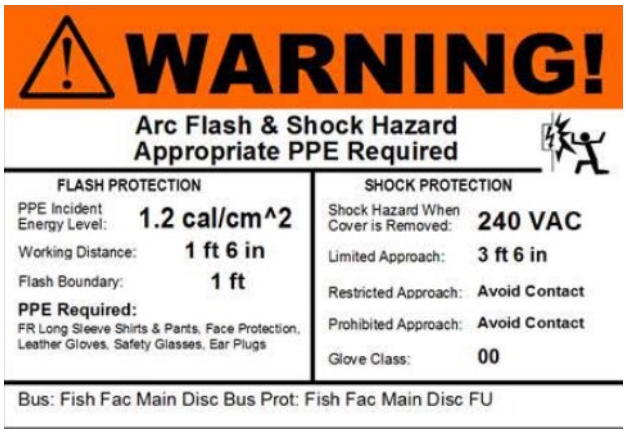


Figure 1 Arc Flash and Shock Hazard Warning Label

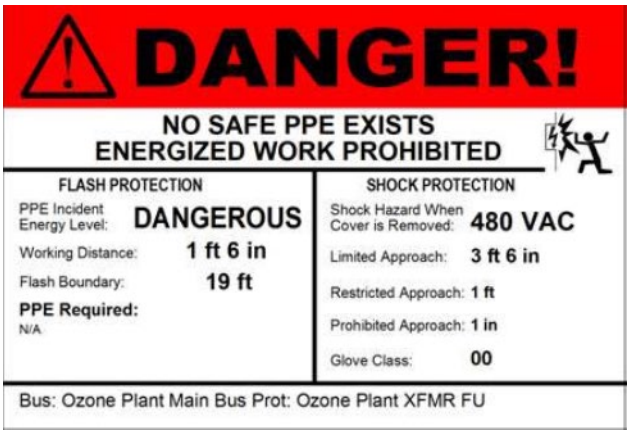


Figure 2 Work Prohibited Danger Label

1.6 DELIVERY, STORAGE, AND HANDLING

A. Upon delivery, all equipment and materials shall immediately be stored and protected by CONTRACTOR in accordance with manufacturer's written instructions. Equipment shall be protected by CONTRACTOR against damage and exposure from the elements. At no time shall the equipment be stored on earth or grass surfaces or come into contact with earth or grass. CONTRACTOR shall keep the equipment clean and dry at all times. Openings shall be plugged or capped (or otherwise sealed by packaging) during temporary storage.

B. Equipment and materials to be located indoors shall be stored indoors and sealed with plastic film wrap.

C. Electrical insulation on all electrical equipment shall be protected against absorption of moisture, and metallic components shall be protected against

corrosion by strip heaters, lamps, or other suitable means. This protection shall be provided immediately upon receipt of the equipment and shall be maintained continuously.

D. Electrical equipment shall be moved by lifting, jacking, or skidding on rollers as described in the manufacturer's instructions. Special lifting harness or apparatus shall be used when required. Lifting and jacking points shall be used when identified on the equipment. CONTRACTOR shall have required unloading equipment on site to perform unloading work on the date of equipment delivery.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURES

A. As listed in sub-paragraphs herein.

B. Substitutions:

1. Substitutions shall comply with specified requirements.

2.1 CONDUCTORS AND CABLES

A. See Section 26 05 19 – Conductors and Cables.

2.2 CONDUIT

A. Conduit and raceways shall be as described in the following paragraphs:

B. Rigid Steel Conduit:

1. Rigid steel conduit shall be heavy wall, hot-dip galvanized, shall conform to ANSI C80.1, and shall be manufactured in accordance with UL 6.

C. Liquidtight Flexible Metal Conduit:

1. Liquidtight flexible metal conduit shall be hot dip galvanized steel, shall be covered with a moisture proof polyvinyl chloride jacket, and shall be UL labelled.

D. Rigid Nonmetallic (PVC) Conduit:

1. PVC conduit shall be heavy wall, Schedule 40, UL labelled for aboveground and underground uses, and shall conform to NEMA TC 2 and UL 651.

2. Under roadways, PVC conduit shall be heavy wall, Schedule 80, UL labelled for aboveground and underground uses and shall conform to NEMA TC 2 and UL 651.

2.3 CABLE TRAY

A. Cable trays, fittings, and supports shall be manufactured by CPI Chatsworth. Part number and quantities are shown on contract drawings.

2.4 WIRING DEVICES, BOXES, AND FITTINGS

A. Concealed conduit systems shall have flush-mounted switches and convenience outlets. Exposed conduit systems shall have surface mounted switches and convenience outlets.

B. Conduit Boxes and Fittings:

1. Galvanized or cadmium plated, threaded, malleable iron boxes and fittings shall be manufactured by Crouse Hinds, Appleton, or O-Z/Gedney, or approved equal.

2. Rigid PVC device boxes and fittings shall be manufactured by Carlon, Cantex, or approved equal.

3. Sheet steel device boxes shall be manufactured by Appleton, Raco, or approved equal.

4. Hub arrangements on threaded fittings shall be the most appropriate for the conduit arrangement to avoid unnecessary bends and fittings.

C. Device Plates:

1. Galvanized or cadmium-plated device plates shall be used on surface mounted outlet boxes where weatherproof plates are not required.

2. Device plates on flush mounted outlet boxes where weatherproof plates are not required shall be AISI Type 302 stainless steel, Eagle "93nnn series", Hubbell "S series", or Leviton "840nn 40 series".

3. Device plate mounting hardware shall be countersunk and finished to match the plate.

4. Device plates for switches outdoors or indicated as weatherproof shall have provisions for padlocking switches "On" and "Off", and shall be Appleton "FSK 1VS", Crouse Hinds "DS185" or O Z/Gedney "FS 1 WSCA".

5. Unless otherwise indicated on the contract drawings, device plates for receptacles indicated as weatherproof shall be Appleton "FSK WRD", Crouse Hinds "WLRD1", or O Z/Gedney "FS 1 WDCA".

6. Flush-mounted, weatherproof plates shall be provided with adapter plates, Appleton "FSK-SBA" or Crouse-Hinds "FS031".

7. Unless otherwise indicated on the contract drawings, device plates for ground fault interrupter receptacles indicated to be weatherproof shall be Appleton "FSK WGFI", Eagle "966", or O Z/Gedney "FS 1 GFCA".

8. Receptacle covers indicated to be weatherproof while in-use shall be Crouse Hinds TP7488 for single gang and TP7489 for double gang receptacles.

9. Engraved device plates, where required, shall be manufactured by Leviton, or equal.

10. Device plates on PVC conduit fittings shall be Carlon "E98 Series" or Cantex "513300 Series".

D. Wall Switches:

1. Standard switches on AC lighting panel load circuits through 277VAC shall be 20 amperes, 120/277VAC, Eagle "2221V" through "2224V", Hubbell "HBL 1221I" through "HBL 1224I", or Leviton "1221-2I" through "1224 2I".

2. Switches for pulse control of lighting contactors shall be 20 amperes, 120/277 VAC, momentary, double-throw, center "Off", Eagle "2220V", Hubbell "1557I" or Leviton "1257-I".

E. Receptacles:

1. Standard convenience outlets shall be duplex, three-wire, grounding, 20 amperes, 125VAC, Eagle "5362V", Hubbell "5362I" or Leviton "5362 I" for 120VAC circuits, and 250VAC, Eagle "5462V", Hubbell "5462I" or Leviton "5462 I" for 240VAC circuits.

2. Switches for low voltage lighting controls shall be specified by lighting control supplier.

2.5 JUNCTION BOXES, PULL BOXES, AND WIRING GUTTERS

A. Indoor boxes (larger than switch, receptacle, or fixture type) and gutters shall be constructed of sheet steel, shall be galvanized after fabrication, and shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.

B. Outdoor boxes and gutters shall be NEMA Type 4X, stainless steel and shall be rigidly supported by stainless steel framing materials. Mounting hardware, which includes nuts, bolts, and anchors, shall be stainless steel. All damaged coatings shall be repaired according to the manufacturer's instructions.

C. Bolt on junction box covers 3 feet square or larger, or heavier than 25 pounds, shall have rigid handles. Covers larger than 3 by 4 feet shall be split.

D. Where indicated on the Drawings, junction and pull boxes with a removable side opposite the underground conduits shall be provided over building ends of underground conduit banks. Boxes shall be sized in accordance with the National Electrical Code, including space for full size continuations of all underground conduits not originally continued. Conduit arrangement shall leave maximum space for future conduits.

E. All boxes shall be sized in accordance with the National Electrical Code, including percentage full and space for full size continuations of all underground conduits not originally continued. Conduit arrangement shall leave maximum space for future conduits. Adequate space shall be provided in all junction boxes for installation and termination of future cables on spare terminal blocks.

F. Underground pull boxes shall be of polymer concrete construction and shall have stackable design with open bottom. Boxes and covers shall be rated for 5,000 pounds minimum. Pull boxes shall be Quazite "PC" series or approved equal.

G. Indoor and Outdoor Lighting Control Scheme.

1. See Drawing 510-01, 510-02, and 510-03 Building Lighting Plans for operational description.

2.6 LIGHTING PANELS

A. Acceptable Manufactures:

1. Each lighting panel shall be a fully rated dead front, 120/208VAC, three-phase panelboard with circuit breakers, in accordance with the Drawings and the following:

B. Cabinet:

1. The panel shall have a surface-mounted enclosure with a NEMA designation appropriate for the location where it will be installed. The enclosure shall have a hinged trim (cover). Breaker operating handles shall be accessible through a latched, lockable, door. At the completion of the project, a neatly printed or typed directory listing the panel and circuit identities shall be mounted inside the door.

2. Panel shall be factory painted ANSI 61 gray.

C. Circuit Breakers:

1. Circuit breakers shall be thermal magnetic, bolt on, individually front replaceable, and shall indicate "On", "Off", and "Tripped". Breakers indicated as multiple pole, shall be common trip. Breakers shall have interrupting ratings not less than 22,000 amperes. Handle clips to prevent casual operation of breakers shall be provided for 10 percent (at least two (2)) of the breakers and provided to the owner. Breakers and provisions for future breakers shall be provided in the quantities, number of poles, and ampere ratings indicated on the Drawings.

D. Buses:

1. The panel shall have main and neutral buses insulated from the cabinet as indicated on the drawings, and a ground bus. Buses shall be copper, with ampere ratings and main lugs or breaker as indicated on Drawings. The ground bus shall be similar to a neutral bus and shall have a good ground connection to the cabinet, a removable bond to the neutral bus, clamp type lugs for the ground cable in each supply conduit, and connections for a ground cable in each load conduit.

2.7 BRANCH CIRCUIT PANELBOARDS

A. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panel board.

B. Materials:

1. Panel board Bus: Copper, current carrying components, rated for AC voltage as indicated on Drawings. Furnish copper ground bus in each panel board.

2. Minimum Integrated Short Circuit Rating: as indicated on project drawings.

3. Molded Case Circuit Breakers: UL 489, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Do not use tandem circuit breakers.

4. Enclosure: NEMA PB 1, Type 1.

5. Cabinet Box: NEMA 12.

C. Cabinet Front: Surface cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock keyed alike.

D. Finishes:

1. Finish in manufacturer's standard gray enamel.

2.8 SURGE PROTECTIVE DEVICES

A. Acceptable Manufacturers:

1. Integral Surge protective devices (SPD) shall be manufactured by Cutler-Hammer, General Electric, Siemens Energy & Automation, or Square D, no exceptions allowed.

2. External SPDs shall be manufactured by Cutler-Hammer, General Electric, Siemens Energy & Automation, Square D, or Current Technology ABB, and Phoenix Contact, no exceptions allowed.

B. Scope:

1. SPD shall be provided as specified herein and as indicated on the Drawings. Each unit shall be designed for parallel connection to the wiring system and shall utilize non-linear, voltage-dependent, metal oxide varistors (MOV) in parallel.

2. Each SPD shall be furnished and installed for the electrical equipment indicated on the Drawings or as specified herein. All new lighting and power panels shall be furnished with an integral SPD.

3. The table below lists the specific SPD ratings for new power panels.

POWERPANEL NAME	LOCATION	VOLTAGE/PHASE	EXPOSURE LEVEL
LP-1	PUMP STATION South Wall	120-208V/3-Phase	Medium
LP-2	PUMP STATION East Wall	120-208V/3-Phase	Medium
PP-1	PUMP STATION East Wall	480V/3-Phase	Medium

C. Surge Protective Device Standards

1. The specified unit shall be designed, manufactured, tested and installed in compliance with the following standards:

a. ANSI/IEEE C62.41 and C62.45.

b. ANSI/IEEE C62.1 and C62.11.

c. National Electrical Manufacturers Association (NEMA LS1 Guidelines).

d. National Fire Protection Association (NFPA 20, 70 [NEC], 75, and 780).

e. Underwriters Laboratories UL 1449 Fourth Edition and 1283, Electromagnetic Interference Filters.

2. The unit shall be UL 1449 Fourth Edition Listed as a Type 2 Surge Protective Device and UL 1283 Listed as an Electromagnetic Interference (EMI) Filter.

D. Environmental Requirements:

1. Operating Temperature: 0 degrees F to +140 degrees F.

2. Relative Humidity: Reliable operation with 5 percent to 95 percent, non-condensing.

E. Electrical Requirements:

1. Unit Operating Voltage. The nominal unit operating voltage and configuration shall be as indicated on the Drawings.

2. Maximum Continuous Operating Voltage (MCOV). The SPD shall be designed to withstand a MCOV of not less than 115 percent of nominal RMS voltage.

3. Operating Frequency. Operating frequency range shall be 47 to 63 Hertz.

4. Protection Modes:

a. Four-wire configured systems shall provide: Line to Neutral (L-N), Line to Ground (L-G), and Neutral-to-Ground (N-G), and Line-to-Line (L-L) protection.

b. Three-wire, single split phase configured systems shall provide: Line to Line (L-L), Line-to-Ground (L-G), Line-to-Neutral (L-N) and Neutral to Ground (N-G) protection.

5. Rated Single Pulse Surge Current Capacity: The rated single pulse surge current capacity, in amps, for each mode of protection of the unit shall be as required and shall be no less than listed in the following table:

	L-N	L-G	N-G	L-L
High Exposure Level	120kA	120kA	120kA	120kA
Medium-High Exposure Level	100KA	100KA	100KA	100KA
Medium Exposure Level	65KA	65KA	65KA	65KA

6. UL 1449 Fourth Edition Voltage Protection Rating (VPR): The maximum VPR per mode for the device (inclusive of disconnect) shall be as required and shall not exceed the following:

VOLTAGE	L-N	L-G	N-G	L-L
120/208V, 3-Phase, 4 Wire	700V	700V	700V	700V
480V, 3-Phase, 3 Wire	-	1,200V	-	1,200V

7. Noise Attenuation: The unit shall be capable of a minimum minus 30 dB attenuation at 100kHz when tested per the 50-Ohm insertion loss method as defined by MIL STD 220A.

8. Nominal Discharge Current: Each SPD shall have a nominal discharge current rating of 20kA.

9. Overcurrent Protection: At high and medium-high exposure levels, the SPD shall incorporate internal fusing capable of interrupting, at minimum, up to 200kA symmetrical fault current with 600 volts ac applied.

    a. At medium and low exposure levels, the SPD shall incorporate internal fusing capable of interrupting, at minimum, up to 65kA symmetrical fault current with 600VAC applied.

    b. The device shall be capable of allowing passage of the rated maximum surge current for every mode without fuse operation.

10. Unit Status Indicators: The unit shall include long-life, externally visible phase indicators that monitor the on-line status of the unit. When furnished integral to the panelboard, the status indicators shall be viewable through a clear window within the panelboard door, or similar provision made to ensure visibility with the door closed.

F. Installation:

1. Each SPD shall be installed according to the manufacturer's recommendations. If possible, for the integral units, provide direct bus connections.

G. Options:

1. Dual Form "C" Dry Contacts. The SPD shall be provided with a set of form "C" dry contacts (normally open and normally closed) to facilitate connection to the Control System (CS) or other remote monitoring system. The contacts shall be normally open or normally closed and shall change state upon any alarm condition.

2.9 CONTROL STATIONS

A. Control stations shall be provided as indicated on the one-line diagrams or schematics or as required by the equipment furnished. Pilot devices shall be 30.5mm, heavy duty, oil tight construction, and shall perform the functions indicated. Pilot lights shall be full voltage type with LED lamps with push-to-test feature. Indoor control stations shall have NEMA Type 12 enclosures or better. Control stations outdoors or indicated to be weatherproof shall have NEMA Type 4X Stainless Steel enclosures with protective caps on the control devices.

2.10 DISCONNECT SWITCHES

A. Unless otherwise specified, each disconnect switch shall be 2 or 3-pole, non-fusible, 600VAC, with a continuous current rating as indicated on the Drawings.

1. Switches located indoors shall have NEMA 12 type enclosure or as required by the locations where they will be installed. Switches located outdoors shall have NEMA Type 4X stainless steel enclosures.

2. Switches shall have high conductivity copper, visible blades; non-teasible, positive, quick make, quick break mechanisms; and switch assembly plus operating handle as an integral part of the enclosure base. Each switch shall have a handle whose position is easily recognizable, and which can be locked in the "OFF" position with three (3) padlocks. The "ON" and "OFF" positions shall be clearly marked.

3. All switches shall be UL listed and horsepower rated and shall meet the latest edition of NEMA KS1. Switches shall have defeatable door interlocks that prevent the door from being opened while the operating handle is in the "ON" position.

PART 3 – EXECUTION

3.0 INSTALLATION, TESTING, AND COMMISSIONING

A. All material, equipment, and components specified herein shall be installed, tested, and commissioned for operation in accordance with these specifications, Section 26 05 83 – Electrical Equipment Installation, and manufacturer's written instructions. Refer to the National Electrical Contractors Association's (NECA) National Electrical Installation Standards (NEIS) for Standard Practices for Good Workmanship in Electrical Contracting (NECA-1) as a minimum baseline of quality and workmanship for installing electrical products and systems that defines what is meant by "neat and workmanlike" as required by the National Electrical Code Article 110.12. Specified requirements supersede NECA practices.

B. Electrical layout drawings are diagrammatic, unless otherwise detailed or dimensioned. The CONTRACTOR shall coordinate the location of electrical material or equipment with the work.

C. Minor changes in location of electrical material or equipment made prior to installation shall be made at no cost to OWNER.

D. Unless otherwise indicated or specified, all indoor floor-mounted electrical equipment and control cabinets shall be installed on concrete equipment pads four (4) inches in height.

E. Adequate bracing shall be provided for seismic forces. The bracing shall be designed to meet requirements for equipment installed in a facility with Seismic Class, Design Category and Risk Category per structural drawing notes.

F. Where required in NECA 90 or by Section 01 60 60 – Facility Startup, testing and commissioning procedures shall be followed prior to energizing equipment.

3.1 SHORT CIRCUIT AND PROTECTIVE-DEVICE COORDINATION STUDIES

A. CONTRACTOR shall be responsible for creating a short circuit study and protective-device coordination study of relays, fuses, circuit breakers, and all other protective devices and shall submit a coordination report as specified herein. The study shall include the entire new distribution system for the POD.

B. CONTRACTOR shall be responsible for and shall ensure that all relays and circuit breakers are set according to the study results.

C. The study shall include, but shall not be limited to, the following:

1. Color-coded printouts of coordination curves prepared with calculation software.
2. A tabulation of all protective relay and circuit breaker trip settings and recommended sizes and types of medium-voltage fuses.
3. Motor starting profiles for all 50 horsepower and larger motors.
4. Transformer damage curves and protection, evaluated in accordance with ANSI/IEEE C57.109.
5. Calculated short-circuit values at all nodes in the distribution system included within the scope of the coordination study.

D. An Engineering firm will perform the studies using the software as designated by OWNER.

E. CONTRACTOR shall be responsible for obtaining the following:

1. The coordination curves for relays, fuses, and circuit breakers.
2. Transformer damage curves.
3. Motor data.
4. Other applicable information for all new and existing electrical equipment.

F. CONTRACTOR shall coordinate with OWNER to obtain the required protective device curves and shall be responsible for all the field work associated with obtaining the necessary data on existing relays, circuit breakers, fuses, and transformers to be included in the coordination study.

G. The coordination report shall be bound in a standard 8 1/2 by 11 inch three-ring binder, as a hard copy, and shall also be submitted electronically in accordance with Section 01 33 00 – Contractor Submittals.

H. The engineering firm shall implement the protective device coordination study settings on new equipment, including Service Entrance ATS and Standby Engine-Generator, and submit a final amended report of the Record As-Built electrical equipment protective device settings subsequent to start-up and testing.

3.2 ARC FLASH HAZARD ANALYSIS

A. CONTRACTOR shall perform an Arc Flash Hazard Analysis in accordance with OSHA 29 CFR Part 1910, NEC, NFPA 70E, and IEEE 1584 and shall submit an Arc Flash Hazard Analysis report as specified herein.

B. The Arc Flash Hazard Analysis shall be performed in association with, or as a continuation of, the short circuit study and protective-device coordination study.

C. Arc Flash Hazard Analysis calculations shall lead to a selection of a level of Personal Protective Equipment (PPE) that is a balance between the calculated incident energy exposure and the work activity being performed, while meeting the following concerns:

1. Provide adequate protection.

2. Avoid the need for more protection than is warranted.

D. Results of the Arc Flash Hazard Analysis shall be used to identify the flash-protection boundary and the incident energy at assigned working distances throughout any position or level in the overall electrical generation, transmission, distribution, or utilization system.

E. The analysis shall include, but shall not be limited to, the following:

1. A tabulation of the symmetrical RMS bolted fault current available and X/R ratio at each piece of electrical equipment.

2. A tabulation of the arc fault current available at each piece of electrical equipment.

3. A list containing the incident energy and the flash-protection boundary for all electrical equipment.

4. A list containing each piece of electrical equipment, its corresponding incident energy, hazard rating, and the required Personal Protective Equipment.

F. An Engineering and Testing Services firm acceptable to OWNER shall conduct the Arc Flash Hazard Analysis.

G. Arc Flash Analysis Software:

1. The Arc Flash Hazard Analysis shall be performed using the latest version of the software designated by OWNER, without exception. After the final version of the study and analysis are completed and accepted, CONTRACTOR shall provide two (2) copies of the software electronic files to OWNER.

H. Arc Flash Hazard Report:

1. CONTRACTOR shall be responsible for submitting complete and accurate arc flash analysis information in the Arc Flash Hazard Report. The report shall be submitted to OWNER for review before the final report is prepared. CONTRACTOR shall ensure that calculated values

for flash-protection boundary, working distance, incident energy, and required Personal Protective Equipment is submitted and provide substantiation that the information will be prominently displayed on electrical equipment.

2. The Arc Flash Hazard Analysis report shall be bound in a standard 8 1/2 by 11 inch, three-ring binder and shall be submitted in accordance with this section. Final selection of required Personal Protective Equipment shall be subject to review and acceptance by OWNER.

I. Arc Flash Labeling:

1. After approval of the Arc Flash Hazard Report by OWNER, CONTRACTOR shall furnish and install arc flash warning labels on the applicable electrical equipment. All electrical equipment shall be provided with the appropriate ANSI compliant arc flash labeling. Labels shall include the flash protection boundary distance, incident energy, and minimum required Personal Protective Equipment.

3.3 CABLE INSTALLATION

A. Cable installation shall be per Section 26 05 19 – Conductors and Cables. Where circuit schedules in the drawings provide materials quantity estimates, it shall be the CONTRACTOR's responsibility to verify total materials quantities based on their routings and plan takeoffs.

3.4 CONDUIT INSTALLATION

A. CONTRACTOR shall be responsible for routing all conduits. This shall include all conduits indicated on the cable or conduit schedules, one-lines, riser diagrams, and homeruns shown on the plan Drawings.

B. Conduits shall be routed as defined in these Specifications. Where conduit routing is shown on plans, it shall be considered a general guideline and shall be field verified to avoid interferences. Where raceway schedules on the drawings provide materials quantity estimates, it shall be the CONTRACTOR's responsibility to verify total materials quantities based on their routings and plan takeoffs.

C. Except as otherwise specified or indicated on the Drawings, conduit installation and identification shall be completed according to the following procedures.

D. Installation of Interior and Exposed Exterior Conduit:

1. This section covers the installation of conduit inside structures, above and below grade, and in exposed outdoor locations. In general, conduit inside structures shall be concealed. Large conduit and conduit stubs may be exposed unless otherwise specified or indicated on the Drawings. No conduit shall be exposed in water chambers unless so indicated on the Drawings.

2. Unless otherwise indicated on the Drawings, CONTRACTOR shall be responsible for routing the conduit to meet the following installation requirements:

    a. Conduit installed in all exposed indoor locations shall be rigid steel. Exposed conduit shall be rigidly supported by hot-dip galvanized hardware and framing materials, including nuts and bolts.

    b. Conduit installed in floor slabs and walls in non-hazardous locations shall be rigid Schedule 40 PVC.

    c. Final connections to dry type transformers, to motors without flexible cords, and to other equipment with rotating or moving parts shall be Liquidtight flexible metal conduit with watertight connectors installed without sharp bends and in the minimum lengths required for the application, but not longer than 6 feet unless otherwise acceptable to OWNER.

    d. Terminations and connections of rigid steel and intermediate metal conduit shall be taper threaded. Conduits shall be reamed free of burrs and shall be terminated with conduit bushings. Use Grounding Myers hubs for all outdoor and wet locations. Hub shall have insulated throat with bonding lock nut or ground screw and be manufactured by Appleton, O-Z Gedney, or Crouse Hinds.

    e. Exposed conduit shall be installed either parallel or perpendicular to structural members and surfaces.

    f. Two (2) or more conduits in the same general routing shall be parallel, with symmetrical bends.

    g. Conduits shall be at least 6 inches from high temperature piping, ducts, and flues.

    h. Rigid Schedule 40 PVC conduit shall have supports and provisions for expansion as required by NEC Article 352.

i. Metallic conduit connections to sheet metal enclosures, whether junction boxes, pull boxes, or other types, those connections shall be securely fastened by locknuts inside and outside.

j. Rigid Schedule 40 PVC conduit shall be secured to sheet metal device boxes using a male terminal adapter with a locknut inside or by using a box adapter inserted through the knockout and cemented into a coupling.

k. Conduits in walls or slabs, which have reinforcement in both faces, shall be installed between the reinforcing steel. In slabs with only a single layer of reinforcing steel, conduits shall be placed under the reinforcement. Conduits larger than 1/3 of the slab thickness shall be concrete encased under the slab.

l. Conduits that cross structural joints where structural movement is allowed shall be fitted with concrete-tight and watertight expansion/deflection couplings, suitable for use with metallic conduits and rigid Schedule 40 PVC conduits. The couplings shall be Appleton Type DF, Crouse Hinds Type XD, or O Z Type DX.

m. Conduit shall be clear of structural openings and indicated future openings.

n. Conduits through roofs or metal walls shall be flashed and sealed watertight.

o. Conduit installed through any openings cut into non-fire rated concrete or masonry structure elements shall be neatly grouted. Conduit penetrations of fire rated structure elements shall be sealed in a manner that maintains the fire rating as indicated on the Drawings.

p. Conduits shall be capped during construction to prevent entrance of dirt, trash, and water.

q. Exposed conduit stubs for future use shall be terminated with galvanized pipe caps.

r. Concealed conduit for future use shall be terminated in equipment or fitted with couplings plugged flush with structural surfaces.

s. Where the Drawings indicate future duplication of equipment wired hereunder, concealed portions of conduits for future equipment shall be provided.

t. Horizontal conduit shall be installed to allow at least 7 feet of headroom, except along structures, piping, and equipment or in other areas where headroom cannot be maintained.

u. Conduit shall not be routed across the surface of a floor, roof, or walkway unless approved by OWNER.

v. All conduits that enter enclosures shall be terminated with acceptable fittings that will not affect the NEMA rating of the enclosure.

w. Nonmetallic conduit, which turns out of concrete slabs or walls, shall be connected to a 90-degree elbow of rigid steel conduit before it emerges. Conduits shall have rigid steel coupling embedded a minimum of 3 inches when emerging from slabs or walls and the coupling shall extend 2 inches from the wall. Corrosion protection wrap shall be used where the conduit emerges from the concrete.

x. Power conductors to and from variable frequency drives shall be installed in steel conduit.

y. All conduits shall enter outdoor exposed enclosures from the bottom; top and side entry is not allowed.

E. Underground Conduit Installation:

1. All excavation, backfilling, and concrete work shall conform to the respective sections of these Specifications. Underground conduit shall conform to the following requirements:

a. All underground conduits shall be concrete encased where indicated on the Drawings.

b. Conduit shall be Schedule 80 PVC in roadways and 40 PVC in all other areas. All PVC joints shall be solvent welded in accordance with the recommendations of the manufacturer.

c. Underground conduits indicated not to be concrete encased shall be rigid Schedule 40 PVC.

d. Underground conduit bend radius shall be at least 2 feet at vertical risers and at least 3 feet elsewhere.

e. Underground conduits and conduit banks shall have at least 2 feet of earth cover, except where indicated otherwise.

f. Underground conduit banks through building walls shall be cast in place, or concreted into boxouts, with water stops on all sides of the boxout.

g. Underground nonmetallic conduits, which turn out of concrete or earth in outdoor locations, shall be connected to 90-degree elbows of rigid steel conduit before they emerge.

h. Conduits not encased in concrete and passing through walls, which have one (1) side in contact with earth, shall be sealed watertight with special rubber-gasketed sleeve and joint assemblies or with sleeves and modular rubber sealing elements.

i. Underground conduits shall be sloped to drain from buildings to manholes.

j. Communications cables shall not be installed in raceways, conduits, boxes, manholes, or handholes containing other types of circuits.

k. Intercommunication and instrument cables shall be separated the maximum possible distance from all power wiring in pull boxes, manholes, and handholes.

F. Sealing Of Conduits:

1. After cable has been installed and connected, conduit shall be blown out to remove all water, then ends shall be sealed by forcing non-hardening sealing compound into the conduits to a depth at least equal to the conduit diameter. This method shall be used for sealing all conduits at handholes, manholes, and building entrance junction boxes, and for 1-inch and larger conduit connections to equipment.

2. Conduits entering hazardous (classified) areas and submersible or explosion proof enclosures shall have Appleton "Type ESU" or Crouse-Hinds "EYS" sealing fittings with sealing compound.

3.5 CABLE TRAY INSTALLATION

Except as otherwise specified or indicated on the Drawings, cable tray installation shall be done according to the following procedures.

A. Installation of Cable Tray:

1. This section covers the installation of cable tray inside structures.

a. After all cutting, punching, reaming, welding, drilling, capping, and cleaning have been completed, all trays shall be degreased and free of any foreign matter that may cause damage to cables.

B. Tray Supports:

1. Tray supports shall be furnished and installed in accordance with the manufacturer's instructions. Support material shall comply with the following requirements:

a. Clamps, fastening hardware, and pins shall be 316 stainless steel materials.

b. The exact location and dimensions of supports and hangers shall be the CONTRACTOR's responsibility and per manufacturer instructions. The support system shall be designed so that it does not interfere with present or future installation, expansion or maintenance of dimensioned equipment, existing pipe, pipe insulation, walls, building steel, HVAC duct, etc. Hanger rods shall not pass between the rails or rungs of any tray.

c. Except where supported by wall brackets, cable trays shall be supported by hanger rods, cross members, and hold-down clamps.

d. Cable trays shall be grounded with copper cable connections to the ground bus bar and in accordance with ANSI/TIA-607-C.

3.6 WIRING DEVICES, BOXES, AND FITTINGS INSTALLATION

A. Metallic and nonmetallic conduit boxes and fittings shall be installed in the following locations:

1. Conduit Boxes and Fittings:

a. Galvanized or cadmium plated, threaded, malleable iron boxes and fittings shall be installed in concrete walls, ceilings, and floors; in the outdoor faces of masonry walls; and in all locations where weatherproof device covers are required.

b. These boxes and fittings shall also be installed in exposed rigid steel and intermediate metal conduit systems.

c. Galvanized or cadmium plated sheet steel boxes shall be installed in the indoor faces of masonry walls, in interior partition walls, and in joist supported ceilings.

d. Rigid PVC device boxes shall be installed in exposed nonmetallic conduit systems.

e. Telephone and communications conduit shall be provided with separate junction boxes and pull fittings.

2. Device Plates:

a. Oversized plates shall be installed where standard-sized plates do not fully cover the wall opening.

3. Wall Switches:

a. Wall switches shall be mounted 3 feet – 6 inches (42 inches) above floor or grade.

b. After circuits are energized, all wall switches shall be tested for proper operation.

4. Receptacles:

a. Convenience outlets shall be 18 inches above the finished floor unless otherwise required.

b. Convenience outlets outdoors, where equipment may be hosed down; shall be 4 feet above floor or grade.

c. Welding receptacles shall be surface-mounted 4 feet above the floor.

d. Conduit and wire for convenience outlet installation is not shown on the Drawings and shall be sized, furnished, and installed by CONTRACTOR. Conductors shall be minimum #12 AWG and conduit shall be minimum 3/4 inch for convenience outlet installation.

5. Special Outlets:

a. Horns and strobe lights for audio/visual alarms shall be mounted a minimum of 8 feet above finished floor and shall be positioned to provide maximum penetration of the surrounding area.

3.7 EQUIPMENT COORDINATION AND INSTALLATION

A. Equipment Coordination:

1. The CONTRACTOR shall coordinate the equipment supplied from various manufacturers and vendors. This includes but is not limited to:

    a. Obtaining specific information on equipment ratings, sizes, and verifying that electrical components supplied meet, or match the requirements such as voltage, phase, frequency, starter types, etc.

    b. CONTRACTOR shall provide equipment that will fit within the space allocated on the Drawings and meet NEC clearances.

    c. Providing power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.

    d. Any discrepancies between the electrical equipment and other equipment shall be brought to the immediate attention of OWNER.

B. Equipment Installation:

1. Except as otherwise specified or indicated on the Drawings, the following procedures shall be used in performing electrical work:

    a. All equipment, boxes, and gutters shall be installed level and plumb. Boxes, equipment enclosures, metal raceways, and similar items mounted on water or earth bearing walls shall be separated from the wall by at least ¼ inch thick corrosion resistant spacers.

    b. Where boxes, enclosures, and raceways are installed at locations where walls are not suitable or available for mounting, concrete equipment pads, framing material, and associated hardware shall be provided.

    c. Equipment with movable components, such as drawout equipment carriages, circuit breakers, hinged doors, and disconnect switches shall operate free and easy without binding or distortion.

    d. Freestanding outdoor equipment shall be permanently sealed at the base, and all openings into equipment shall be screened or sealed with concrete grout to keep out rodents and insects the size of wasps and mud daubers. Small cracks and openings shall be sealed from inside with silicone sealant, Dow Corning "795" or General Electric "SCS1200".

C. Equipment Cleaning:

1. All deposits of oil, grease, mud, dirt or debris shall be cleaned from the electrical equipment following installation and field wiring. Loose debris shall be vacuumed from electrical equipment and a detergent water-based solution, or other liquid cleaners not harmful to material or equipment finishes, shall be used as recommended by the manufacturer to remove remaining deposits.

2. Before final acceptance, the CONTRACTOR shall touch up any scratches on equipment with manufacturer touch-up paint following equipment manufacturer's recommended procedures.

3.8 GROUNDING

A. See Section 26 05 26 – Grounding, for detailed grounding requirements.

3.9 LIGHTING FIXTURE INSTALLATION

A. See Section 26 57 00 – Lighting Fixtures for details.

B. The Drawings indicate the general locations and arrangements of the lighting fixtures. Fixtures in rows shall be aligned both vertically and horizontally unless otherwise specified. Fixtures shall be clear of pipes, mechanical equipment, structural openings, indicated future equipment and structural openings, and other obstructions.

C. Conduit and wire for lighting fixture installation is not shown on the Drawings and shall be sized, furnished and installed by CONTRACTOR. Circuits to emergency lighting units, exit signs, and fixtures indicated to be night lights shall not be switched. Circuits to lighting fixtures indicated to have emergency battery packs shall include an additional un-switched hot conductor. Conductors shall be minimum #12 AWG and conduit shall be minimum 3/4 inch for lighting fixture installation.

3.10 TESTING AND COMMISSIONING

A. Testing and commissioning of this section will be included and documented as part of Pre-Startup Checks as defined in Section 01 60 60 – Facility Startup.

B. Cable Testing:

1. Insulation Resistance Testing (Megger Test). All main power and motor feeds 480VAC and above shall have their insulation resistance measured. Record resistance for Line- Line and Line-Ground on Insulation Megger test report form and submit with Cable List.

2. Cable/Conductor Integrity Tests. All cable/conductor integrity tests shall be documented on a copy of the Cable List, designated for such use. All discrepancies shall be resolved before proceeding with testing.

3. Verify and document cable/conductor as-found, on-spool, is satisfactory for installation, i.e., no shorts between conductors and shields (as applicable) and no open conductors. If satisfactory, date and initial.

4. After cable/conductor is pulled into its final location, but prior to securing, verify cable/conductor is satisfactory for termination, i.e., no shorts between conductors and shields (as applicable) and no open conductors. If satisfactory, date and initial.

5. All cables/conductors verified satisfactory for termination, shall be secured and terminated as directed within the Specifications and as shown on the Drawings.

6. Point-to-Point Tests. After required cable/conductor integrity testing is completed, and installation and wiring connections are completed, the CONTRACTOR shall perform a complete point-to-point check of all conductors including control and instrumentation wiring by comparing the physical terminations to the wiring diagrams and verifying that each external connection is correctly wired and labeled. Tracking of point-to-point tests shall be done using highlighter pen to indicate the verified circuits on the wiring diagrams. These highlighted drawings shall be kept as part of the Pre-Startup Tests. Checkout shall be completed before any Equipment Functional tests begin, including those associated to the Control System (CS). All wiring errors found shall be corrected prior to the beginning of local network configuration of networked devices.

7. Cable Lengths. Following installation of each cable, CONTRACTOR shall record the installed length of the cable in feet in the Cable List for as-built purposes. The cable list shall be kept on site and updated in accordance with Pre-Startup test plan requirements. Cable list lengths shall be used for the Coordination Study and submitted to OWNER as part of Operation and Maintenance Manuals.

C. Receptacle Testing:

1. After circuits are energized, each receptacle shall be tested for correct polarity and each GFCI receptacle shall be tested for proper operation.

D. Motor Testing:

1. All motor rotation shall be confirmed per, and documented in, individual equipment pre-startup checks. CONTRACTOR shall support testing of motors specified under other sections of this specification.

2. Motors shall have their insulation resistance measured before they are connected. Motors 50 HP and larger shall have their insulation resistance measured at the time of delivery as well as when they are connected. Insulation resistance values less than 10 megohms are not acceptable.

E. Lighting Testing and Commissioning:

1. After all lighting circuits are energized, each light fixture shall be confirmed as operational, and all lighting controls verified to operate.

– End of Section –

SECTION 26 05 19

CONDUCTORS AND CABLES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section specifies conductors and cables rated 600VAC or less used for power, lighting, receptacle, and control circuits. CONTRACTOR shall supply conductors and cables for CONTRACTOR, vendor, and OWNER supplied equipment.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Product Requirements
Section 01 60 60 – Facility Startup
Section 26 05 11 – General Electrical Requirements
Section 26 05 26 – Grounding

1.2 REFERENCE STANDARDS

A. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

B. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued.

1. ASTM B3 - Soft or Annealed Copper Wire
2. ASTM B8 - Concentric-Lay-Stranded Copper Conductors, Hard, Medium- Hard, or Soft

3. IEEE 1202 - IEEE Standard for Flame Testing of Cables for Use in Cable Tray in Industrial and Commercial Occupancies
4. ICEA S-95-658 - Power Cables Rated 2000 Volts or less for the Distribution of Electrical Energy
5. ICEA S-66-524 - Cross-Linked-Thermosetting-Polyethylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy
6. ICEA S-58-679 - Control, Instrumentation and Thermocouple Extension Conductor Identification
7. NFPA 70 - National Electric Code (NEC)
8. UL 44 - Rubber-Insulated Wires and Cables
9. UL 83 - Thermoplastic-Insulated Wires and Cables
10. UL 1277 - Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members
11. UL 62 - Flexible Cords and Cables

1.3 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Additional Submittal Requirements:

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph as a whole.
2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer to a detailed written explanation of the reasons for requesting the deviation. shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

3. The CONTRACTOR shall provide review comments attached to the submittal identifying compliance or non-compliance with section, confirming that he has verified that submittals meet specified requirements.

4. CONTRACTOR shall furnish a submittal for all types of cable and conductors to be provided. The submittal shall include the cable manufacturer and type, and sufficient data to indicate that the cable and conductors meet the specified requirements.

5. In addition to the complete specifications and descriptive literature, a sample of the largest size of each type of cable shall be submitted for review before installation. Each sample shall include legible and complete surface printing of the cable identification.

C. Reports:

1. Cable Test Data Reports:

a. Cable Test Data Report for each cable given DC Voltage test submitted to OWNER in accordance with the requirements of Section 01 60 60 – Facility Startup as part of Pre-Startup Checks.

b. Cable/Conductor Integrity Test Report, shall document each cable/conductor terminated, be compiled using the Circuit Schedule, and be submitted to OWNER in accordance with the requirements of Section 01 60 60 – Facility Startup as part of Pre-Startup Checks.

c. Cable Point to Point Test Report submitted to OWNER in accordance with the requirements of Section 01 60 60 – Facility Startup as part of Pre-Startup Checks.

2. Cable Length Report:

a. Cable Length Report shall document the Installed length of each cable in feet, be complied using the Circuit Schedule and be submitted to OWNER in accordance with the requirements of Section 01 60 60 – Facility Startup as part of Pre-Startup Checks.

1.4 IDENTIFICATION

A. All conductors in power, control, and instrumentation circuits shall be identified, color coded, and labeled in accordance with Section 26 05 11 – General Electrical Requirements.

PART 2 – PRODUCTS

2.0 GENERAL

A. Unscheduled Conductors and Cables:

1. Where not specified on the Drawings, conductors and cables shall be sized in accordance with the National Electrical Code for the particular equipment served with the minimum size as specified herein.
2. Unscheduled 120VAC panel circuit conductors shall be sized by the CONTRACTOR in accordance with the breakers specified and the NEC to limit voltage drop to 3 percent. CONTRACTOR shall fully examine the drawings to determine circuit lengths and the distribution panel schedule(s) for expected loads.
3. Minimum size of lighting and receptacle circuit conductors shall be #12 AWG.
4. Minimum size of control circuit conductors shall be #14 AWG.
5. Power, control, lighting, and receptacle circuit conductors shall be provided in accordance with CABLESPEC sheet "600V POWER CABLE" (see paragraph 3.5), unless otherwise specified.

B. Scheduled Conductors and Cables:

1. Scheduled Conductors and Cables shall be type and size indicated on the Cable Schedule. CONTRACTOR shall verify loads and conductor size to ensure compliance with NEC.

2.1 CONNECTORS, TERMINATORS AND SPLICES

A. Manufacturers:

1. AFC Cable Systems, Inc.
2. AMP Incorporated/Tyco International.
3. Hubbell/Anderson.
4. O-Z/Gedney; EGS Electrical Group LLC.
5. 3M Company; Electrical Products Division.
6. Thomas and Betts Corp.
7. Tyco Electronics.

B. Description:

1. Connectors shall be tool applied compression type of correct size and UL listed for the specific application. Connectors shall be tin-plated high conductivity copper. Wire nuts are prohibited, lever-nuts are acceptable.

2. Connectors for wire sizes #8 AWG and larger shall be compression tool installed one-hole lugs, up to size #3/0 AWG, and two-hole or four-hole lugs for size #4/0 AWG and larger. Mechanical clamp, dimple, screw-type connectors are not acceptable.

3. Terminators (or sealing fittings) shall be used where indicated on the Drawings, or as required for a good and workmanlike installation, to support and effectively seal the entrance of exposed cable into an enclosure. Terminators shall include a compound chamber and support means and be listed for the application.

4. All circuits shall be continuous though all junction boxes, wireways, pull boxes, etc. until the circuit conductors are terminated at suitable terminal strips within motor control centers, control cabinets and panels, distribution panels, local control stations, etc. In-line splices and taps shall be used only by written consent of OWNER.

5. Power conductor splices shall be compression type, made with a compression tool die approved for the purpose, as made by Thomas and Betts Corp., or equal. Splices shall be covered with electrical products designed for the application, insulated, and covered with a heat-shrinkable sleeve or boot, as specified elsewhere.

6. Motor connection kits shall consist of heat-shrinkable, polymeric insulating material over the connection area and high dielectric strength mastic to seal the ends against ingress of moisture and contamination. Motor connections may use the Tyco Electronics removable boot product line. Motor connection kits shall accommodate a range of cable sizes for both in-line and stub-type configurations. Connection kits shall be independent of cable manufacturer's tolerances.

2.2 CABLE

A. All types of cable shall conform to the CABLESPEC sheets at the end of this specification section (see paragraph 3.5), and as described herein.

B. 600 Volt Power Cable:

1. Cable in power, control, indication, and alarm circuits operating at 600 Volts or less, except where, multiconductor control, and

instrument cables are required, shall comply with CABLESPEC sheet "600V POWER CABLE".

C. 600 Volt Instrument Cable:

1. Cable for electronic circuits to instrumentation, metering, and other signaling and control equipment shall be two conductor instrument cable, twisted for magnetic noise rejection and protected from electrostatic noise by a total coverage shield. Types of instrument cables shall comply with CABLESPEC sheet "600V INSTRUMENT CABLE".

D. Multiconductor Control Cable:

1. When indicated on the Drawings, cable in control, indication and alarm circuits shall be multi-conductor. Cable shall comply with CABLESPEC sheet "600V MULTICONDUCTOR CABLE". Cable shall be shielded.

E. VFD Power Cable:

1. Power cable to equipment controlled by a variable frequency drive operating at 600 Volts or less, shall be 2,000 Volt rated, and shall comply with CABLESPEC sheet "VFD POWER CABLE".

2.3 CORD AND CABLE SUPPORT GRIPS

A. Cord grips shall be provided where indicated on the Drawings, or as required for a good and workmanlike installation, to attach flexible cord to equipment enclosures (e.g. water level transducers).

B. Cord grips shall consist of a threaded aluminum body and compression nut with a neoprene bushing and Stainless-Steel wire mesh for strain relief. Cord grip shall provide a watertight seal at enclosure interface and sized to accommodate the flexible cord.

C. Cable support grips shall be provided where indicated on the Drawings for support of flexible cable. Support grips shall be heavy duty, double eye, double weave, Stainless Steel, closed wire mesh sized to accommodate the cable as manufactured by Hubbell Wiring Devices division or approved equal. Support grip breaking strength shall be rated with a safety factor ten (10) times maximum working load.

PART 3 – EXECUTION

3.0 GENERAL

A. Except as otherwise specified or indicated on the Drawings, cable shall be installed according to the following procedures, taking care to protect the cable and to avoid kinking the conductors, cutting, or puncturing the jacket, contamination by oil or grease, or any other damage. Circuits to supply electric power and control to equipment and devices, communication and signal circuits as indicated on the one-line diagrams shall be installed continuous and may not be spliced unless approved by OWNER. Where raceway and circuit schedules on the drawings provide materials quantity estimates, it shall be the CONTRACTOR's responsibility to verify total materials quantities based on their routings and plan takeoffs.

B. Pulling wire and cable into conduit or trays shall be completed without damaging or putting undue stress on the insulation or jacket. Manufacturer recommended UL Listed pulling compounds are acceptable lubricants for pulling wire and cable. Grease is not acceptable.

C. Raceway construction shall be complete, cleaned, and protected from the weather before cable is installed. Where wire or cable exits a raceway or tray, a means of wire or cable support shall be provided.

3.1 600 VOLT CONDUCTOR AND CABLE

A. Conductors in panels and electrical equipment shall be bundled and laced at intervals not greater than 6 inches, spread into trees and connected to their respective terminals. Lacing shall be made up with plastic cable ties. Cable ties shall be tensioned and cut off by using a tool specifically designed for the purpose such as a Panduit GS2B. Other methods of cutting cable ties are unacceptable.

B. Conductors crossing hinges shall be bundled into groups not exceeding 10 to 15 conductors and protected using nylon spiral flexible covers to protect conductors. Provide oversized plastic panel wiring duct within panels.

C. Slack shall be provided in junction and pull boxes, handholes and manholes. Slack shall be sufficient to allow cables or conductors to be routed along the walls. Amount of slack shall be equal to largest dimension of the enclosure. Provide dedicated electrical wireways and insulated cable holders mounted on Unistrut in manholes and handholes.

D. Raceway fill limitations shall be as defined by NEC and the following:

1. Lighting and receptacle circuits may be in the same conduit in accordance with de-rating requirements of the NEC. Lighting and receptacle circuits shall not be in conduits with power or control conductors. Signal conductors shall be in separate conduits from power conductors. Motor feeder circuits shall be in separate conduits including small fan circuit unless combination fan-light fixture.
2. Power conductors derived from uninterruptible power supply systems shall not be installed in raceways with conductors of other systems. Install in separate raceways.

3.2 MISCELLANEOUS INSTALLATION REQUIREMENTS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B (values are referenced in Informative Annex I of the 2023 edition of the NEC).

B. Splices shall be made only at final device locations in accordance with device manufacturer’s requirements or in junction boxes as specified herein or as shown on the Drawings, unless otherwise approved by OWNER.

C. Splices and terminations are subject to inspection by OWNER prior to and after insulating.

D. In-line splices and tees, where approved by OWNER, shall be made with tubular compression connectors and insulated as specified for motor terminations. Splices and tees in underground handholes or pull boxes shall be insulated using Scotch-cast epoxy resin or Raychem splicing kits.

E. Terminations at solenoid valves, 120-208VAC motors, and other devices furnished with pigtail leads shall be made using self-insulating tubular compression connectors within the termination box.

F. Motor terminations at 460VAC motors shall be made by bolt-connecting the lugged connectors.

G. Solid wire shall not be used.

H. Sharing neutrals for power circuits is unacceptable.

I. Conductor and cable markers shall be provided at splice points.

J. Spare cable ends shall be taped, coiled, and identified.

3.3 PORTABLE CORD

A. Portable cord feeding permanent equipment, such as pendant cords, pumps, cranes, hoists, and portable items shall have a wire mesh cord grip

of flexible Stainless-Steel wire to take the tension from the cable termination. Connection of portable cords to permanent wiring shall be accomplished with the use of terminals. In-line taps and splices shall be used only where specified.

3.4 TESTING

A. The CONTRACTOR shall test all conductors and cable in accordance with Section 26 05 11 – General Electrical Requirements.

3.5 CABLE SPECIFICATION SHEETS (CABLESPEC)

A. Conductor and cable types for different locations, service conditions and raceway systems are specified on individual cable specification sheets (CABLESPECS). Scheduled and unscheduled conductors and cables shall be installed in accordance with the CABLESPECS.

B. The following CABLESPEC sheets are included in this section:

1. 600V POWER CABLE
2. 600V INSTRUMENT CABLE
3. 600V MULTICONDUCTOR CABLE
4. VFD POWER CABLE

CABLESPEC: 600V POWER CABLE

Cable System Identification:	Lighting/Power/Control Cable, XHHW-2
Description:	Single conductor cross-linked polyethylene power cable (Tray Rated). Sizes: #14 AWG through 750 kcmil.
Voltage:	600V
Conductor Material:	Bare annealed copper; stranded in accordance with ASTM B8.
Insulation:	NEC Type XHHW-2, 90 degree C dry and wet, cross-linked polyethylene (XLPE) in accordance with ICEA S-66-524 and UL 44.
Jacket:	None
Flame Resistance:	UL 44
Manufacturer(s):	Okonite, Southwire, Houston Wire & Cable, General Cable, Allied Cable, or approved equal.
Uses Permitted:	Power, control, lighting and outlet circuits.
Installation:	Install in accordance with this Section.
Factory Testing:	Cable shall meet the requirements of ICEA S 95 658.

CABLESPEC: 600V INSTRUMENT CABLE

Cable System Identification:	600V, Twisted/Shielded Pair or Triad, Instrument Cable
Description:	Single Pair, or Multi-pair, Shielded Instrument Cable conductor cross linked polyethylene power cable.
Voltage:	600V
Conductor Material:	#16 AWG, 7-Strand, Concentric-lay, uncoated copper, Maximum operating temperature 90 degrees C dry, 75 degrees C, wet.
Insulation:	Polyvinyl chloride, not less than 15mils avg. thickness; 13mils minimum thickness, UL 62, Type TFN.
Jacket: Conductor:	Nylon, 4mils min thickness, UL 62.
Cable Assembly:	Black, Flame-Retardant Polyvinyl Chloride, UL 1277, applied over tape-wrapped cable core.
Shield:	Cable assembly, combination aluminum-polyester tape and 7-strand, #20 AWG minimum size, tinned copper drain wire, shield applied to achieve 100 percent cover over insulated conductors.
Flame Resistance:	UL 1277
Manufacturer(s):	Okonite, Southwire, Belden, Houston Wire & Cable, Annixter, or approved equal.
Uses Permitted:	Analog signals benefiting from shielding, 4-20mA, 0-10VDC
Conductor Identification:	Pair: 1 – Black and 2 – White Triad: 1 – Black, 2 – White and 3 – Red
Installation:	Install in accordance with this Section.
Factory Testing:	Insulated conductors shall meet the requirements of UL 62 for Type TFN. Assembly jacket shall meet the requirements of UL 1277. Cable shall meet the vertical tray flame test requirements of UL 1277.

CABLESPEC: 600V MULTICONDUCTOR CABLE

Cable System Identification:	600 Volt Multiconductor Control Cable
Description:	Single conductor cross-linked polyethylene power cable.
Sizes:	#12 AWG & #14 AWG
Voltage:	600V
Conductor Material:	7 or 19 Strands, Concentric-Lay, Uncoated Copper. Maximum operating temperature 90 degrees C dry, 75 degrees C wet.
Insulation:	Flame-retardant cross-linked polyethylene (FR-XLP) per ICEA S-73-532 and UL Standard 44 for Type XHHW-2, VW-1 conductors
Jacket/Cable Assembly:	Black, Flame-Retardant Polyvinyl Chloride, UL 1277, applied over tape-wrapped cable core.
Flame Resistance:	UL 83, UL 1277
Manufacturer(s):	Okonite, Southwire, Houston Wire & Cable, General Cable, Allied Cable, or approved equal.
Uses Permitted:	Control circuits.
Conductor Identification:	ICEA S-58-679 Method 1, Table E-2
Installation:	Install in accordance with this Section.
Factory Testing:	Insulated conductors shall meet the requirements of UL 83 for Type THHN-THWN. Assembly jacket shall meet the requirements of UL 1277. Cable shall meet the flame test requirements of UL 1277 for TC power and control tray cable

CABLESPEC: VFD POWER CABLE

Cable System Identification:	Variable Frequency Drive Power Cable
Description:	3 conductor cross-linked polyethylene power cable. Sizes: #14 AWG through 750 kcmil.
Voltage:	2,000V
Conductor Material:	Stranded, uncoated copper. Max operating temperature: 90 degrees C.
Ground:	Copper conductor sized per NEC with green insulation.
Insulation:	Cross-linked polyethylene, ICEA S-66-524.
Jacket:	Cable Assembly: Black, flame-retardant polyvinyl chloride, UL 1277, applied over tape-wrapped cable core.
Flame Resistance:	UL 1277
Manufacturer(s):	Okonite, Southwire, Houston Wire & Cable, General Cable, Allied Cable, Belden, or approved equal
Uses Permitted:	Variable Frequency Drives to Motor Power Cable.
Conductor Identification:	ICEA S-58-679 Method 4.
Installation:	Install in accordance with this Section.
Factory Testing:	Cable shall meet the requirements of ICEA S-66-524, UL1277 and IEEE Standard 1202 ribbon burner flame test.

– End of Section –

SECTION 26 05 26

GROUNDING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the grounding of all new grounding electrode conductors, equipment grounding conductors, fittings, accessories, and hardware to permanently and effectively ground the neutral points of transformers, computer equipment, electrical equipment frames, conduit, cable trays, lightning arresters and all non-current-carrying metal parts, including structural steel and fences.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Quality Control and Assurance
Section 01 60 00 – Product Requirements
Section 01 60 60 – Facility Startup
Section 01 91 13 – General Commissioning Requirements
Section 26 05 11 – General Electrical Requirements

1.2 REFERENCE STANDARDS

A. American standards and codes are referenced to cover the minimum level of quality and function. The latest edition and addenda of the following publications shall apply:

1. American Society for Testing and Materials (ASTM)
2. National Electrical Manufacturers Association (NEMA)
3. Occupational Safety and Health Administration (OSHA)
4. Electrical and Electronic Manufacturers Advisory Council (EEMAC)
5. IEEE 80 – Guide for Safety in AC Substation Grounding
6. IEEE 81 – Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
7. IEEE 81.2 – Guide for Measurement of Impedance and Safety Characteristics of Large, Extended or Interconnected Grounding Systems
8. IEEE 142 – Recommended Practice for Grounding of Industrial and Commercial Power Systems

9. IEEE 665 – Guide for Generating Station Grounding
10. IEEE 837 – Guide for Qualifying Permanent Connections Used in Substation Grounding
11. IEEE 1050 – Guide for Instrumentation and Control Equipment Grounding in Generating Stations
12. IEEE 1100 – Recommended Practice for Powering and Grounding Electronic Equipment
13. IEEE C2 – National Electrical Safety Code (NESC)
14. NFPA 70 – National Electrical Code
15. NFPA 780 – Standard for the Installation of Lightning Protection Systems

1.3 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Additional Submittal Requirements:

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph as a whole.
2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
3. The CONTRACTOR shall provide review comments attached to the submittal identifying compliance or non-compliance with section, confirming that he has verified that submittals meet specified requirements.

4. Information covering all materials used shall be submitted for review. Each sheet of descriptive literature submitted shall be clearly marked to identify the relevant material or equipment. Sheets or drawings covering more than the item being considered shall have all inapplicable information crossed out. Manufacturers' catalog sheets shall be submitted for the following items:
    a. Terminal lugs and clamps.
    b. Copper ground cable.
    c. Ground rods.
    d. Ground connection hardware.

1.4 DELIVERY, STORAGE, AND HANDLING

A. All materials shall be stored and handled in accordance with the manufacturer's recommendations. Materials shall be stored indoors or otherwise covered and weather protected.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. nVent ERICO Cadweld® heavy-duty or approved equal for exothermic welds.

B. Burndy® HYGROUND® fittings or approved equal for compression connections.

C. Substitutions:
    1. Substitutions must fully comply with specified requirements.

2.1 MATERIALS

A. All grounding materials required shall be furnished new and undamaged, and in accordance with the following requirements.

B. Rods:
    1. Minimum 3/4 inch, 10-foot copper-clad standard type. The copper cladding shall be electrolytically bonded to the steel rod or bonded by a molten welding process. Cold rolled copper cladding is not acceptable.

C. Cable - Bare:
    1. Soft drawn copper, Class B stranding, ASTM B8.

D. Cable - Insulated:

1. Soft drawn copper, Class B stranding with green colored XLPE insulation, Type RW90.

E. Exothermic Welds:

1. Molds, cartridges, materials, and accessories as recommended by the manufacturer of the molds for the items to be welded using Cadweld® heavy-duty or approved equal. The same manufacturer shall furnish molds and powder.

F. Compression Connectors:

1. Tools and dies for irreversible compression system and accessories as recommended by the manufacturer. Burndy® HYGROUND® fittings or approved equals. The same manufacturer shall be used for tools, dies, and connectors.

G. High Impedance Grounding Resistor:

1. System shall incorporate High Impedance Grounding Resistor at the Automatic Transfer Switch (ATS) neutral bus, as shown on drawings:

a. 530-01, ELECTRICAL ONE-LINE DIAGRAM.

b. 530-03, ELECTRICAL EQUIPMENT GROUNDING AND BONDING DETAIL.

2. High Impedance Grounding Resistor and associated equipment shall be sized by CONTRACTOR for proper system operation, after completion of specified Short Circuit and Protective-Device Coordination Studies, and Arc Flash Hazard Analysis, per Section 26 05 11 - General Electrical Requirements.

H. All clamps, connectors, bolts, washers, nuts, and other hardware used with the grounding system shall be silicon bronze or Stainless Steel.

PART 3 – EXECUTION

3.0 GENERAL REQUIREMENTS

A. The grounding system shall be installed in accordance with Article 250 of the National Electrical Code (NEC) and per the contract drawings.

B. Electrical Equipment Grounding:

1. The enclosing cases, mounting frames, etc., of all switches, circuit breakers, control panels, motors, lighting fixtures, receptacles, and any other electrically operated or electrical equipment, as well as all

metal conduit, cable trays, and other raceways, shall be effectively and permanently grounded with a separate copper grounding conductor of cross-section as required by IEEE and NESC and as indicated on the drawings.

C. Grounding Conductors:

1. The grounding conductor shall be of sufficient capacity to ensure continuity and continued effectiveness of the ground connections to carry fault currents.

2. Grounding conductors shall be as short and straight as possible, protected from mechanical injury and without splice or joint.

3. The equipment grounding conductor shall be run from a ground established at the source of supply to the equipment to be grounded, with the circuit conductors.

4. All grounding conductors shall be Class B, stranded, soft drawn copper, unless shown otherwise on the drawings.

5. Cable tray or conduit shall not be used as the sole grounding means.

6. Grounding conductors shall be sized per the requirements of NEC Article 250 or as shown on the drawings, whichever is larger.

3.1 GROUND GRID

A. Point of Diversion Facilities Ground Grid:

1. The overall grounding arrangement shall be per drawing 530-03.

2. The main ground grid shall be #4/0 AWG minimum, stranded, soft drawn, bare copper cable. All electrical equipment and metallic structures shall be tied to the grounding network. Ground taps to building steel and major electrical equipment, including generators, transformers, and switchgear, shall be #2/0 AWG minimum or as indicated on the drawings. Taps for structures such as stairways, framing, and minor electrical equipment shall be #2 AWG minimum or as otherwise designated on the plan drawings.

B. Ground Rods:

1. The location of ground rods is shown on the drawings.

C. Laying Of Grounding Conductors:

1. Grounding conductors shall be laid slack below grade at a minimum depth of 24 inches unless shown otherwise on the drawings.

2. Ground cables in direct burial applications shall be laid down with sufficient slack to prevent damage from stretching during the back filling process.

3. Embedded ground cables shall be installed in such a way that movement of structures will not stretch or break the cables where the cables cross contraction joints.

D. Grounding Stingers:

1. Grounding conductors (stingers) required for building structure and equipment shall be tapped off the ground mat and stubbed up through the concrete floor slab. Conductor length above the slab shall be 10 feet minimum.

3.2 CONNECTIONS

A. All grounding connections shall be made in accordance with NEC Article 250.

B. Ground cable splices and joints, ground rod connections, and equipment bonding connections shall meet the requirements of IEEE 837 and shall be exothermic weld connections or irreversible high-compression connections, i.e., nVent ERICO Cadweld® "Exothermic" or Burndy® HYGROUND®. Other types of Mechanical connectors shall not be used. Cable connections to bus bars shall be made with high-compression one, two, or four-hole lugs, as sized for the conductors.

C. Below Grade:

1. All ground connections below grade shall be made with exothermic welds (e.g., Cadweld®) or compression type lugs (e.g., Burndy®) installed with manufacturer approved die and crimp tool with corrosion inhibitor.

D. Connections to Steel:

1. All connections to steel shall be made with compression type lug (e.g., Burndy®) or exothermically welded (e.g., Cadweld®). All compression or exothermic welds shall be made per manufacturer's recommendations. Bolted connections shall be cleaned prior to installation.

E. Connections to Equipment:

1. Connections to equipment shall be bolted. Bolted connections shall be cleaned prior to installation. Grounding conductors shall be connected employing compression lugs and die type crimpers. All

mechanical fasteners used for grounding shall be compatible for the use with copper. Aluminum shall not be used.

F. Sizing of Grounding Connections:

1. Connections shall be sized per the NEC. The minimum conductor size for connections to the ground grid shall be #2 AWG.

G. Connection at Source:

1. Ground conductors in power cable or ground wire in conduits shall be connected directly to the source equipment ground by mechanical bolted joint, and to motor frame or equipment enclosure and/or equipment ground bar.

H. Circuits from a Motor Control Center (MCC):

1. Ground conductors, Equipment Grounding Conductors, in all power cables, or the green ground wire in conduits leaving motor starters, shall be connected to the ground system for each respective starter. Ground conductors in motor control centers, panels or other service equipment's incoming line cables shall be grounded.

I. Connections to Motors:

1. Motor frames shall be drilled and tapped to install a Servit Post (e.g., Burndy®) within the terminal box enclosure for connection of equipment grounding wires. The terminal box mounting screws shall not be used for this purpose. All motors shall be bonded to the grounding system via the power feeder ground conductor, Equipment Grounding Conductor.

J. System Neutral:

1. Neutrals shall be grounded only at the source unless required otherwise by the NEC.

2. High Impedance Grounding Resistor shall be the only connection between the ATS Neutral and Ground.

3. The ATS Ground Bus shall be the common grounding system connection point for the Ground Grid, Building Ground, and Equipment Bonding Jumper to Motor Control Center (MCC) 1A.

4. No Line-to-Neutral loads shall be served.

5. The neutrals of service transformers shall be connected to the grounding system as shown by typical details on the drawings.

K. Fuses:

1. Fuses shall not be used in grounded (neutral) conductors.

L. Equipment Frames:

1. Frames of transformers, motor control centers, and other electrical apparatus shall be mechanically connected to the grounding system. Where indicated, equipment frames shall have multiple grounds. The equipment ground conductor in all circuits shall be connected to the frame or ground lug in the load centers and not the neutral bus. Equipment ground shall not be connected to a system neutral.

M. Metallic Raceways/Tray:

1. Cable tray and metal conduit systems shall be grounded with copper cable connections to the ground grid or to building steel.

N. Manholes:

1. Manholes shall have NEMA 4-hole ground plates embedded at the top of each wall, with #3/0 AWG pigtails attached for external connection to the ground conductor routed along each duct bank.

O. Duct Bank:

1. The duct bank grounding shall be connected to the facility ground grid where indicated, to the grounds of all interconnecting raceways, and to grounding provisions in the manholes and junction boxes. Each duct bank shall include at least one (1) embedded bare copper #4/0 AWG ground conductor.

P. Cable Shields:

1. Power cable shield grounding for Variable Frequency Drive (VFD) cable shall be at both the source and destination ends unless otherwise noted on the drawings.

2. Unless otherwise indicated on the drawings, cable shields shall be grounded at one location only.

3. Instrument circuit shields shall be grounded to an isolated ground bar at the control panel end of the circuit.

Q. Above Grade Connections:

1. The acceptable method of above grade connections of ground cable is compression fittings with bolted connections and tools.

R. Connection Hardware:

1. Silicon bronze shall generally be used for current-carrying parts. Stainless Steel shall generally be used otherwise.

3.3 IDENTIFICATION AND SIZING

A. Sizing:

1. Equipment grounding conductors shall be sized per the NEC and as shown on the Drawings for circuits contained therein. The minimum size for equipment grounding conductors shall be #12 AWG. In no case may the grounding conductor size be smaller than required by the NEC.

B. Color Identification:

1. The equipment grounding conductors, if insulated, shall be covered by green or green/yellow combination insulation.

C. Neutral:

1. For all power wiring, the white colored neutral may never be used as a grounding conductor or for any other purpose other than as a neutral.

3.4 FIELD QUALITY CONTROL

A. Inspections:

1. CONTRACTOR shall inspect existing connections prior to making new connections. CONTRACTOR shall regularly inspect crimp tool dies to ensure the dies are replaced when they exceed their usable life span.

B. Ground System Resistance:

1. The CONTRACTOR shall perform ground system integrity tests of all newly installed major equipment grounds, loops and rods before and after connection to the existing grounding system. Continuity test shall be performed between the ground grid and all major equipment frames and system neutrals.

2. Testing of the grounding electrode system shall be completed after all embedded and buried electrode conductors and rods are installed, but prior to finish earth work and paving.

3. Testing shall be completed at the Intake Facility and at the Service Entrance Automatic Transfer Switch (ATS).

4. Ground resistance to remote earth at any point of the system shall be no greater than five (5) ohms. If Contractor or Owner measures resistance greater than five ohms, contractor is to assist in determining problem.

5. If subsequent repairs are made or supplemental electrodes or conductors are added to augment the system, the augmented system shall be tested again. -point method per IEEE 81. Signed test report results shall be provided to OWNER for all testing conducted by the CONTRACTOR.

– End of Section –

SECTION 26 05 34

ELECTRICAL BOXES AND FITTINGS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Drawing and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification section, apply to WORK of this section.

1.1 DESCRIPTION OF WORK

A. Extent of electrical box and associated fitted work is indicated by drawings and schedules.

B. Types of electrical boxes and fittings in this section include the following:

1. Outlet boxes.
2. Device boxes.
3. Junction boxes.
4. Pull boxes.
5. Terminal boxes.
6. Bushings.
7. Locknuts.
8. Knockout closures.

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of electrical boxes and fittings, of types, sizes and capacities required, whose products have been in satisfactory use in similar service for not less than three years.

B. Installer's Qualifications: Firm with at least three years of successful installation experience on projects utilizing electrical boxes and fittings similar to those required for this project.

C. NEC Compliance: Comply with NEC as applicable to construction and installation of electrical wiring boxes and fittings.

D. UL Compliance: Comply with applicable requirements of UL 50 and UL 514-Series pertaining to electrical boxes and fittings. Provide electrical boxes and fittings which are UL-listed and labeled.

E. NEMA Compliance: Comply with applicable requirements of NEMA Stds/Pub No.'s OS1, OS2, and Pub 250 pertaining to outlet and device boxes, covers and box supports.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's data on electrical boxes and fittings.

PART 2 – PRODUCTS

2.0 FABRICATED MATERIALS

A. Outlet and Device Boxes: Except as noted, provide standard corrosion resistant cast ferrous boxes with threaded conduit hubs and plugs. Provide number and sizes of hubs and plugs as indicated or required for the intended application. Size boxes in accordance with NEC requirements. Provide boxes with mounting lugs for boxes to be surface mounted. Provide boxes with threaded holes and cadmium plated screws for securing box covers and/or wiring devices. Provide cover and gasket for each box. Provide watertight covers where indicated or required. Device boxes shall be type FS or FD.

B. Junction, Pull and Terminal Boxes: Boxes shall be galvanized steel, except as otherwise noted, with screwed covers; of types, shapes and sizes to suit each respective location and installation; with welded seams and equipped with Stainless Steel nuts, bolts, screws and washers. Boxes shall be manufactured of not less than 14 gage steel. Where necessary to provide rigidity, heavier steel place, or stiffening members, shall be used. Barriers shall be provided where necessary to provide separation between different voltages. Provide cover gaskets for outdoor or wet locations. Boxes for outdoor or wet locations shall be per Hoffman Bulletin A-93 or of equal construction.

C. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes to suit respective installation requirements and applications.

PART 3 – EXECUTION

3.0 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS

A. General: Install electrical boxes and fittings where indicated, in accordance with manufacturer's written instruction, applicable requirements of NEC and NECA's "Standard of Installation," and in accordance with recognized

industry practices to fulfill project requirements. Install additional boxes as required to meet code requirements or to facilitate pulling of wires.

B. Where practical, pull-boxes and conduits shall be so arranged as to provide a straight, pull-through cable configuration.

C. Coordinate installation of electrical boxes and fitting with wire/cable, wiring devices and raceway installation WORK.

D. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.

E. Provide knockout closures to cap unused knockout holes where blanks have been removed. Plug unused conduit hubs and make weatherproof where required.

F. Install electrical boxes in those locations which ensure ready accessibility to enclosed wiring.

G. Avoid using round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surfaces.

H. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry. Box support must be independent of conduit.

I. Provide electrical connections for installed boxes.

J. Subsequent to installation of boxes, protect boxes from construction debris and damage.

K. Provide gasketed (Myers) hub for conduit terminating at a sheet metal box of weatherproof construction.

L. Size boxes in accordance with NEC requirements where size is not otherwise indicated.

M. Properly ground electrical boxes and test to ensure electrical continuity with raceway system and ground grind.

– End of Section –

SECTION 26 05 83

ELECTRICAL EQUIPMENT INSTALLATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the installation requirements of electrical equipment.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Product Requirements
Section 01 60 60 – Facility Startup
Section 01 64 00 – Owner-Furnished Equipment
Section 26 05 11 – General Electrical Requirements
Section 26 24 23 – Low Voltage Motor Control Center

1.2 REFERENCE STANDARDS

A. All work shall be performed in accordance with the NEC - National Electrical Code, the NESC - National Electrical Safety Code, and the following standards where applicable:

1. ICEA Insulated Cable Engineers Association
2. IEEE Institute of Electrical and Electronics Engineers
3. IESNA Illuminating Engineering Society of North America
4. NEIS National Electrical Installation Standards

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. CONTRACTOR shall provide OWNER written notice at least fourteen (14) days prior to the need for manufacturer's field services furnished by others.

1.4 GENERAL

A. Equipment specified to be installed under this section shall be erected and placed in proper operating condition in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by OWNER.

B. The electrical equipment identified as being provided by OWNER will be furnished complete for installation by CONTRACTOR.

C. Coordination:

1. When manufacturer's field services are provided by the equipment manufacturer, CONTRACTOR shall coordinate the services with the equipment manufacturer. CONTRACTOR shall give OWNER written notice at least fourteen (14) days prior to the need for manufacturer's field services furnished by others.

2. CONTRACTOR shall review equipment submittals and coordinate with the requirements of the Work and the Contract Documents. CONTRACTOR accepts sole responsibility for determining and verifying all quantities, dimensions, and field construction criteria.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. When sills are required for electrical equipment, they shall be shipped ahead of the scheduled equipment delivery to permit installation before concrete is placed.

B. Storage:

1. Upon delivery, all equipment and materials shall immediately be stored and protected by CONTRACTOR in accordance with Section 01 60 00 – Product Requirements, and in accordance with manufacturer's written instructions.

2. Equipment shall be protected by CONTRACTOR against damage and exposure from the elements. At no time shall the equipment be stored on earth or grass surfaces or come into contact with earth or grass.

3. CONTRACTOR shall keep the equipment clean and dry at all times. Openings shall be plugged or capped (or otherwise sealed by packaging) during temporary storage.

C. Handling:

1. Electrical equipment shall be moved by lifting, jacking, or skidding on rollers as described in the manufacturer's instructions. Special lifting harness or apparatus shall be used when required.

2. Lifting and jacking points shall be used when identified on the equipment. CONTRACTOR shall have required unloading equipment on site to perform unloading work on the date of equipment delivery.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.0 INSTALLATION, TESTING, AND COMMISSIONING

A. All installation work shall be in accordance with manufacturer's written instructions.

B. All material, equipment, and components specified to be installed according to this section shall be installed, tested, and commissioned for operation in compliance with NECA– NEIS Specification System. Where required in NECA 90, Commissioning Building Electrical Systems procedures shall be followed prior to energizing equipment.

C. Electrical equipment cubicles and vertical sections shall be installed plumb and level. Drawout equipment carriages, circuit breakers, and other removable components shall operate free and easy without binding or distortion.

D. Unless otherwise indicated or specified, all floor-mounted electrical equipment and control cabinets shall be installed on concrete equipment pads four (4) inches in height.

E. Motor control centers with integral floor sills shall be secured to concrete floors or equipment pads with anchor bolts.

F. Adequate bracing shall be provided for seismic forces. The bracing shall be designed to meet requirements for equipment installed in a facility with Seismic Class, Design Category and Risk Category per structural drawing notes.

G. All deposits of oil, grease, mud, dirt or debris shall be cleaned from the electrical equipment following installation and field wiring. A detergent water-based solution, or other liquid cleaners not harmful to material or equipment finishes, shall be used as recommended by the manufacturer.

– End of Section –

SECTION 26 22 00

LIGHTING AND DISTRIBUTION TRANSFORMERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

1.1 DESCRIPTION OF WORK

A. Extent of transformer work is indicated by drawings and schedules.

B. Types of transformers specified in this section include the following:

1. Dry-type transformers.

C. Refer to other Division-26 Sections for electrical wiring connections required in conjunction with transformers; not work of this section.

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of lighting/distribution transformers of types and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installers' Qualifications: Firm with at least 5 years of successful installation experience on projects utilizing electric power and distribution transformers similar to those required for this project.

C. NEC Compliance: Comply with NEC as applicable to installation and construction of electrical power/distribution transformers.

D. ANSI Compliance: Comply with applicable requirements of ANSI Standards C57-Series pertaining to power/distribution transformers. Comply with applicable requirements of ANSI Standard 89.1, "Specialty Transformers."

E. NEMA Compliance: Comply with requirements of NEMA Std. Pub/No.'s ST 20; "Dry-Type Transformers for General Applications", TR 1 and TR 27.

F. UL Compliance: Comply with applicable portions of ANSI/UL 506, "Safety Standard for Specialty Transformers". Provide lighting and power/distribution transformers and components which are UL-listed and labeled.

G. NESC Compliance: Comply with applicable requirements of National Electrical Safety Code (ANSI Std. C2) pertaining to indoor and outdoor installation of transformers.

1.3 SUBMITTALS

A. Product Data. Submit manufacturer's technical product data including:

1. Type of construction, rated kVA, frequency, primary and secondary voltages, percent taps, polarity, impedance and certification of transformer performance efficiency at indicated loads, percentage regulation at 100 percent and 80 percent power factor, no-load and full-load losses in watts, hot-spot and average temperature rise above 40 degrees Celsius ambient temperature, sound level in decibels, and standard published data.

2. Submit manufacturer's standard outline indicating dimensions, weight, method of mounting & support, and location of electrical connections.

3. Submit manufacturer's standard wiring diagram with terminals indicated.

PART 2 – PRODUCTS

2.0 LIGHTING/DISTRIBUTION TRANSFORMERS

A. General: Except as otherwise indicated, provide manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for complete installation.

1. Transformer T-1, 75kVA, three phase, 480V primary, 208V/120V, three phase, 4-Wire, secondary, copper winding transformer to be furnished by CONTRACTOR.

B. Dry-Type Distribution Transformers:

1. Provide factory-assembled, general-purpose, air-cooled, dry-type distribution transformers where shown; of sizes, characteristics, and rated capacities indicated.

2. Provide primary winding with a minimum of four, 2-½ percent taps for de-energized tap-changing operation.

3. Provide terminal enclosure with cover, to accommodate primary and secondary coil wiring connections and electrical supply raceway terminal connector. Equipment terminal leads with connectors installed.

4. Provide wiring connectors suitable for copper wiring.

5. Provide only transformers with copper windings.

C. Insulation:

1. Class 150 energy efficient insulation or better and rate for continuous operation at rated kVA.

2. Limit transformer surface temperature rise to maximum of 65 degrees Celsius.

3. Limit terminal compartment temperature to 75 degrees Celsius when transformer is operating continuously at rated load with ambient temperature of 40 degrees Celsius.

D. Basic Impulse Level: 10kV or higher for transformers under 300kVA and 30kV for transformers 300kVA and over.

E. Sound Level: Cushion-mount transformers with external vibration isolation supports; sound-level ratings not to exceed 45-dB as determined in accordance with ANSI/NEMA standards.

F. Grounding: Electrically ground core and coils to transformer enclosure by means of flexible metal grounding strap. Provide ground stud for connection to station ground system. Provide ground stud for connection to station ground system.

G. Supports and Mounting: Provide supports and mounting material in accordance with transformer manufacturer's recommendations.

1. Lighting and Distribution transformers to be suitable for wall, floor or trapeze mounting as indicated on the drawings.

H. Enclosure and Finishes:

1. Provide transformers with fully-enclosed sheet steel enclosures.

2. Provide lifting eyes or brackets.

3. Coat interior and exterior surfaces of transformer, including bolted joints, with manufacturer's standard color baked-on enamel.

PART 3 – EXECUTION

3.0 INSPECTION

A. Installer must examine areas and conditions under which transformers and ancillary equipment are to be installed, and notify CONTRACTOR in writing of conditions detrimental to proper completion of the work. Do not proceed with the work until satisfactory conditions have been corrected in a manner acceptable to Installer.

3.1 INSTALLATION OF TRANSFORMERS

A. Install transformers as indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NESC, NEMA, ANSI and IEEE standards, and in accordance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate transformer installation work with electrical raceway and wire/cable work, as necessary for proper interface.

C. Connect transformer units to electrical wiring system; comply with requirements of other Division-26 Sections.

D. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturers published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Std. 486A and B.

3.2 GROUNDING

A. Provide equipment grounding connections for lighting/distribution transformers as indicated. Tighten connections to comply with tightening torques specified in UL Std. 486A to assure permanent and effective grounding.

3.3 TESTING

A. Prior to energization of transformers, check all accessible connections for compliance with manufacturer's torque tightening specifications.

B. Prior to energization, check circuitry for electrical continuity, and for short-circuits. Prior to energization, check for faulty insulation by means of megger tests.

C. Upon completion of installation of transformers, energize primary circuitry at rated voltage and frequency from normal power source and test transformers including, but not limited to, voltage and sound levels. Adjust voltage taps as needed. Measure audible sound levels, to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

3.4 UNLOADING, STORAGE, AND HANDLING

A. Transformers shall be installed at their permanent locations, and assembly operations completed as soon as possible after their arrival at the project site. If installation and assembly must be substantially delayed, the CONTRACTOR shall use all necessary measures and protect the units against damage from any cause and shall complete any preliminary tests and protective procedures called for by the manufacturers' instructions.

B. Transformers shall be unloaded and stored until required for installation. Storage shall be indoors, and the units shall be kept clean and dry, with all necessary protection against dust, dirt, and mechanical injury and against weather if stored outdoors.

– End of Section –

SECTION 26 24 16

PANELBOARD

PART 1 – GENERAL

1.0 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

A. National Electrical Manufacturers Association (NEMA)

1. NEMA 250 Enclosures for Electrical Equipment (1,000 Volts Maximum)
2. NEMA AB 1 Molded-Case Circuit Breakers, Molded Case Switches, and Circuit-Breaker Enclosures
3. NEMA PB 1 Standard for Panelboards

B. National Fire Protection Association (NFPA)

1. NFPA 70 National Electrical Code
2. NFPA 70E Electrical Safety in the Workplace

C. Underwriters Laboratories (UL)

1. UL 67 Standard for Panelboards

1.1 GENERAL REQUIREMENTS

A. Section 26 05 11 – General Electrical Requirements applies to WORK specified in this section:

1. Detail Drawings shall be submitted for the panelboards consisting of fabrication and assembly drawings for all parts of the WORK in sufficient detail to enable the ENGINEER to check conformity with the requirements of the contract documents. Drawings shall include details of bus layout.
2. Outline Drawings for panelboards shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.
3. Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified requirements. Statements must be dated

after the award of this contract, name the project, and list the specific requirements which it is intended to address.

1.2 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 – Contractor Submittals.

B. Shop Drawings:

1. Detail Drawings and Outline Drawings shall be submitted for panelboards in accordance with paragraph entitled, "General Requirements," of this section.

C. Product Data:

1. Manufacturer's catalog data shall be submitted for the following items:

2. Panelboards.

3. Directory Card and Holder.

D. Samples:

1. Keys shall then be properly tagged and delivered to the OWNER.

E. Test Reports:

1. Test reports shall be submitted for the following tests in accordance with the paragraph entitled, "Site Testing," of this section. Panelboards shall not be energized until the recorded test data has been submitted to and approved by the ENGINEER.

2. Continuity Tests.

3. Insulation Tests.

F. Certificates:

1. Statements shall be submitted in accordance with paragraph entitled, "General Requirements," of this section.

G. Manufacturer's Instructions:

1. Manufacturer's instructions shall be submitted for Panelboards including special provisions required to install equipment components and system packages. Special notices shall detail impedances, hazards, and safety precautions.

PART 2 – PRODUCTS

2.0 PANELBOARDS

A. Panelboards shall be totally enclosed in a steel cabinet, dead-front circuit breaker type with copper buses, surface- or flush-mounted as indicated. Panelboards shall conform to NEMA (National Electrical Manufacturers' Association) NEMA 1 as indicated. Panelboards shall have buses fabricated for bolt-on type circuit breakers.

B. An outer door or cover, hinged on one side, shall be provided on surface mounted panelboards to provide gutter space access. A center door shall be provided for circuit breaker/switch access only.

C. Voltage and current rating, number of phases, and number of wires shall be as indicated. Four-wire panelboards shall be provided with an isolated full-capacity neutral bus. Panelboards shall be rated for 208Y/120-Volt, three-phase of 480-Volt three-phase, 60-hertz as shown on the drawings.

D. Panelboards shall be provided with a separate grounding bus, bonded to the enclosure. Grounding bus shall be a solid bus bar of rectangular cross section equipped with binding screws for the connection of equipment grounding conductors.

E. Each panelboard, as a complete unit, shall have a short-circuit current rating equal to or greater than the integrated equipment rating shown on the panelboard schedule or as indicated within the Short Circuit and Protective-Device Coordination Studies.

F. Panelboards and main lugs or main breaker shall have current ratings as shown on the panelboard schedule.

G. Bus bar connections to the branch circuit breakers shall be the "distributed phase" type. Three-phase, four-wire busing shall be such that when any three adjacent single-pole breakers are individually connected to each of the three different phases, two- or three-pole breakers can be installed at any location. The current-carrying parts of the bus assembly shall be tin plated. Main ratings shall be as shown on drawings.

H. Mechanical lugs furnished with panelboards shall be cast copper or copper alloys of sizes suitable for the conductors indicated to be connected thereto. Lugs to be rated for 75 degrees Celsius terminations.

I. Boxes shall have the manufacturer's standard knockouts and shall be galvanized code-gage sheet steel. Fronts shall be of code-gage sheet steel furnished with hinged doors with adjustable trim clamps for securing the fronts to the boxes.

J. Entire panelboard front shall be hinged on one side with a piano hinge for the full height and shall also have captive screws opposite the hinged side.

K. Where panelboards are installed flush with the walls, the installation details shall be such that the hinged front can be opened without damage to the adjacent wall surfaces.

L. Panelboard enclosures shall be NEMA 1 or as shown in the drawings.

M. Enclosures shall be provided with hinged fronts and corrosion-resistant steel pin-tumbler cylinder locks. Locks shall be keyed alike, and two keys shall be provided for each enclosure.

N. Panelboards shall be finished with baked enamel. The finish color shall be ANSI (American National Standards Institute) gray.

O. Panelboards and breakers shall be UL listed for the voltage, load current, and short circuit interrupting capacity as noted on drawings. Circuit breakers utilized shall be UL listed for use in the specific panelboards provided.

2.1 CIRCUIT BREAKERS

A. Circuit breakers shall be the molded-case type. Frame and trip ratings shall be as indicated on the drawings.

B. Interrupting rating of circuit breakers shall be as indicated. If not shown, the interrupting rating for circuit breakers in 120/208-Volt panelboards shall be not less than 22,000 amperes rms symmetrical.

C. Circuit breakers shall be bolt-on type.

D. Shunt trips shall be provided where indicated.

E. UL Class B (20-milliampere sensitivity) ground fault circuit protection shall be provided on 120-Volt AC branch circuit as indicated. This protection shall be an integral part of the branch circuit breaker that also provides overload and short-circuit protection for branch circuit wiring. Tripping of a branch circuit breaker containing ground fault circuit interruption shall not disturb the feeder circuit to the panelboard. A single-pole circuit breaker with integral ground fault circuit interruption shall require no more panelboard branch circuit space than a conventional slide pole circuit breaker.

F. When multiple wires per phase are specified, the circuit breakers shall be furnished with connectors made to accommodate multiple wires.

G. Circuit breaker spaces called out on the drawings shall be complete with mounting hardware to permit ready installation of the circuit breakers.

2.2 DIRECTORY CARD AND HOLDER

A. A directory card shall be mounted on the inside of hinged fronts and doors in a metal frame, with spaces for circuit numbers, loads controlled, and locations.

B. The filled out and completed Directory card shall identify each branch circuit with its respective and numbered circuit breaker.

2.3 FACTORY TESTING

A. Complete panelboards shall be tested in accordance with UL 67.

2.4 PRECAUTIONARY LABEL

A. To ensure persons are aware of immediate or potential hazard in the application, installation, use, or maintenance of panelboards, each panelboard shall be conspicuously marked on the trim or dead front shield with the text DANGER Arc Flash Hazard per NFPA (National Fire Protection Association) 70 and NFPA 70E Standards.

B. If the panel is supplied with a door, the label shall be visible when the door is in an open position.

PART 3 – EXECUTION

3.0 INSTALLATION

A. Panelboards shall be installed as indicated and in accordance with the manufacturer's instructions. Panels shall be fully aligned and mounted so that the height of the top operating handle will not exceed 72 inches above the finished floor.

B. Directory-card information shall be typewritten in capital letters to indicate outlets controlled and final locations served by each circuit and shall be mounted in holders behind protective covering.

3.1 SITE TESTING

A. Each panelboard enclosure key shall be shown to operate the enclosure locks in the presence of the OWNER.

B. Panelboards shall be given continuity and insulation tests after the installation has been completed and before the panelboard is energized.

C. Test equipment, labor, and personnel shall be provided by the CONTRACTOR as required to perform the tests as specified.

D. Insulation tests on panelboards rated 300 Volts or less shall be conducted using a 500-volt minimum insulation-resistance test set.

1. Readings shall be recorded after 1 minute and until the reading is constant for 15 seconds.

2. Resistance between phase conductors and between phase conductors and ground shall be not less than 25 megohms.

E. Test data shall be recorded and shall include the location and identification of panelboards and megohm readings versus time.

– End of Section –

SECTION 26 24 23

LOW VOLTAGE MOTOR CONTROL CENTER

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section includes the requirements for 600V-class low voltage motor control centers (MCCs) for use on alternating current power systems.

B. The MCCs shall be furnished as specified in this section and as shown on the contract drawings.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 60 60 – Facility Startup
Section 01 77 00 – Project Closeout
Section 26 05 11 – General Electrical Requirements
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 35 26 – Active Harmonic Filters

1.2 REFERENCES

A. The MCC shall meet or exceed the requirements within the following standards for MCCs.

1. NEMA ICS 18 – Industrial Control and Systems: Motor Control Centers
2. UL 845 – UL Standard for Safety for Motor Control Centers
   NOTE: UL 845 is a harmonized standard consisting of:
   a. Underwriters Laboratories Inc. (UL) UL 845
   b. Canadian Standards Association (CSA) C22.2 No. 254-05
   c. Association of Standardization and Certification (ANCE) NMX-J-353-ANCE-2006
3. NFPA 70 – National Electrical Code

B. The MCC shall be designed, manufactured, and tested in facilities registered to ISO 9001.

1.3 DESIGN REQUIREMENTS

A. Provide MCC based on applicable NEMA and UL standards and in accordance with the detailed contract specifications and drawings.

B. The manufacturer of the MCC shall also be the manufacturer of the across-the-line motor starters, across-the-line contactors, solid-state reduced voltage starters, and variable frequency drives. The use of third-party supply and assembly for these components in the MCC is not acceptable.

C. The OWNER's Representative will confirm motor full-load amperage ratings and provide those ratings to the MCC manufacturer to achieve proper sizing of the drives, soft starters, motor branch circuit, and overload protection.

D. The manufacturer and the CONTRACTOR shall ensure the installed equipment meets all requirements.

1.4 PRE-MANUFACTURE SUBMITTALS

A. Refer to Section 01 33 00 – Contractor Submittals for submittal procedures.

B. Manufacturer Drawings:

1. MCC plans and elevations showing dimensional information including details such as, but not limited to, the following:
    a. MCC height (less any removable lifting angles or eyes).
    b. MCC width.
    c. MCC depth.
    d. Location of shipping splits.
2. Structure descriptions showing the following:
    a. Bus ratings.
    b. Enclosure ratings.
    c. Short-circuit withstand ratings.
    d. Other information as required for approval.
3. Conduit locations.
4. Required bus splices.
5. Unit descriptions including information such as, starter sizes, circuit breaker frame sizes, circuit-breaker continuous ampere ratings, and pilot devices.
6. Nameplate information.
7. Schematic wiring diagrams.

8. Manufacturer drawings shall be provided in PDF format.

9. Manufacturer drawings shall include a drawing schedule (that lists the drawing numbers), version levels, and status of drawings (such as, preliminary, approval, and final).

C. Product Data:

1. Data sheets and publications on all major components including, but not limited to, the following:

a. Motor starters, including Variable Frequency Drives (VFDs) and Reduce Voltage Soft Starters (RVSS).

b. Overload relays.

c. Circuit breaker and fuse information including time current characteristics.

d. Control power transformers.

e. Pilot devices.

f. Relays.

g. Networking Equipment

D. Specification Response:

1. For all clarifications, deviations, and exceptions, they must be clearly identified on the submittal coversheet and include a detailed description.

E. Installation Instructions:

1. Provide a copy of the manufacturer's installation instructions that includes the following:

a. Receiving, handling, and storage instructions.

b. General description for reading nameplate data, serial numbers, UL markings, and short circuit ratings.

c. Installation procedures including splicing procedures.

d. Conduit and cable installation.

e. Installing and removing plug-in units.

f. Operation of operator handles and unit interlocks.

g. Checklist before energizing.

h. Procedure for energizing equipment.

i. Maintenance procedures

F. Training Documentation:

1. Operations and Maintenance training course outline for a networked MCC.

1.5 FINAL SUBMITTALS

A. Refer to Section 01 33 00 – Contractor Submittals for submittal procedures, and to Section 01 77 00 – Project Closeout for the procedure on submittal of final documentation.

B. All clarifications and exceptions must be clearly identified.

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph.

2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

C. The CONTRACTOR shall provide certification that the MCC has been installed in accordance with the manufacturer's instructions and with local codes and standards that govern MCC installations.

D. The CONTRACTOR shall provide certification that all circuit breaker settings have been adjusted per field requirements.

E. The CONTRACTOR shall provide certification that all power fuses have been installed per field requirements.

F. The CONTRACTOR shall provide certification that all motor overload settings have been adjusted per installed motor characteristics.

G. The CONTRACTOR shall provide certification that all settings for solid state devices such as reduced voltage solid-state controllers and variable frequency drives have been adjusted per the specific application requirements.

H. The CONTRACTOR shall be responsible for marking any changes to the 'As-Shipped' drawings from the manufacturer to reflect any field modifications and providing these markups to the OWNER prior to project closeout.

I. The manufacturer shall assist the CONTRACTOR to provide certification that any timing devices have been properly adjusted.

J. As Shipped Drawings:

1. The manufacturer shall provide final drawings reflecting the 'As-Shipped' state of the MCC documents previously submitted.
2. Manufacturer drawings shall be provided in PDF format.
3. Manufacturer drawings shall include a drawing schedule (that lists the drawing numbers), version levels, and status of drawings (such as, preliminary, approval, and final).
4. The manufacturer shall assist the CONTRACTOR for making any changes to the 'As-Shipped' drawings from the manufacturer to reflect any field modifications.

K. Manufacturer's Operation and Maintenance Manuals:

1. As-Shipped Drawings.
2. Certificate of Quality Conformance.
3. Maintenance data.
4. MCC installation instructions.
5. Installation/operation instructions for major components such as, automatic transfer switch, and circuit breakers.
6. MCC spare parts listing and pricing.
7. Training course documentation for a networked MCC.

1.6 QUALITY ASSURANCE

A. The manufacturer of the MCC shall have a minimum of 45-years of experience in the manufacturing and assembly of NEMA Low Voltage motor control centers.

B. The manufacturer shall have ISO 9001 registered facilities for the design, manufacture, and testing of MCCs.

C. MCC sections and individual MCC units shall be designed and manufactured in accordance with UL 845 requirements.

D. MCC sections and individual MCC units shall be UL listed, where possible.

1.7 REGULATORY REQUIREMENTS

A. The manufacturer shall assist the CONTRACTOR to ensure that the installation conforms to the requirements of the latest edition of the NFPA 70 'National Electrical Code' and/or other applicable installation standards.

1.8 DELIVERY, STORAGE, AND HANDLING

A. The manufacturer shall advise the CONTRACTOR with directions to coordinate the shipping splits with the MCC manufacturer for entry into the building.

B. Shipping splits shall be noted on the MCC manufacturer drawings.

C. The manufacturer shall advise the CONTRACTOR with directions to store the MCCs in a clean, dry, and heated space.

D. The manufacturer shall advise the CONTRACTOR with directions to protect the units from dirt, water, construction debris, and traffic.

E. During storage, the manufacturer shall advise the CONTRACTOR with directions to connect internal space heaters (if specified) with temporary power.

F. MCCs are to be shipped with external lifting angles at the top and running continuously for each shipping split. Lifting eyelets are not acceptable.

1.9 ENVIRONMENTAL REQUIREMENTS

A. The MCC enclosure rating shall be appropriate for the environment where the MCC is to be located.

1.10 FIELD MEASUREMENTS

A. The OWNER's Representative will, in cooperation with the manufacturer, assist the CONTRACTOR to verify all field measurements prior to the fabrication of the MCC.

1.11 WARRANTY

A. The manufacturer shall provide their standard parts warranty for 24 months from the date of shipment from the manufacturer's factory.

B. The manufacturer shall confirm this warranty as part of the submittal.

1.12 SPARE MATERIALS

A. The CONTRACTOR shall review the manufacturer's recommended spare parts list and discuss it with the OWNER to determine requirements for spare parts.

B. The CONTRACTOR shall provide the quotation for spare parts to the OWNER.

PART 2 – MOTOR CONTROL CENTER SPECIFICATIONS

2.0 MANUFACTURERS

A. MCCs shall be Allen-Bradley® CENTERLINE® 2100 motor control centers (MCCs) or approved equal.

2.1 RATINGS

A. The MCC shall be rated for the system voltage as indicated on the contract drawings.

B. The MCC horizontal and vertical power bus bracing shall be rated to meet or exceed the available fault current as shown on the contract drawings but shall not be less than 65,000 Amperes (A) rms symmetrical.

C. All MCC units shall have a full rated short-circuit rating that meets or exceeds the available fault current as shown on the contract drawings.

1. The use of series short-circuit current ratings shall be permitted only for panelboards; series short-circuit ratings for other types of units is not acceptable.

D. All circuit breakers used in the motor control center shall have full-rated, short-circuit current ratings based on the applied MCC voltage.

1. Slash rated short-circuit interrupting ratings for circuit breakers are not acceptable.

2.2 ENCLOSURE

A. The MCC enclosure shall be NEMA/UL Type 1 with gasket around perimeter of doors.

B. Each section shall be equipped with two full-metal side sheets to isolate each vertical section and to help reduce the likelihood of fault propagation between sections.

C. All interior and exterior surfaces shall be painted ANSI 49 medium-light gray. The vertical wireways and unit back plates shall be painted high-visibility gloss white.

D. All unpainted parts shall be plated for corrosion resistance.

E. Removable closing plates on each end of the MCC shall cover all horizontal bus and horizontal wireway openings.

F. Insulating sheets shall be provided on the inside of end closing plates for horizontal bus openings to help prevent burn-through of the end closing plate in the event that an internal arcing fault occurs in the horizontal bus compartment.

2.3 STRUCTURE

A. The MCC shall be of dead front construction and shall consist of one or more vertical sections bolted together to form a rigid, free-standing assembly. The systems shall be designed to allow for the addition of future sections at either end, and to permit the interchanging of units.

B. Vertical sections shall be rigid, free-standing structures.

1. Vertical sections shall have internal mounting angles running continuously within the shipping block.

2. An external mounting channel that is required to maintain structure integrity is not acceptable.

3. Vertical sections shall be 90 inches High, 20 inches Deep, and 20 inches Wide, except where larger dimensions are required.

4. Vertical sections shall be provided with a removable steel lifting angle on all shipping blocks. The angle shall run the length of the shipping block.

5. Lifting eyes are not acceptable.

6. Each standard section shall be capable of being subdivided into 12 usable, unit spaces.

7. Two-unit spaces shall constitute one space factor and shall be 13 inches in height.

8. One unit space shall constitute one-half space factor and shall be 6.5 inches in height.

C. Horizontal wireways:

1. Horizontal wireways shall be located at the top and bottom of the MCC.

2. Horizontal wireways shall be 6 inches in height and extend the full depth of the vertical section to allow maximum flexibility in locating conduit for MCC feeds and loads.
3. Horizontal wireways shall be continuous across the length of the MCC, except where access needs to be denied due to electrical isolation requirements.
4. The horizontal wireways shall be isolated from the power bus.
5. The horizontal wireways shall have removable covers held in place by captive screws.

D. Provide a full height vertical wireway, independent of the plug-in units, in each standard vertical section.

1. The vertical wireway shall be isolated from the vertical and horizontal buses.
2. The vertical wireway shall be covered with a hinged and secured door.
3. Wireway tie bars shall be provided.
4. Isolation between the wireway and units shall be provided.

2.4 BUS BARS

A. Horizontal Power Bus:

1. The horizontal bus shall be rated as shown on the drawings.
2. The horizontal bus material shall be copper with tin plating.
3. The horizontal bus shall be supported, braced and isolated from the vertical bus with a high strength, non-conductive, non-tracking, glass polyester material.
4. For standard sections, the horizontal bus shall be continuous within each shipping block and shall be braced within each section.
5. Horizontal bus splices shall have at least two bolts on each side.
6. The horizontal bus shall be insulated by using a polypropylene flame-retardant wrap.

B. Vertical Bus:

1. The vertical power bus shall have an effective rating of 600 A. If a center horizontal bus construction is utilized, then the rating shall be 300 A above and below the horizontal bus for an effective rating of

600 A. If a top or bottom mounted horizontal bus is utilized, then the full bus must be rated for 600 A.

2. The vertical bus material shall be copper with tin plating.

3. The vertical bus shall attach to the horizontal bus with at least two bolts.

4. The vertical bus shall be continuously braced by a high strength, non-conductive, non-tracking, glass-filled polyester material and isolated from the unit spaces by a non-conductive, polycarbonate molded cover.

5. The vertical bus shall be isolated from the horizontal power bus except where necessary to connect the vertical power bus to the horizontal power bus.

6. Automatic shutters shall cover plug-in stab openings when units are removed.

C. Ground Bus:

1. Provide a ground bus system consisting of a horizontal ground bus connected to vertical ground buses mounted in each section.

2. Provide a tin-plated copper 0.25 x 2-inch horizontal ground bus mounted in the bottom of the MCC unless otherwise specified in the drawings.

3. Provide a pressure-type mechanical lug mounted on the ground bus in the incoming line section.

4. Provide a unit ground stab on all unit inserts. The ground stab shall establish unit insert grounding to the vertical ground bus before the plug-in power stabs engage the power bus. The grounding shall be maintained until after the plug-in power stabs are disengaged.

D. Neutral Bus:

1. There are no neutral loads.

2. Provide an incoming neutral termination plate in the MCC main device unit that is connected to horizontal neutral bus in the section with the main.

3. Horizontal neutral bus shall be provided in main incoming section only.

4. Neutral bus rating shall be same as the horizontal power bus rating.

2.5 ETHERNET/IP COMMUNICATION

A. The MCC shall have Ethernet wiring incorporated into its design.

1. The MCC shall have factory installed industrial Ethernet cabling incorporated throughout the vertical section across the entire lineup.

2. Each motor starter, electronic overload relay, power monitor, AC drive, and soft starter unit in the MCC shall be supplied with a means to communicate via EtherNet/IP network.

3. Plug-in units should be able to move around without impacting the network.

4. Maintenance activities should be able to be performed without impacting the network.

B. Industrial Ethernet Switch:

1. The MCC shall have managed industrial Ethernet switch(s) with Ports to connect each EtherNet/IP enabled device.

2. Ethernet Switches shall be provided with spare ports to accommodate network expansion and future plug-in unit inserts.

3. The managed industrial Ethernet switch shall deliver optimal network security, network resiliency (if needed), and flexibility. The functionality should include port-based control/prioritization, switch-level ring support, VLAN segmentation, and other Layer-2 switch features.

4. The managed industrial Ethernet switch shall have the ability to include, if needed, Gigabit ports, CIP Sync functionality, Network Address Translation (NAT), and an Industrial SD Card.

5. The managed industrial Ethernet switch shall include redundant terminal blocks for customer supplied/connection of an external 24V DC UPS.

C. Industrial Ethernet Switch Layout:

1. Layout – Horizontal Wireway Mounted Ethernet Switch:

a. The managed industrial Ethernet Switch shall be mounted in the top horizontal wireway.

b. The industrial Ethernet cable shall connect each switch to one another in a linear topology.

D. Industrial Ethernet Cabling:

1. Industrial Ethernet Cable Ratings:

a. The industrial Ethernet cable shall be 600V UL Category 5e PLTC rated.

b. The use of a 300V rated cable is not acceptable.

c. Ethernet Switch-to-Device cable labels shall be located on both ends of the cable to specify where the cable is connected to on both ends.

d. A detailed Ethernet network table and Ethernet network diagram specifying IP addresses, subnet masks, device locations, cable label details, and 24V DC capacities shall be included in the MCC documentation.

e. The EtherNet/IP device within each unit shall be factory connected to the industrial Ethernet switch directly by using a 600V – UL rated Category 5e PLTC rated industrial Ethernet cable.

2. Layout – Vertical Wireway Ethernet Adapters/Ports:

a. An industrial Ethernet cable shall be routed behind the vertical wireway from the managed industrial Ethernet Switch to the Ethernet adapters located in the vertical wireway.

b. A second industrial Ethernet cable shall be routed from the EtherNet/IP device within each unit and factory connected to the Ethernet adapter ports in the vertical wireway by using a 600V – UL rated Category 5e PLTC rated industrial Ethernet cable.

c. Up to four (4) Ethernet adapters allowing up to eight (8) Ethernet device connections that meet the following criteria shall be provided:

i. In necessary vertical wireways of standard sections to simplify installation, relocation and addition of plug-in units.

ii. Each Ethernet adapter in the vertical wireway shall be connected to a port on the industrial Ethernet switch by using a 600V – UL rated Category 5e PLTC rated industrial Ethernet cable.

d. The industrial Ethernet cable for Frame Mounted units shall be routed through the horizontal wireway from the managed industrial Ethernet Switch directly to the EtherNet/IP Frame

Mounted device using a 600V – UL rated Category 5e PLTC rated industrial Ethernet cable.

3. Power Supplies:

   a. Power supplies shall provide 24V DC for the devices that require it.

   b. The MCC manufacturer shall check the user's design to confirm that adequate power supplies have been specified to conform with network requirements.

   c. Power supply output shall be rated 8 A, 24V DC.

   d. Power supplies shall be Allen-Bradley Bulletin 1606-XLS240E or approved equal.

   e. Power supply units shall be provided with a buffer module to provide a minimum of 500 millisecond ride-through at full load (the buffer module is optional for the standard Ethernet power supply).

   f. Buffer modules shall be Allen-Bradley Bulletin 1606-XLSBUFFER24 or approved equal.

   g. Two (2) 24V DC adapters allowing four (4) power connections shall be provided:

      i. In each vertical wireway of standard sections to simplify installation, relocation and addition of plug-in units.

      ii. Each 24V DC adapter in the vertical wireway shall be connected to the power supply.

   h. The power supplies units shall be provided with a door mounted external 120V AC connection for laptop power and Ethernet network connection.

   i. Redundant 24V DC power shall be provided for all Ethernet enabled devices:

      i. A Redundancy Unit shall be included that provides the capability of interconnecting two independent power supplies in a redundant way (N+1) and whose output is connected to the 24V DC circuit. The Redundancy Unit shall be powered by one of the following options:

         a) Two Rockwell Automation-supplied 24V DC power supply units.

ii. Two, 8 A, power supply modules shall be placed in the same power supply unit and wired in parallel with blocking diodes whose output is connected to the 24V DC circuit.

E. EtherNet/IP Interface for Motor Starter Units:

1. Motor starter units shall have an electronic overload relay that incorporates the following features:

a. Built-in EtherNet/IP communication.

b. Overload relay I/O powered by using 24V DC.

c. Status indicators for status indication.

d. Overload relays shall have a reset button on the outside of the unit door.

e. Selectable trip of NEMA Class 5 to 30. Unless indicated, the trip class shall be set for NEMA Class 20 operation.

f. Up to six (6) inputs and three (3) outputs of direct I/O. Additional I/O can be provided with an add-on module to the overload relay. Input voltage shall match the overload relay power voltage.

g. Protective functions:

i. Functions shall provide a programmable trip level, warning level, time delay, and inhibit window.

ii. Protective functions shall include Thermal overload, Phase loss, Stall, Jam, Underload, Current imbalance, Remote trip, and PTC thermistor input.

iii. Ground fault protection is required.

a) The protection range shall be 20 mA to 5 A.

iv. PTC Thermistor input is required.

v. Voltage protection is required.

a) Input fusing shall not be used on NEMA 3 and smaller starters.

h. Current monitoring functions shall include phase current, average current, full load current, current imbalance percent, percent thermal capacity utilized, and ground fault current (if required).

i. Voltage, energy, and frequency measuring capabilities shall be included when voltage protection is required.

j. Diagnostic information shall include device status, warning status, time to reset, trip status, time to overload trip, and history of last five trips.

k. Preventive maintenance information shall include Allowable starts per hour, required Time between starts, Starts counter, Starts available, Time until next start, total operating hours, and elapsed operating time.

l. Overload relay shall include an on-board logic processor to allow basic logic to be performed within the overload relay based on network data and the status of the inputs to the overload relay.

m. The overload relay shall support the following CIP messaging types: Polled I/O messaging, Change-of-state/cyclic messaging, Explicit messaging, Group 4 offline node recovery messaging, and Unconnected Message Manager (UCMM).

n. The overload relay shall provide the following functions to minimize network configuration time: Full parameter object support, Configuration consistency value, and Add-on Profile.

o. The overload relay shall include an E300 Control Station connected to the overload relay by a single cable.

p. The overload relay shall provide the following functions to minimize network configuration time: Full parameter object support, Auto-negotiate duplex and speed on communication port, and Automatic Device Configuration (ADC).

2. The overload relay shall be Allen-Bradley 193-ESM/592-ESM, 193-EIO/592-EIO, or 193-ECM 'E300' Electronic Overload or approved equal.

F. EtherNet/IP Interface for Variable Frequency AC Drives and Solid-State Reduced Voltage Motor Controllers.

1. The EtherNet/IP communication interface shall be supplied to allow for communication between the solid-state component and the Ethernet network.

G. EtherNet/IP Interface for Other Units:

1. Provide an EtherNet/IP interface for other units as indicated on the contract drawings.

2. Refer to the contract drawing wiring diagrams for points to be monitored.

H. Programming and Testing:

1. The MCC manufacturer shall load the IP Address and Subnet Mask into each unit and Ethernet switch.

2. The IP Address shall be as indicated on the contract drawings or as provided by the OWNER's Representative.

3. The MCC manufacturer shall test the MCC to ensure that each unit communicates properly prior to shipment.

4. The MCC manufacturer shall provide a disk containing applicable electronic data sheet (EDS) files for the EtherNet/IP devices.

5. The IP Address shall be visible on the unit Nameplate for any units containing an EtherNet/IP enabled device.

6. All firmware will be provided with the same revision level of firmware across all similar intelligent electronic devices:

a. E300 overload relays.

b. PowerFlex 755 drives.

c. Stratix® 5700 switches.

d. PowerMonitor™ 5000 energy meters.

e. SMC™ Flex starters.

2.6 UNIT INFORMATION

A. The minimum compartment height shall be 6.5 inches, and this shall be considered one-half space factor.

B. NEMA Size 5 FVNR starters and below shall be provided as plug-in units.

C. Plug-in units:

1. Plug-in units shall consist of a unit assembly, unit support pan, and unit door assembly.

2. Units shall be supplied with removable doors. The unit doors shall be fastened to the structure so that the doors can be closed when the unit is removed.

3. A unit support pan shall be provided for support and guiding units. Unit support pans shall remain in the structure when units are removed to provide isolation between units. A service position shall

be provided for plug-in units that allows for the unit to be supported but disengaged from the bus. The unit shall be capable of being padlocked in the service position. This position is to be used to isolate a unit from the bus to allow service to be performed on the connected load equipment.

D. Power Stabs:

1. Unit stabs for engaging the power bus shall be tin-plated copper and provided with stainless back-up springs to provide and maintain a high-pressure, 4-point connection to the vertical bus.

2. Wiring from the unit disconnecting means to the plug-in stabs shall not be exposed on the rear of the unit. A separate isolated pathway shall be provided for each phase to minimize the possibility of unit fault conditions reaching the power bus system.

    a. Power cable termination at the plug-in stab shall be a maintenance-free crimp type connection.

E. Disconnect Handle:

1. Plug-in units shall be provided with a heavy-duty, non-conductive, industrial duty, flange mounted handle mechanism for control of each disconnect switch or circuit breaker.

2. Use of rotary operators is not acceptable.

3. Disconnect handles may pivot in the vertical or horizontal plane.

4. On-off condition shall be indicated by the handle position, red and green color indicators with the words ON and OFF, and the international symbols ‘1’ and ‘0’ (one and zero), along with a pictorial indication of the handle position.

5. Handles shall be capable of being locked in the OFF position with up to three padlocks.

6. Plug-in units shall be provided with interlocks per NEMA and UL requirements. Interlocks shall be provided for the following:

    a. Prevention of unit insertion or withdrawal with the disconnect in the ON position.

    b. Prevention of the unit door from being opened when the disconnect is in the ON position:

        i. A feature for intentionally defeating this interlock by qualified personnel shall be provided.

c. Prevention of the disconnect switch from being moved to the ON position if the unit door is open:

i. A feature for intentionally defeating this interlock by qualified personnel shall be provided.

F. Pilot Devices:

1. Where specified, units shall be furnished with pushbuttons, selector switches, or pilot lights.

2. Pilot devices shall be rated NEMA/UL Type 4/13 water-tight/oil tight.

3. For units with vertically operated disconnect handles:

a. When three or less pilot devices are utilized, they shall be Allen-Bradley Bulletin 800H, 30.5mm devices or approved equal.

b. When more than three devices are required, the use of Allen-Bradley Bulletin 800F, 22.5mm devices (or approved equal) is permitted.

c. For Drives pilot devices:

i. 800H, 30.5mm devices or approved equal will be provided for all PowerFlex 70 drives.

ii. 800F, 22.5mm devices or approved equal will be provided for all PowerFlex 750 and PowerFlex 520 series drives.

4. For units with horizontally operated disconnect handles:

a. The devices shall be Allen-Bradley Bulletin 800F.

G. Terminal Blocks:

1. Control terminal blocks shall be provided on all contactor and starter units.

a. Control terminal blocks shall be a pull-apart design on all plug-in units for easy removal of the unit from the structure.

2. Control terminal blocks on non-plug-in contactor and starter units shall be fixed type.

3. Power terminal blocks shall be provided on all contactor and starter units, rated NEMA size 3 (100 A) and below that utilize vertically operated disconnects:

a. Power terminal blocks shall be pull-apart for NEMA size 1 and 2 (30 A and 60 A contactors).

4. Power terminal blocks for NEMA size 3 starters (100 A contactors) shall be non-pull-apart.

5. Terminal blocks shall not be located adjacent to or inside the vertical wireway.

H. Doors:

1. Each unit shall be provided with a removable door mounted on removable pin-type hinges.

2. The unit doors shall be capable of being opened at least 110 degrees Fahrenheit.

3. The unit doors shall be removable from any location in the MCC without disturbing any other unit doors.

4. The unit door shall be fastened to the structure so it can be closed to cover the unit space when the unit is removed.

5. The unit doors shall be held closed with quarter-turn latches.

6. Unit door latches shall be provided with arc resistant latches to help keep the door latched in the event that an internal arcing fault occurs.

2.7 METERING COMPARTMENT

A. MCCs shall include a plug-in metering unit.

B. Units shall include the following:

1. Fusible disconnect with fuses.

a. The disconnect must be operable with the unit door closed.

2. Fused control circuit transformer.

3. Current transformers shipped loose to be installed by the installation contractor onto incoming power conductors.

4. Solid-state power monitor with door mounted display.

C. Power Monitor:

1. Power monitors shall be capable of displaying the following:

a. Line current for all three phases with plus or minus 0.2 percent full-scale accuracy.

b. Average three phase current with plus or minus 0.2 percent full-scale accuracy.

c. Line-to-neutral and line-to-line voltage with plus or minus 0.2 percent of full-scale accuracy.

d. Current and voltage unbalance.

e. Real, reactive, apparent, and true power with plus or minus 0.4 percent full-scale accuracy.

f. kWH, kVARH, and kVAHnet.

g. True RMS to the 45th harmonic.

h. Frequency at plus or minus 0.5 percent.

i. Power factor at plus or minus 0.4 percent.

2. Power monitors shall include min/max logs and trend logs with up to 45,867 data points.

3. Power monitors shall be capable of performing distortion analysis with THD, Crest Factor (I, V) and Distortion power factor.

4. The power monitor shall include EtherNet/IP communication module.

5. Power monitors shall include two form-C relays.

6. Power monitors shall be Allen-Bradley PowerMonitor 5000 unit or approved equal.

2.8 DISCONNECTS

A. Main Disconnect:

1. Main Circuit Breaker Disconnect:

a. Lugs to accommodate the incoming power conductors as indicated on the contract drawings shall be provided by the MCC manufacturer.

b. Size the circuit breaker frame and trip rating as shown on the drawings.

c. The interrupting capacity rating shall meet or exceed the available fault current as shown on the contract drawings:

i. Interrupting capacity based on a slash rating is not acceptable.

d. Provide an air-insulated circuit breaker (ACB) with thermal magnetic trip unit for 250 A and smaller frames; provide electronic trip unit for 400 A and larger frames.

e. Provide a removable protective barrier to reduce the possibility of incidental contact with the line terminals.

f. Provide one normally open and one normally closed, circuit breaker auxiliary contact that follows the position of the circuit breaker main contacts for indication of 'On' or 'Off/Tripped.'

g. For ACBs rated 1,000 A and above, on Wye connected systems with a solidly grounded neutral, provide integrated ground fault protection with adjustable pick-up and adjustable time delay

2. Main Incoming:

a. The ACB may be withdrawable from a fixed cradle, if possible.

b. The SCCR rating shall be up to 100 kA, 600V.

c. Current ratings up to 3,200 A shall be available.

d. The ACB shall be 100% rated.

3. Main Incoming ACB Features:

a. Located in Left MCC Column.

b. Bottom entry.

c. Requires no forced air cooling.

d. No rear access required.

e. Standard with Maintenance mode operation.

f. Minimum 4 AUX contacts included.

g. Digital Trip Unit & Interface.

h. Lockout/Tag out (LOTO) capabilities standard.

4. Main Incoming ACB Options:

a. Dedicated Power Metering section.

b. Hardwired Remote Operation.

c. Network communications and networked remote operations.

d. Six (6), Additional Aux Contacts.

B. Feeder Disconnects:

1. Disconnecting means for feeders shall be circuit breakers with thermal-magnetic trip units for 250 A and smaller frames; provide an electronic trip unit for 400 A and larger frames.

2. Interrupting capacity rating shall meet or exceed the available fault current as shown on the contract drawings:

    a. Interrupting capacity based on a slash rating is not acceptable.

3. Minimum frame size shall be 125 A.

4. Provide one normally open and one normally closed, circuit breaker auxiliary contact which follows the position of the circuit breaker main contacts for indication of 'On' or 'Off/Tripped.'

5. Provide door mounted 120V AC push-to-test pilot lights with LED lamps for On (Red) and Off/Tripped (Green) status indication.

2.9 COMBINATION NEMA ACROSS THE LINE STARTERS

A. Starters shall meet applicable NEMA and UL requirements.

B. Starters shall be minimum NEMA Size 1.

1. Fractional NEMA sizes are not acceptable.

C. The motor starter shall be Allen-Bradley Bulletin 500 or 300 or approved equal.

D. Starters shall be provided with a 3-pole solid state overload relay that includes the following features:

1. If EtherNet/IP communication is required, refer to the part of this section titled 'EtherNet/IP Interface for Motor Starter Units,' which takes precedence over this overload relay requirement.

2. Selectable trip classes of 5, 10, 15, 20, or 30 for E300 overloads.

3. Set for class 20 unless otherwise indicated on the contract drawings.

4. Overload protection.

5. Phase loss protection.

6. Trip current adjustment range of 5:1.

7. Visual trip status indication.

8. Test/Reset button.

9. Bipolar latching relay with one normally open and one normally closed contact, rated NEMA B600 for use in motor contactor control circuits.

10. Thermal memory circuit to model the heating and cooling effects of motor on and off periods.

11. Ground Fault protection shall be provided.

12. If ground fault protection is required, it shall have a selectable trip value between 20 mA and 5 A.

13. The overload relay shall be Allen-Bradley E300 Electronic Overload.

E. In addition to the hold-in contact, starters shall be provided with one normally open and one normally closed auxiliary contact. The starter shall be capable of accommodating up to six contacts in addition to the hold-in contact.

F. Provide a control power transformer with a rated secondary voltage of 120V AC. The control power transformer shall be provided with primary and secondary fusing.

G. Overload relays shall have a reset button located on the outside of the unit door.

H. Provide a door mounted selector switch for Hand-Off-Auto operation. The Hand mode shall provide local control at the MCC unit door. In the Auto mode, control shall be provided through a remote contact.

I. Provide door mounted 120V AC push-to-test pilot lights E300 Control Station with LED lamps for On (Red) and Off (Green) status indication.

2.10 MOTOR STARTER UNITS

A. Electro-mechanical NEMA starters:

1. Disconnecting means for the across the line starters shall be motor circuit protectors.

2. Unit short-circuit current rating shall be greater than or equal to the available fault current as shown on the contract drawings.

3. Units shall be supplied based upon the rules/requirements set forth in the UL 845, NEMA ICS-18, and NFPA 70.

4. Installation contractor will field adjust the units based upon the particular motor application.

5. Minimum MCP frame size shall be 125 A

6. Provide one normally open and one normally closed-circuit breaker auxiliary contact that follows the position of the circuit breaker main contacts for indication of ‘On’ or ‘Off/Tripped.’

7. Provide door mounted 120V AC push-to-test pilot lights with LED lamps for On (Red) and Off/Tripped (Green) status indication

2.11 COMBINATION SOFT STARTER UNITS

A. Disconnecting means for solid-state controllers shall be an Inverse Time Circuit Breaker.

B. Customer Load Cables Exit Top.

C. SMC Flex converted to SMC-50 with internal bypass:

1. NEMA 1.
2. 125HP-400HP (201A-480A).
3. 480V.
4. 20 inches Wide, below 350HP.
5. 20 inches Deep, Bumped Back Bus.
6. Includes Digital I/O Module (150-SM4).

D. Catalog Number: 2155JB-F201LKB-3XB-13D-13HBA0-13HIC-13XB-51TJM-91-9000-751S, or as approved.

1. Total Space Factor = 6.
2. Wiring: NEMA Type B wiring.
3. Output Current Rating: 201A.
4. Circuit Breaker: Thermal Magnetic, 65kA at 480V (J6F Frame) (250A Trip)
5. Human Interface Module: LCD full numeric keypad - Door Mounted.

E. Unit short-circuit current rating shall be greater than or equal to the available fault current as shown on the contract drawings.

F. Provide a control power transformer with a rated secondary voltage of 120V AC. The control power transformer shall be provided with primary and secondary fusing.

G. The controller shall be Allen-Bradley SMC Flex and shall include the following features:

1. Integrated bypass contactor that is closed once the motor is up to full speed.
2. Electronic overload protection with adjustable trip class.
3. Four programmable auxiliary contacts.
4. Selectable control capabilities: soft start, kickstart, current limit start, dual ramp, full voltage, linear speed, preset slow speed, soft stop.
5. Additional control capabilities: Pump Control.

6. LCD display.
7. Keypad programming for configuration.
8. Built-in, selectable protective functions for: Overload, Phase Reversal, Phase Loss/Open Load, Phase Imbalance, Shorted SCR, SCR Over temperature, excessive starts per hour, over/under voltage, voltage unbalance.
9. Metering capabilities for: current, voltage, kW, kWH, power factor, motor thermal capacity utilized, elapsed time.

H. Provide an input isolation contactor.

I. The SMC unit shall be provided with line side protective modules. The modules shall contain capacitors and metal oxide varistors (MOVs) that protect the internal power circuitry from severe electrical transients and/or high electrical noise.

J. Provide door-mounted pilot devices as shown on the contract drawing wiring diagrams.

K. Provide door-mounted 120V AC push-to-test pilot lights with LED lamps for 'ON' (Red) and 'OFF' (Green) status indication.

L. Emergency run bypass contactor is required. Emergency run bypass shall be fully rated for the motor load and be capable of starting the motor at full voltage. The emergency run bypass shall be provided with the same type of solid-state overload relay protection as for the electromechanical starter units.

2.12 VARIABLE FREQUENCY DRIVE

A. Variable frequency drives shall be Allen-Bradley PowerFlex 755TS w/Total Force AC Drive. Two sizes of VFDs shall be provided.

B. For the 250HP pump motors, use Catalog Number: 2163VTB-361HKB-14DFHSJ-14HBA6-14PWT-14RLX-56TMM-751S, or as approved.

1. Total Space Factor = 6.
2. Wiring: NEMA Type B wiring.
3. Output Current Rating: 302A.
4. Circuit Breaker: Electronic (LSI), 100kA at 480V, (600A Trip).
5. Human Interface Module: LCD full numeric keypad - Door Mounted.
6. Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz.

7. Control Wiring: #16 AWG MTW(TEW) Cu.
8. High Speed Class J Fuse - Mersen (-14DFHSJ).
9. Sleeve Type Markers (-751S).
10. Customer Load Cables Exit (Top).
11. 5 percent, 320 Amp reactor (250HP, ND/HD 480V), 1321-3RB320-C.
12. Include Engineered Modification and/or Custom Diagram.

C. For the 2HP pump motor, use Catalog Number: 2163VTB-5P0F1HKB-14DA2R1-14DFHSJ-14HBA6-14RLX-37TGM-751S, or as approved.

1. Total Space Factor = 2.
2. Wiring: NEMA Type B wiring.
3. Output Current Rating: 3 A.
4. Circuit Breaker: Thermal Magnetic, 100 kA at 480V (G6C Frame) (15 A Trip)
5. Human Interface Module: LCD full numeric keypad - Door Mounted.
6. Control: Transformer with Secondary Fuse, Standard Capacity, Primary Fusing, 120V/60Hz.
7. Control Wiring: #16 AWG MTW(TEW) Cu.
8. Features Included:
    a. Drive 120VAC w/ I/O (-14DA2R1).
    b. High Speed Class J Fuse - Mersen (-14DFHSJ).
    c. Drive Line Reactor (-14RLX).
    d. Sleeve Type Markers (-751S).
    e. Change 3 percent to 5 percent, 5 Amp reactor (3 HP), as required for Harmonics reduction.
    f. Include Engineered Modification and/or Custom Diagram).

D. Provide a control power transformer with a rated secondary voltage of 120V AC. The control power transformer shall be provided with primary and secondary fusing.

E. Provide door-mounted pilot devices.

F. Provide door-mounted 120V AC push-to-test, pilot lights with LED lamps for On (Red) and At-Speed (White) status indication.

G. Provide one isolated, configurable analog input and output.

H. Provide an integrated network safety safe-torque-off capable of EtherNet/IP control.

I. Harmonic mitigation, including the Point of Common Coupling (PCC), shall be as indicated on the drawings. MCC-mounted harmonic mitigation elements shall be UL/cUL listed.

J. MCC fed Active Harmonic Filters (AHF), as indicated on drawings, shall be furnished for harmonic mitigation of the MCC-connected loads, per Section 26 35 26 – Active Harmonic Filters.

1. Limit harmonic current to <5 percent Total Demand Distortion (TDD) per IEEE 519-2022, table 10.3.

2. AHFs shall be capable of parallel connection of multiple units to meet the required level of mitigation.

3. Current Transformers (CTs) shall be supplied for field installation on the MCC incoming power cabling, as required by the AHFs.

2.13 GROUND OPTIONS

A. Ground Detection Lights:

1. Not used.

2.14 SOFTWARE

A. Preconfigured Software:

1. Software and Firmware shall be latest version.

2. Software shall be capable of viewing multiple MCC lineups.

3. Software communication driver shall allow the software to be installed and operated on the EtherNet/IP network.

4. Software shall be capable of functioning as a standalone software package or as an ActiveX control in a Human Machine Interface (HMI).

5. Software shall be capable of displaying the following:

a. Elevation View:

i. Dynamically displays status information based on reading data from devices in the MCC lineup.

ii. Sizeable graphical/virtual representation to allow ease of viewing multiple MCC lineups.

iii. Unit nameplate information.

iv. Unit status indicators (ready, running, warning, fault, no communication.)

v. Should be able to add devices, move devices, add sections and move sections.

b. Unit Monitor View:

i. Preconfigured for a specific unit.

ii. Real-time monitoring via real-time analog dials, parameter value display, and data trending.

iii. Data configurable for customized viewing.

iv. Modifying device parameters.

v. Data trend export functionality to .csv file.

c. Spreadsheet View:

i. User configurable for customized monitoring displaying maximum information about the lineup.

ii. Sorting and cascading functions.

iii. Custom user fields.

d. Event Log:

i. Track history of MCC unit.

ii. Automatic logging of trips, warnings, and changes.

iii. Manual entry of events.

e. Documentation:

i. Front elevation drawings.

ii. Unit wiring diagrams.

iii. User manuals.

iv. Spare parts lists.

v. Ability to add and/or update documentation.

f. Integration Assistant:

i. Integrate the MCCs into the PLC software and generate required tags and IP address configurations for devices:

a) Choose from device_IP address or Nameplate_IP address for tag naming convention.

b) Ability to map devices to any EtherNet/IP communication cards in the PLC I/O chassis.

ii. Integrate the MCCs with energy monitoring software and display real-time device energy consumption data directly in preconfigured software.

PART 3 – EXECUTION

3.0 EQUIPMENT HANDLING

A. Care shall be taken in transporting or handling the MCC during installation to prevent damage to the equipment.

B. Damage that occurs during installation or handling shall be corrected at the CONTRACTOR's expense, and at no cost to the OWNER.

3.1 INSTALLATION

A. Electrical installation shall comply with NFPA 70 'National Electrical Code' and/or other applicable installation standards.

B. Identify components in accordance with Section 26 05 11 – General Electrical Requirements.

C. CONTRACTOR shall install MCC in accordance with manufacturer's instructions.

D. CONTRACTOR shall tighten accessible bus connections and mechanical fasteners to the manufacturer's torque requirements.

E. CONTRACTOR shall select and install fuses in fusible switches based upon field requirements.

F. CONTRACTOR shall adjust circuit breaker settings based upon field requirements and/or Arc Flash Study results.

G. CONTRACTOR shall adjust overloads to match the installed motor characteristics.

H. CONTRACTOR shall adjust all settings for solid state devices such as reduced voltage solid-state controllers and variable frequency drives to match the installed motor characteristics.

I. Comply with NECA 1.

J. Manufacturer shall assist the CONTRACTOR to install MCC in accordance with manufacturer's instructions. A trained representative of the MCC manufacturer shall inspect the completed MCC installation prior to it being

energized and certify to the OWNER and installation contractor that it is properly installed and ready for energization.

3.2 CONNECTIONS

A. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

C. Ground equipment in accordance with Section 26 05 26 – Grounding.

D. Connect wiring in accordance with Section 26 05 19 – Conductors and Cables.

E. Route and brace conductors in accordance with manufacturer's written instructions. Do not obscure manufacturer's markings and labels.

F. Final connections to equipment may be made with rigid metallic conduit (RMC), or alternatively by liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 INSPECTION, OPERATIONAL TESTING, AND ACCEPTANCE

A. Prior to the startup, the unit and appurtenances shall be inspected for proper alignment and proper connections.

1. After installing equipment, test for compliance with requirements in accordance with NETA ATS.

2. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.

b. Inspect physical and mechanical condition.

c. Inspect anchorage, alignment, grounding, and required clearances.

d. Verify that the unit is clean.

e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.

f. Verify tightness of all control connections.

g. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

i. Use of low-resistance ohmmeter.

ii. Verify tightness of accessible bolted electrical connections by calibrated torque wrench method in accordance with manufacturer's published data.

h. Perform visual and mechanical inspection of surge arresters.

i. Inspect control power transformers.

i. Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.

ii. Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.

iii. Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

3. Electrical Tests:

a. Perform insulation-resistance tests on all control wiring with respect to ground.

b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.

c. Verify settings and operation of control devices.

d. Calibrate and set all relays and timers.

e. Verify phase rotation, phasing, and synchronized operation.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

a. Check for electrical continuity of circuits and for short circuits.

b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

B. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

C. Prepare test and inspection reports.

D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each section. Remove all access panels so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

E. CONTRACTOR shall engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.

1. Provide assistance and support to the factory-authorized service representative during testing and inspection.

3.4 MANUFACTURER'S SERVICES

A. Manufacturer of the MCC shall be capable of providing the programming for the programmable logic controller and the operator interface if provided within the MCC. The manufacturer shall assist the CONTRACTOR and OWNERS Representative with programming support, as needed.

B. Manufacturer of the MCC shall be capable of providing start-up services as part of the supply of the MCC. The manufacturer shall assist the CONTRACTOR with start-up services.

3.5 TRAINING

A. A course outline shall be submitted as part of the MCC submittals.

B. The manufacturer shall provide the services of a factory-trained technician for one, 4-hour, minimum, training period for instructing OWNER's personnel on the concepts, knowledge and tools necessary to troubleshoot, and use the networked MCC.

C. The manufacturer shall provide training materials for 5 OWNER's personnel. Training shall occur at the PROJECT Site and/or the OWNER's offices in Umatilla, Oregon.

D. The CONTRACTOR shall schedule and coordinate the training with the manufacturer and OWNER's personnel through the OWNER's Representative.

– End of Section –

SECTION 26 25 00

LOW VOLTAGE METAL ENCLOSED BUS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This specification describes the electrical and mechanical requirements for metal-enclosed, non-segregated phase bus duct rated from 600 V through 38 kV. The bus duct system described is to be suitable for indoor and outdoor installations with nominal current ratings operating in ambient temperatures up to 40 degrees Celsius (C).

B. This specification covers only the general requirements of the bus duct assemblies. The specific requirements of each assembly (plan, arrangement, components, etc.) will be shown on drawings provided by the OWNER. These drawings will form the basis for developing the drawings to manufacture and install.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 77 00 – Project Closeout
Section 26 05 11 – General Electrical Requirements
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 05 83 – Electrical Equipment Installation
Section 26 24 23 – Low Voltage Motor Control Center

1.2 REFERENCES

A. The assemblies shall be constructed, wired and tested in accordance with all applicable sections of the following latest listed standards and codes.

1. Institute of Electrical and Electronics Engineers (IEEE C37.23), Standard for Metal-Enclosed Bus.
2. National Electric Code (NEC) (NFPA No. 70).
3. National Electrical Manufacturers Association (NEMA).

B. It shall be the manufacturer's responsibility to be knowledgeable of the requirements of the above Standards and Codes. Where standards or codes conflict, ANSI IEEE-C37.23 shall be the governing document.

C. Site Conditions:

1. Ambient air temperature limits (minus 30 degrees C to plus 40 degrees C).
2. Altitude above sea level 360.0 feet.
3. Maximum wind velocity 145 miles per hour, Exp. C.
4. Ice load (N/A) pounds per square foot (not expected in this location).
5. Snow load 8 pounds per square foot.
6. Seismic Loading: Site Class D, and Seismic Design Category D.

1.3 BASIC CONSTRUCTION

A. The bus duct shall be of the non-segregated phase type with adequate air space between each phase and from phase to ground.

B. Bus duct designed for outdoor installations shall be totally enclosed, non-ventilated, weather resistant, with peaked top cover.

C. Bus duct designed for indoor installations shall be totally enclosed, non-ventilated and drip proof. Ventilated enclosures may be used in environments not subject to harsh chemical vapors, concentrated air borne particulates, or dripping liquids.

1.4 RATINGS (CURRENT RATINGS BASED UPON 40 DEGREES C AMBIENT)

A. Maximum voltage 600 V rms.

B. Basic impulse insulation level 60 kV.

C. Rated frequency withstand 5 kV (1 min. dry) 60Hz.

D. Rated continuous current 2,000 Amperes.

E. Momentary withstand current 65 kA Asymmetrical.

F. Conductor total temperature limit 105 degrees C for silver/tin plated surfaces, or equivalent bolted bus joints.

G. Enclosure total temperature limit 80 degrees C.

1.5 CONDUCTORS

A. Copper-ETP 110 ASTM Designation B187 or Aluminum 6101-T61 ASTM Designation 8236.

B. Conductors must not exceed specified temperature limit when operated at the rated current.

C. Conductor supports must be provided to withstand short circuit currents and remain functional after short circuit has been experienced.

1.6 BUS JOINTS

A. Temperature rise of bus bar joint shall not exceed 65 degrees C above a maximum 40 degrees C ambient, or a total of 105 degrees C operating temperature.

B. Standard hardware shall be high strength plated steel; including bolts, nuts, flat washers, and (lock washers for copper connections), or (Belleville spring washers for aluminum connections). Non-magnetic hardware can be supplied when specified.

C. Contact surfaces of bolted copper joints shall be silver plated, or bolted aluminum joints shall be tin plated, to maintain low contact resistance without the use of joint compounds.

1.7 BUS BAR INSULATION

A. Bus duct systems operating at 600 Volt or less will not require an insulation material applied to the conductors or joints. Adequate air space will be provided between phases, and phase to ground to operate without insulation.

B. Insulation at bus joints shall be molded vinyl boots, or appropriate insulating tape(s).

1.8 GROUNDING

A. The bus enclosure shall be designed to carry the system ground fault current without excessive temperature rise. A separate ground bus shall be provided on the inside of the bus enclosure. Separate ground bus may terminate to equipment, or a ground pad, for connection to the station ground.

B. Flexible jumpers shall be provided at all expansion joints to ensure ground continuity.

C. The housing ground continuity shall be maintained at the shipping splits by the use of housing ground splice plates.

1.9 CONDUCTOR SUPPORT SYSTEMS

A. Bus conductors shall be rigidly supported within the enclosure and shall be braced to withstand the minimum short circuit current of 65,000A RMS (Sym.) or as determined by the results of the Short Circuit Current Study performed, as specified, in Section 26 05 11 - General Electrical Requirements, whichever is higher.

B. Supports shall be non-hygroscopic, track resistant, flame retardant, completely molded, glass-reinforced polyester blocks. Silicone rubber inserts will be supplied between the conductors and the support blocks to eliminate the air gap between them.

C. The use of cut GPO-3 fiberglass plates, with or without porcelain inserts for any voltage, is not acceptable, except when serving as a vapor barrier.

1.10 ENCLOSURES

A. Painted aluminum is the preferred material for the construction of enclosures. This limits the effects of hysteresis or magnetic heating caused by induced and circulating currents.

B. All exposed surfaces are to be finished as described below:

1. All surfaces shall be cleaned to prepare them for paint adhesion.

2. All surfaces shall have a primer coat applied to 0.2 mil minimum dry film thickness.

3. Outside surfaces shall have a final finish coat of 1.0 mil minimum dry film thickness.

C. Enclosure shall be designed for a maximum temperature rise of 40 degrees C when carrying rated current in a 40 degrees C ambient.

D. Removable covers shall be provided throughout the bus duct run, both top and bottom, for access to bus joints and supports without the need for disassembling the bus duct. Welded covers are unacceptable.

E. Outdoor Weatherproof Construction:

1. Top covers shall be peaked and have drip lips to shed and prevent entry of wind-blown rain.

2. Outdoor exposed enclosure assembly hardware shall be stainless steel.

3. Top cover joints, and joints with end flanges, are to be flanged, gasketed, and protected with a metallic sealing strip.

4. Screened breather/drains are required along bottom covers and at all low points of the installation.

F. Indoor Non-Ventilated Drip-Proof Construction:

1. Housing will include gasketed solid top and bottom covers, and solid sides to prevent entry of falling liquid or solid particles.

2. Enclosure Assembly hardware shall be stainless steel.

3. Screened breather/drains are required along the enclosure bottom and at all low points along the installation.

G. Enclosure joints will provide adjustment to accommodate site variances and linear expansion of up to 1/4 inch per joint.

H. Manufacturer will include any necessary additional expansion joints required by lengths and configuration of each run or at building seismic joints. (Refer to paragraph 1.14)

I. Enclosures are to be shipped in longest practical lengths (up to 18 feet straight) to minimize field assembly labor.

1.11 SPACE HEATERS

A. Space heaters shall be completely factory wired inside the bus enclosure. Wiring shall be in a separate grounded metal shielding. Heaters shall be thermostatically controlled.

B. Space heaters shall be rated for operation at 240 Volts, with power rating as determined by the manufacturer.

C. Space heaters shall be operated at 120 Volts, or at half the rated voltage and a quarter of the rated power, to maintain low heater surface temperature and prolong their life.

1.12 TESTING

A. All equipment will be subjected to ANSI-C37.23 standard production tests.

B. Manufacturer may be requested to submit test reports showing compliance with the following ANSI 37.23 design tests, or may submit design tests performed on similar ratings along with technical data to substantiate compliance of the equipment being furnished.

1. Temperature Rise
2. Insulation Withstand
3. Impulse
4. Wet and Dry Withstand
5. Momentary
6. Insulation Flame Retardance
7. Water Tightness

1.13 EQUIPMENT CONNECTIONS

A. All transition parts for connection to mating equipment terminals shall be provided by the bus manufacturer. The OWNER will provide the manufacturer with the necessary interfacing details from other equipment manufacturers, to allow the bus duct manufacturer to design the connections.

B. Equipment connections will include bolting hardware, bus adapters (where required), insulating materials and assembly drawings.

C. Connections to other equipment are normally insulated with insulating tapes. Custom molded insulating boots may be requested.

1.14 EXPANSION JOINTS (FOR ENCLOSURES OR CONDUCTORS)

A. Expansion joints are required for straight runs exceeding 80 feet on copper conductors, or 60 feet on aluminum conductors. This applies to indoor or outdoor bus duct construction.

B. Expansion joints may be factory or field assembled. Full assembly instructions shall be furnished when field installation is required.

C. Only Outdoor Expansion Joints shall be used in UBC Seismic Zones 3 or 4, or equivalent, as Earthquake Joints, indoors or outdoors, and when equipment being connected are on different pads.

1.15 DOCUMENTATION REQUIREMENTS

A. Dimensioned drawings with plan, elevation, and other views necessary for clarity.

B. General bus duct description drawings with views of bus bar, supporting blocks, and the housing arrangement.

C. Bus termination drawings showing details of the connecting equipment (transformers, switchgear, etc.).

D. Drawings giving location of space heaters, and diagrams indicating the OWNER's other terminal locations.

E. Installation and Operating Instructions on all of the equipment furnished.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

– End of Section –

SECTION 26 32 01

ENGINE-GENERATOR SET FOR STANDBY POWER

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Installation of one (1) complete and fully functional engine-driven generator set with all necessary ancillary wiring as shown in the drawings.

B. The generator set shall be provided by the OWNER. The set shall be assembled and attached to the concrete base by CONTRACTOR.

C. The generator shall be primarily controlled by an Automatic Transfer Switch (ATS) as described in specification Section 26 36 00 – Automatic Transfer Switch.

D. The field run connections to the generator, furnishing and installation of remote-control and monitoring field cables, and electrical connection hardware shall be provided by CONTRACTOR.

E. The contractor shall connect the owner supplied Generator load center to power and to various generator loads as shown in the drawings.

1.1 DESCRIPTION

A. The purpose of the engine-generator set is to provide backup and auxiliary power for the new Umatilla Intake pump station, Oregon, in the event of the loss of primary utility power.

1.2 QUALITY ASSURANCE

A. The engine-generator shall be installed in a thorough and workmanlike manner by a contractor having at least 10 years of experience installing such equipment for commercial and industrial use.

B. Installation shall be by experienced personnel, familiar with this type of work, and who have demonstrated previous experience.

C. The CONTRACTOR shall fully conform to the Manufacturer's installation instructions.

D. Perform functional tests on all systems. The Engine-Generator assembly and transfer switch must be tested and commissioned as a complete system.

1.3 WARRANTY

A. The manufacturer and CONTRACTOR shall be responsible for ensuring that the fuel system, engine-generator set, power delivery system, and exhaust system form an integrated, serviceable, and fully functioning package.

B. The manufacturer and CONTRACTOR shall guarantee all products to be free from defects in material and workmanship for a minimum period of two years from the date of acceptance by the OWNER.

C. Manufacturer's Warranty:

1. Engine-Generator manufacturer's warranty will be provided to OWNER, as specified in the pre-procurement contract.

2. CONTRACTOR shall install the Engine-Generator in a workmanlike manner to maintain the manufacturer's warranty.

3. CONTRACTOR'S warranty shall cover the installation and shall be in accordance with Section 01 60 00 Products Requirements.

D. The manufacturer and CONTRACTOR shall expedite and make all necessary efforts and repairs to correct defects and deficiencies at no expense to the OWNER.

1.4 SUBMITTALS

A. The Manufacturer shall provide written test procedures that separately describe a set of Safety Run Tests and a set of Performance Tests. These testing procedures shall be subject to mutual agreement between the Manufacturer and OWNER. CONTRACTOR shall perform these tests in coordination with the OWNER.

B. Drawing Markups: Include markups to all drawings including but not limited to plans, elevations, sections, or details showing field revisions if required. Provide markups to the owner for the creation of record drawings.

PART 2 – PRODUCTS (INTENTIONALLY LEFT BLANK)

PART 3 – EXECUTION

3.0 EQUIPMENT HANDLING

A. Care shall be taken in transporting or handling the engine-generator set during installation to prevent damage to the equipment.

B. Damage that occurs during installation or handling shall be corrected at the CONTRACTOR's expense, and at no cost to the OWNER.

3.1 INSTALLATION

A. Electrical installation shall comply with NFPA 70 'National Electrical Code' and/or other applicable installation standards.

B. For vibration isolation, flexible fittings shall be provided for all conduit, cable trays, and raceways attached to the engine-generator set; metallic conductor cables installed on the engine-generator set and from the engine-generator set to equipment not mounted on the engine-generator set shall be flexible stranded conductor; and terminations of conductors on the engine-generator set shall be crimp-type terminals or lugs.

C. The equipment specified herein shall be located as shown in the contract drawings and installed in accordance with the Manufacturer's recommended methods.

D. Prior to connection to the engine-generator set, individual component and equipment functional tests for fuel piping, coolant piping, and lubricating oil piping, electrical circuit continuity, insulation resistance, circuit protective devices, and equipment not provided by the OWNER shall be performed by CONTRACTOR.

E. Concrete base-mounting: Anchor to concrete base by bolting.

1. Install Engine-Generator on cast-in-place concrete equipment base. Comply with requirements for equipment bases and foundations specified in Section 03 30 00 – Cast-in-Place Concrete.

2. Comply with manufacturers requirements for seismic control devices.

3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

4. Provide workspace and clearances required by NFPA 70.

F. Identify components in accordance with Section 26 05 11 – General Electrical Requirements.

G. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control, and communication requirements of transfer switches as recommended by manufacturer.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment in accordance with Section 26 05 26 – Grounding.

E. Connect wiring in accordance with Section 26 05 19 – Conductors and Cables.

F. Route and brace conductors in accordance with manufacturer's written instructions. Do not obscure manufacturer's markings and labels.

G. Final connections to equipment may be made with rigid metallic conduit (RMC), or alternatively by liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 INSPECTION, OPERATIONAL TESTING, AND ACCEPTANCE

A. Prior to the startup, the unit and appurtenances shall be inspected for proper alignment and proper connections.

1. After installing equipment, test for compliance with requirements in accordance with NETA ATS.

2. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.

b. Inspect physical and mechanical condition.

c. Inspect anchorage, alignment, grounding, and required clearances.

d. Verify that the unit is clean.

e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.

f. Verify tightness of all control connections.

g. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

i. Use of low-resistance ohmmeter.

ii. Verify tightness of accessible bolted electrical connections by calibrated torque wrench method in accordance with manufacturer's published data.

3. Electrical Tests:

    a. Perform insulation-resistance tests on all control wiring with respect to ground.

    b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.

    c. Verify settings and operation of control devices.

    d. Verify phase rotation, phasing, and synchronized operation.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.

    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

B. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

C. Prepare test and inspection reports.

D. CONTRACTOR will engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.

1. Provide assistance and support to the factory-authorized service representative during testing and inspection.

2. Final acceptance of the engine-generator set will not be given until the Manufacturer and CONTRACTOR have successfully completed all tests and after all defects in installation material or operation have been corrected to the satisfaction of the OWNER. Acceptance by the OWNER shall be in writing.

3.4 DEMONSTRATION

A. The OWNER shall engage a factory-authorized service representative to train OWNER's maintenance personnel to adjust, operate, and maintain generator and related equipment.

B. Coordinate this training with that for generator equipment.

– End of Section –

SECTION 26 35 26

ACTIVE HARMONIC FILTERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section specifies the furnishing, installation, connection, and testing of harmonic mitigation filter equipment, indicated as filters in this section.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 60 – Facility Startup
Section 26 05 11 – General Electrical Requirements
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 05 34 – Electrical Boxes and Fittings

1.2 QUALITY ASSURANCE

A. Quality Assurance shall be in accordance with Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES) in Section 26 05 11 General Electrical Requirements, requirements for electrical installations.

1.3 SUBMITTALS

A. Submit in accordance with Paragraph, SUBMITTALS in Section 26 05 11 – General Electrical Requirements for electrical installations, 01 33 00 Contractor Submittals, and the following requirements:

1. Shop Drawings:

   a. Submit sufficient information to demonstrate compliance with drawings and specifications.

   b. Include electrical ratings, dimensions, weights, mounting details and materials, terminations, and connection diagrams.

   c. Complete nameplate data including manufacturer's name and catalog number.

   d. Certification from the manufacturer that the filters have been seismically tested to International Building Code requirements. Certification shall be based upon simulated

seismic forces on a shake table or by analytical methods, but not by experience data or other methods.

2. Manuals:

   a. When submitting the shop drawings, submit companion copies of complete maintenance and operating manuals including technical data sheets and wiring diagrams.

   b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.

3. Certification: Two weeks prior to the final inspection, submit the following:

   a. Certification by the manufacturer that the filters conform to the requirements of the drawings and specifications.

   b. Certification by the CONTRACTOR that the filters have been properly installed, adjusted, and tested.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced and shall be the most current publication cycle. Publications are referenced in the text by designation only.

B. Institute of Electrical and Electronics Engineers (IEEE)

   1. 519 Harmonic Control in Electrical Power Systems

   2. 1100 Powering and Grounding Electronic Equipment

C. International Code Council (ICC)

   1. IBC International Building Code

D. National Fire Protection Association (NFPA)

   1. 70 National Electrical Code (NEC)

E. Underwriters Laboratories, Inc. (UL)

   1. 508 Industrial Control Equipment

PART 2 – PRODUCTS

2.0 ACTIVE HARMONIC FILTER

A. Provide two (2) three-phase, three-wire external harmonic filters with the following requirements:

1. The filter shall treat low frequency harmonics (3rd, 5th, 7th, 11th, 13th, etc.) by microprocessor-controlled active power electronics which switch the AC power to control the output.

2. Touchscreen display shall show harmonic spectrum data, line voltage and current, harmonic current, and reactive current, at a minimum.

3. Ampere and Voltage ratings of the filter shall be as shown on drawings.

B. MANUFACTURER

1. AHF shall be Hammond Power Solutions, TruWave™ or OWNER approved equal.

PART 3 – EXECUTION

3.0 INSTALLATION

A. The filters shall be installed and connected in accordance with the approved shop drawings and manufacturer's instructions.

B. The filters shall be 200 Ampere floor mounted. In seismic areas, filters shall be adequately anchored and braced per details on structural contract drawings to withstand the seismic forces at the location where installed.

3.1 ACCEPTANCE CHECKS AND TESTS

A. An authorized representative of the filter manufacturer shall technically supervise and participate during all the field tests. The manufacturer’s representative shall certify in writing that the equipment has been installed and tested in accordance with the manufacturer’s recommendations.

B. Perform manufacturer’s required field tests in accordance with the manufacturer's recommendations. In addition, include the following:

1. Visual Inspection and Tests:

a. Compare equipment nameplate data with specifications and approved shop drawings.

b. Inspect physical, electrical, and mechanical condition.

c. Verify appropriate anchorage, required area clearances, and correct alignment.

d. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method or performing thermographic survey after energization.

e. Verify grounding connections.

f. Vacuum-clean filter enclosure interior. Clean filter enclosure exterior.

g. Verify the correct operation of all indicating devices.

h. Use a three-phase harmonic analyzer to measure voltage and current total harmonic distortion levels, with filter connected to and disconnected from the bus using the circuit protective device.

i. Check doors for proper alignment and operation.

3.2 FOLLOW-UP VERIFICATION

A. Upon completion of acceptance checks and tests, the CONTRACTOR shall show by demonstration in service that the filters are in good operating condition and properly performing the intended function.

3.3 INSTRUCTION

A. Furnish the services of a factory-trained technician for one 2-hour training period for instructing personnel in the maintenance and operation of the filters, on the date requested by the OWNER.

– End of Section –

SECTION 26 36 00

AUTOMATIC TRANSFER SWITCH

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Transfer switch controller.

B. Standard (open) transition, contactor type, bypass isolation transfer switches.

C. Transfer switch accessories.

1.1 DEFINITIONS

A. Automatic Transfer Switch (ATS): Device in which a controller manages the entire process, and initiation begins when the controller senses a loss of the primary source. The controller monitors the source voltage and sends a command to the generators to run when the voltage falls below a preset limit for a prescribed period. The controller also monitors the secondary source voltage and frequency, and when these values are within acceptable limits, the switch transfers the load from the primary to the secondary source. When the primary source is reestablished for a prescribed period to ensure stability, the switch may automatically transfer the load back to the primary source.

B. Bypass Isolation Transfer Switch: Transfer switch that incorporates a standard automatic and a manual transfer switch into a single unit. Bypass isolation is used to transfer power to the manual switch to allow servicing of the ATS while maintaining power to connected loads.

1. Mechanically Operated: Physical handle is used to select between manual and automatic sides of the bypass isolation transfer switch.

2. Electrically Operated: Push-button controls are used to select between manual and automatic sides of the bypass isolation transfer switch.

C. Contactor type switching mechanism: Contactors are constructed as an electrically controlled, double-throw switch where a solenoid mechanism opens one set of power contacts while closing a second set.

D. Enclosure, Type 3R: An enclosure type defined by UL 50 as follows: Constructed (with knockouts on the sides and bottom) for either indoor or outdoor use to provide protection against falling dirt, rain, sleet, snow, and

windblown dust. Will be undamaged by the external formation of ice on the enclosure. Type 3R enclosures are rainproof, which means they are constructed, protected, or treated to prevent beating rain from interfering with the successful operation of the apparatus or result in wetting of live parts and wiring within the enclosure under specified conditions. They are not raintight, which means exposure to beating rain could result in water entering a Type 3R enclosure under certain conditions; nor are they watertight, which means moisture could enter a Type 3R enclosure when subjected to a stream of water under certain conditions.

E. Insulated-Case Type Switching Mechanism: Provides electronic trip overcurrent protection using UL 1558 listed circuit breakers (100 percent rated).

F. Service Entrance Transfer Switch: Transfer switch that serves as both ATS and utility service disconnect.

G. Programmed (Delayed) Transition: Break both normal and emergency sides before transfer. The load disconnects from one source and then pauses in an "off" position before connecting to the alternate source to protect from power surges. The delay allows the magnetic field to decay to a safe level before transferring.

H. Withstand and Close-On Rating (WCR): The following are the types of transfer switch WCR ratings.

1. Specific Breaker Rating: Transfer switch that is tested in coordination with specific upstream circuit breakers. Only breakers listed on the transfer switch rating decal may be used.

2. Time-Based Rating (Any Breaker): Transfer switch that passes the "any breaker" test can withstand a fault of a given magnitude for three cycles. This allows an ATS to be used with any UL 489 circuit breaker.

3. Short-Time Rating: The short-time ratings require longer-duration application of fault current and are intended for selective coordination purposes, where an extended delay is needed to allow for downstream protective devices to clear a fault closer to its source.

1.2 SUBMITTALS

A. Refer to Section 01 33 00 – Contractor Submittals for submittal procedures, and to Section 01 77 00 – Project Closeout for the procedure on submittal of final documentation.

B. All clarifications and exceptions must be clearly identified.

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph.

2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

C. The CONTRACTOR shall provide certification that the ATS has been installed in accordance with the manufacturer's instructions and with local codes and standards that govern ATS and service entrance installations.

D. The CONTRACTOR shall provide certification that all circuit breaker settings have been adjusted per field requirements.

E. Drawing Markups: Include markups to all drawings including but not limited to plans, elevations, sections, or details showing field revisions if required. Provide markups to the owner for the creation of record drawings.

1.3 QUALITY ASSURANCE

A. The ATS shall be installed in a thorough and workmanlike manner by a contractor having at least 10 years of experience installing such equipment for commercial and industrial use.

B. Installation shall be by experienced personnel, familiar with this type of work, and who have demonstrated previous experience.

C. The CONTRACTOR shall fully conform to the Manufacturer's installation instructions.

D. Perform functional tests on all systems. Engine-generator assembly and transfer switch must be tested and commissioned as a complete system.

1.4 WARRANTY

A. Manufacturer's Warranty:

1. ATS Manufacturer's warranty will be provided to OWNER, as specified in the pre-procurement contract.

2. CONTRACTOR shall install the ATS in a workmanlike manner to maintain the Manufacturer's warranty.

B. CONTRACTOR'S warranty shall cover the installation and shall be in accordance with Section 01 60 00 Product Requirements.

PART 2 – PRODUCTS (INTENTIONALLY LEFT BLANK)

PART 3 – EXECUTION

3.0 EQUIPMENT HANDLING

A. OWNER has procured the ATS and will coordinate transfer to CONTRACTOR for installation.

1. Care shall be taken in transporting or handling the ATS during installation to prevent damage to the equipment.

2. Damage that occurs during installation or handling shall be corrected at the CONTRACTOR's expense, and at no cost to the OWNER.

3.1 INSTALLATION

A. CONTRACTOR shall work with OWNER and ATS SUPPLIER, to coordinate the installation, according to the manufacturer's instructions.

B. Electrical installation shall comply with NFPA 70 National Electrical Code (NEC), and/or other applicable installation standards.

C. Floor-Mounting Switch: Anchor to floor by bolting.

1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 30 00 – Cast-in-Place Concrete.

2. Comply with manufacturers requirements for seismic control devices.

3. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

4. Provide workspace and clearances required by NFPA 70.

D. Identify components in accordance with Section 26 05 11 – General Electrical Requirements.

E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

F. Comply with NECA 1.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control, and communication requirements of transfer switches as recommended by manufacturer.

B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures.

C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.

D. Ground equipment in accordance with Section 26 05 26 – Grounding.

E. Connect wiring in accordance with Section 26 05 19 – Conductors and Cables.

F. Route and brace conductors in accordance with manufacturer's written instructions. Do not obscure manufacturer's markings and labels.

G. Final connections to equipment may be made with rigid metallic conduit (RMC), or alternatively by liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.3 INSPECTION, OPERATIONAL TESTING, AND ACCEPTANCE

A. Prior to the startup, the unit and appurtenances shall be inspected for proper alignment and proper connections.

1. After installing equipment, test for compliance with requirements in accordance with NETA ATS.

2. Visual and Mechanical Inspection:

a. Compare equipment nameplate data with Drawings and Specifications.

b. Inspect physical and mechanical condition.

c. Inspect anchorage, alignment, grounding, and required clearances.

d. Verify that the unit is clean.

e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.

f. Verify that manual transfer warnings are attached and visible.

g. Verify tightness of all control connections.

h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:

i. Use of low-resistance ohmmeter.

ii. Verify tightness of accessible bolted electrical connections by calibrated torque wrench method in accordance with manufacturer's published data.

i. Perform manual transfer operation.

j. Verify positive mechanical interlocking between normal and alternate sources.

k. Perform visual and mechanical inspection of surge arresters.

l. Inspect control power transformers.

i. Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.

ii. Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.

iii. Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.

3. Electrical Tests:

a. Perform insulation-resistance tests on all control wiring with respect to ground.

b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.

c. Verify settings and operation of control devices.

d. Calibrate and set all relays and timers.

e. Verify phase rotation, phasing, and synchronized operation.

f. Perform automatic transfer tests.

g. Verify correct operation and timing of the following functions:

i. Normal source voltage-sensing and frequency-sensing relays.

ii. Engine start sequence.

iii. Time delay on transfer.

iv. Alternative source voltage-sensing and frequency-sensing relays.

v. Automatic transfer operation.

vi. Interlocks and limit switch function.

vii. Time delay and retransfer on normal power restoration.

viii. Engine cool-down and shutdown feature.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

   a. Check for electrical continuity of circuits and for short circuits.

   b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

   c. Verify that manual transfer warnings are properly placed.

   d. Perform manual transfer operation.

5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.

   a. Simulate power failures of normal source to ATS and retransfer from emergency source with normal source available.

   b. Simulate loss of phase-to-ground voltage for each phase of normal source.

   c. Verify time-delay settings.

   d. Verify pickup and dropout voltages by data readout or inspection of control settings.

   e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.

   f. Perform contact-resistance test across main contacts and correct values exceeding 500 microohms (μΩ) and values for one pole deviating by more than 50 percent from other poles.

g. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

a. Verify grounding connections and locations and ratings of sensors.

b. Coordinate tests with tests of generator and run them concurrently.

B. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

C. Prepare test and inspection reports.

D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

E. OWNER will engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.

1. Provide assistance and support to the factory-authorized service representative during testing and inspection.

2. Final acceptance of the engine-generator set will not be given until the Manufacturer and CONTRACTOR have successfully completed all tests and after all defects in installation material or operation have

been corrected to the satisfaction of the OWNER. Acceptance by the OWNER shall be in writing.

3.4 DEMONSTRATION

A. The OWNER will engage a factory-authorized service representative to train OWNER's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training includes testing ground-fault protective devices and instructions to determine when the ground-fault system will be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

– End of Section –

SECTION 26 57 00

LIGHTING FIXTURES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to WORK of this section.

1.1 DESCRIPTION OF WORK

A. Extent of lighting fixture work is indicated by drawings and schedules.

B. Types of lighting fixtures in this section include the following:

1. Light Emitting Diode (LED).

C. Applications of lighting fixtures required for project include the following:

1. General lighting.

2. Supplementary lighting.

1.2 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of lighting fixtures of types and rating required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with lighting fixture work similar to that required for project.

C. Codes and Standards:

1. NEC Compliance: Comply with NEC as applicable to installation and construction of building lighting fixtures.

2. NEMA Compliance: Comply with applicable requirements of NEMA Std Pub/Nos. LE 1 and LE 2 pertaining to lighting equipment.

3. UL Compliance: Comply with UL standards pertaining to lighting fixtures. Provide lighting fixtures and components which are UL-listed and labeled.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data on building light fixtures, including complete photometric data.

B. Shop Drawings: Submit fixture shop drawings, as directed in Section 01 33 00 Contractor Submittals, with separate sheets for each fixture, assembled in "luminaire type" alphabetical or numerical order, with proposed fixture and accessories clearly indicated on each sheet.

C. Maintenance Data: Submit maintenance data and parts list for each lighting fixture and accessory; including "trouble-shooting" maintenance guide. Include that data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 01.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Handle lighting fixtures carefully to prevent damage, breaking, and scoring. Do not install damaged fixtures or components; replace with new.

B. Store lighting fixtures in clean dry place. Protect from weather, dirt, fumes, water, construction debris and physical damage.

1.5 WARRANTY

A. The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. Manufacturers and Substitutions: Fixtures other than those listed on the drawings and schedules may be submitted for OWNER approval, if they are of similar design, equivalent photometric characteristics and equally efficient.

2.1 LIGHTING FIXTURES

A. General: Provide lighting fixtures, of size, types and ratings indicated; complete with, but not limited to, housings, energy efficient lamps, lamp holders, reflectors, energy efficient ballasts, starters and wiring. Ship fixtures factory-assembled, with parts required for a complete installation. All metal parts shall be grounded as common unit.

B. Lighting Fixture Types: The various fixture types required are indicated on drawings and schedules. Fixtures must comply with minimum requirements as stated therein. Review architectural and structural drawings and specifications to verify ceiling types, modules, suspension systems appropriate to installation.

2.2 EQUIPMENT IDENTIFICATION

A. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

PART 3 – EXECUTION

3.0 INSPECTION

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Do not proceed with WORK until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.1 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer’s written instructions, applicable requirements of NFPA 70 (NEC), IEEE C2 (NESC), NECA’s “Standards of Installation”, NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Coordinate with other electrical WORK as appropriate to properly support fixture weight. Submit design of hangers, method of fastening, where other than indicated on drawings, for review by OWNER.

C. Provide fixtures and/or fixture outlet boxes with hangers to properly support fixture weight. Submit design of hangers, method of fastening, where other than indicated on drawings, for review by OWNER.

D. Install flush mounted fixtures to eliminate light leakage between fixture frame and finished surface.

E. Fasten fixtures securely to indicated structural supports; and ensure that solid pendant fixtures are plumb and level.

F. In general, conduits for lighting and convenience outlets are shown diagrammatically on the drawings. It is CONTRACTOR’s responsibility to furnish and install conduits, boxes and fittings in accordance with other

Division-26 sections. Exposed lighting conduit shall be galvanized steel RMC (rigid metallic conduit). Underground (buried or concrete embedded) conduit shall be PVC. EMT RMC may not be used. Fittings shall be water-tight. Rigid steel conduit shall be not less than 3/4".

G. Branch circuit Wire sizes shall be in accordance with NEC for 75 degrees C conductor temperature corrected for proper ambient air temperature and the number of conductors in the raceway. Ambient air temperature shall be taken as 40 degrees C in all areas except those for which a higher temperature has been indicated on the plans. Minimum conductor sizes shall be #12 AWG for lighting and receptacle circuits.

H. It is essential, in order to minimize the extent and duration of temporary lighting WORK, that the permanent lighting systems be installed and made operative as early as practicable. The CONTRACTOR shall, therefore, install permanent lighting equipment wherever practicable (to be determined by the OWNER) instead of temporary equipment. In active construction areas where permanent fixtures may be omitted and temporary outlets connected to pigtails in the permanent outlet boxes. Services to complete or partially complete systems may be provided from temporary power sources as required.

3.2 ADJUSTING AND CLEANING

A. At the completion of lighting WORK, a final check and cleanup shall be made on all lighting systems. This shall assure that all fixtures, lenses, cabinets and equipment are in good conditions, clean, and operating properly, and that any material or equipment damaged during the construction period has been replaced or satisfactorily repaired. Repairs and refinishing, if any, shall be to the approval of the OWNER.

B. Protect installed fixtures from damage during remainder of construction period.

3.3 GROUNDING

A. Provide equipment grounding connections for lighting fixtures. Ground noncurrent-carrying parts of equipment including luminaires, mounting arms, brackets, and metallic enclosures. Tighten connections to comply with tightening toques specified in UL Std 486A to assure permanent and effective grounds.

3.4 FIXTURE REPLACEMENT AND SPARES

A. Upon completion of installation, verify that equipment is properly installed, connected, and adjusted. Conduct an operating test to show that the equipment operates in accordance with the requirements of this section.

B. At Date of Substantial Completion, replace any fixtures which are observed to be noticeably dimmed after CONTRACTOR's use and testing, as judged by OWNER.

C. Furnish stock of 1 (one), spare fixture of each type and size of fixture supplied. Deliver replacement stock as directed to OWNER's storage space.

– End of Section –

DIVISION 27 – COMMUNICATIONS

SECTION 27 10 00

BUILDING TELECOMMUNICATIONS CABLING SYSTEM

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The telecommunications cabling and pathway system horizontal cabling, horizontal and backbone pathways, service entrance facilities, work area pathways, telecommunications outlet assemblies, conduit, raceway, and hardware for splicing, terminating, and interconnecting cabling necessary to transport telephone and data (including LAN) for the River Pump Station and is exclusive of the Supervisory Control and Data Acquisition System (SCADA) covered in Section 40 61 11 – Instrumentation and Control System.

B. The CONTRACTOR shall provide necessary coordination and support to the OWNERS System Integrator for all RIVER PUMP STATION equipment system software integration for the SCADA, including SCADA computer, PLC, and HMI programming.

C. The CONTRACTOR will provide all equipment as required on the drawings and specified herein. In addition, the CONTRACTOR will perform all work running fiber cables between the Water Treatment Facility and the Pump Station.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Products Requirements
Section 01 60 60 – Facility Startup
Section 26 05 11 – General Electrical Requirements
Section 26 05 26 – Grounding
Section 40 61 11 – Instrumentation and Control System
Section 40 66 11 – Network Systems
Section 40 66 33 – Metallic and Fiber Optic Communications Cable and Connectors
Section 40 67 11 – Panels, Consoles, and Appurtenances

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. National Electrical Contractors Association (NECA)

a. NECA/BICSI 568 (2006) Standard for Installing Building Telecommunications Cabling

2. National Fire Protection Association (NFPA)

a. NFPA 70 (2020) National Electrical Code

b. Oregon Electrical Specialty Code (2021)

3. Telecommunications Industry Association (TIA)

TIA-492AAAA-B	EN-Detail Specification for 62.5-µm Core Diameter/125-µm Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers
TIA-568-C.0	(2009; Add 1 2010; Add 2 2012) Generic Telecommunications Cabling for Customer Premises
TIA-568-C.1	(2009; Add 2 2011; Add 1 2012) Commercial Building Telecommunications Cabling Standard
TIA-568-C.2	(2009; Errata 2010) Balanced Twisted-Pair Telecommunications Cabling and Components Standards
TIA-569	(2012c; Addendum 1 2013; Errata 2013) Commercial Building Standard for Telecommunications Pathways and Spaces
TIA-606	(2012b) Administration Standard for the Telecommunications Infrastructure
TIA-568-C.0	(2009; Add 1 2010; Add 2 2012) Generic Telecommunications Cabling for Customer Premises

4. Underwriters Laboratories (UL)

UL 1286	(2008; Reprint Sep 2013) Office Furnishings
UL 1863	(2004; Reprint Nov 2012) Communication Circuit Accessories
UL 467	(2007) Grounding and Bonding Equipment
UL 50	(2007; Reprint Apr 2012) Enclosures for Electrical Equipment, Non- environmental Considerations
UL 969	(1995; Reprint Nov 2008) Standard for Marking and Labeling Systems

1.3 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Shop Drawings & Product Data:

1. Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control

panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, industry, and technical society publication references.

2. Telecommunications drawings per Paragraph 1.4 - Quality Assurance of this Section.

3. Include cut sheets and manufacturer data of all equipment submitted under this specification.

C. Additional Submittal Requirements:

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph as a whole.

2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

3. The CONTRACTOR shall provide review comments attached to the submittal identifying compliance or non-compliance with section, confirming that they have verified that submittals meet specified requirements.

4. Submittal information shall be manufacturer's catalog descriptive literature with identifying arrows pointing to the specific equipment,

devices, and materials to be supplied. Catalog information shall include technical specifications and application information, including NEMA and electrical ratings, range, weight, accuracy, etc. Catalog cutsheets shall be edited to show only the items, model numbers, and information which apply and include all information as described below.

5. Multiple submittals for this section will be allowed provided that a marked-up copy of the specification section is included with each submittal.

D. Test Reports

1. The CONTRACTOR shall submit a comprehensive test plan for all systems installed under this contract for review by the OWNER. This shall be submitted one (1) month prior to their initiating final testing of any data cable system. This plan can be format in a manner convenient to the CONTRACTOR but must contain itemization of systems to be tested as described in these specifications, estimated dates and duration's, staff to be applied and their responsibility, qualifications, certifications and experience, and a summary of testing equipment to be used. The plan shall show, at a minimum, test configurations, calibration procedures, impedances, and measurement equipment.

2. The CONTRACTOR shall furnish a written report certifying installation is in compliance with OWNER's requirements.

E. Qualifications:

1. The CONTRACTOR installing the telecommunications facilities and equipment herein specified shall be an experienced TELECOMMUNICATIONS CONTRACTOR. They shall demonstrate:

   a. A minimum of five (5) years of continuous operation performing similar scopes of work

   b. Personnel are trained and certified in the installation of telecommunications facilities equipment.

   c. BICSI Registered/Certified Communications Distribution Designer (RCDD) on staff.

   d. Supervisor or lead technician on the project has a current registered BICSI RCDD and/or Registered BICSI Technician Certification

1.4 QUALITY ASSURANCE

A. Telecommunications Shop Drawings:

1. Provide drawings in accordance with TIA-606. The identifier for each termination and cable shall appear on the drawings. Drawings shall depict final telecommunications installed wiring system infrastructure in accordance with TIA 606. The drawings should provide details required to prove that the distribution system shall properly support connectivity from the Pump Station electrical room to the telecommunications outlets. The following drawings shall be provided as a minimum:

a. T2 – Building Area Drawings - Drop Locations and Cable Identification (ID'S). These drawings show drop locations, telecommunications rooms, access points and detail call outs for common equipment rooms and other congested areas.

b. T4 – Typical Detail Drawings - Faceplate Labeling. Detailed drawings of symbols and typical such as faceplate labeling, faceplate types, faceplate population.

B. Standard Products:

1. Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for two (2) years prior to bid opening. The two (2) year period shall include applications of equipment and materials under similar circumstances and of similar size.

2. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the two (2) year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in this section.

1.5 DELIVERY AND STORAGE

A. Provide protection from weather, moisture, extreme heat and cold, dirt, dust, and other contaminants for telecommunications cabling and equipment placed in storage.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. As listed in subsequent sections.

B. Substitutions:

1. Substitutions shall comply with specified requirements.

2.1 COMPONENTS

A. Components shall be UL or third party certified. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations, submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. Provide a complete system of telecommunications cabling and pathway components using star topology. Provide support structures and pathways, complete with outlets, cables, connecting hardware and telecommunications cabinets/racks. Cabling and interconnecting hardware and components for telecommunications systems shall be UL listed or third-party independent testing laboratory certified, and shall comply with NFPA 70 and conform to the requirements specified herein.

2.2 TELECOMMUNICATIONS PATHWAY

A. Provide telecommunications pathways in accordance with TIA-569 and as specified in Section 26 05 11 – General Electrical Requirements. Provide system furniture pathways in accordance with UL 1286.

2.3 TELECOMMUNICATIONS CABLING

A. Cabling shall be UL listed for the application and shall comply with TIA-568-C.0, TIA- 568-C.1, TIA-568-C.2, TIA-568-C.3 and NFPA 70, and as specified in Section 40 66 33 – Metallic and Fiber Optic Communication Cable and Connections. Provide a labeling system for cabling as required by TIA-606 and UL 969.

2.4 TELECOMMUNICATIONS SPACES IN RIVER PUMP STATION

A. Provide all hardware and equipment for the Pump Station as shown on contract drawings.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTOR ASSEMBLIES

A. OUTLET/CONNECTOR COPPER

1. Outlet/connectors shall comply with FCC Part 68, TIA-568-C.1, and TIA-568-C.2. UTP outlet/connectors shall be UL 1863 listed, non-keyed, 8-pin modular, constructed of high impact rated thermoplastic housing and shall be third party verified and shall comply with TIA-568-C.2 Category 6e requirements. Outlet/connectors provided for UTP cabling shall meet or exceed the requirements for the cable provided. Outlet/connectors shall be terminated using a Type 110 IDC PC board connector, color-coded for both T568A and T568B wiring. Each outlet/connector shall be wired T568B. UTP outlet/connectors shall comply with TIA-568-C.2 for 200 mating cycles.

B. Cover Plates:

1. Telecommunications cover plates shall comply with UL 514C, and TIA-568-C.1; flush or oversized design constructed of 302 stainless material. Provide labeling in accordance with paragraph 3.1 LABELING in this section.

C. Outlet Boxes for Telecommunications System:

1. Provide the following:

a. Standard type 4-11/16 inches square by 2-1/8 inches deep.

b. Outlet boxes for wall-mounted telecommunications outlets 4 by 2-1/8 by 2 1/8 inches deep.

c. Depth of boxes, large enough to allow manufacturers' recommended conductor bend radii.

2.6 GROUNDING AND BONDING PRODUCTS

A. Provide in accordance with UL 467, TIA-607, and NFPA 70. Components shall be identified as required by TIA-606. Provide ground rods, bonding conductors, and grounding bus bars as specified in Section 26 05 26 – Grounding.

PART 3 – EXECUTION

3.0 SITE PHONE/DATA INSTALLATION

A. Install telecommunications cabling and pathway systems, including the horizontal and backbone cable, pathway systems, telecommunications outlet/connector assemblies, and associated hardware in accordance with NECA/BICSI 568, TIA-568- C.1, TIA-568-C.2, TIA-569, NFPA 70, and UL standards as applicable. Provide cabling in a star topology network.

B. Pathways and outlet boxes shall be installed as specified in Section 26 05 11 – General Electrical Requirements. Install telecommunications cabling with copper media in accordance with Section 40 66 33 – Metallic and Fiber Optic Communications Cable and Connectors to avoid electromagnetic interference between power and telecommunications equipment. Cabling shall be run with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

C. Cabling:

1. Cabling shall be installed and tested in accordance with Section 40 66 33 – Metallic and Fiber Optic Communications Cable and Connectors.

D. Pathway Installations:

1. Provide in accordance with TIA-569 and NFPA 70. Provide building pathway as specified in Section 26 05 11 – General Electrical Requirements. All cable shall be installed in conduits.

E. Cable Tray Installation:

1. Install cable tray as specified in Section 26 05 11 – General Electrical Requirements.

F. Work Area Outlets:

1. Terminations: Terminate UTP cable in accordance with TIA-568-C.1, TIA 568 C.2 and wiring configuration as specified. Telephone outlets shall be 18 inches above the floor unless otherwise required. Telephone outlets outdoors and in garages; in basements, shops, storerooms, and rooms where equipment may be hosed down; shall be 4 feet above floor or grade.

2. Cover Plates: As a minimum, each outlet/connector shall be labeled as to its function and a unique number to identify cable link in accordance with the paragraph LABELING in this section.

3. Cables: Unshielded twisted pair and fiber optic cables shall have a minimum of 12 inches of slack cable loosely coiled into the telecommunications outlet boxes. Minimum manufacturer's bend radius for each type of cable shall not be exceeded.

4. Pull Cords: Pull cords shall be installed in conduit serving telecommunications outlets that do not have cable installed.

G. Grounding and Bonding:

1. Provide in accordance with TIA-607, NFPA 70 and as specified in Section 26 05 26 – Grounding.

3.1 LABELING

A. Labels:

1. Provide labeling in accordance with TIA-606. Handwritten labeling is unacceptable. Stenciled lettering for voice and data circuits shall be provided using mechanical device.

B. Cable:

1. Cables shall be labeled using color labels on both ends with identifiers in accordance with TIA-606.

C. Termination Hardware:

1. Workstation outlets and patch panel connections shall be labeled using color coded labels with identifiers in accordance with TIA-606.

3.2 TESTING

A. Provide tests in accordance with Section 40 66 33 – Metallic and Fiber Optic Communications Cable and Connectors.

– End of Section –

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

SECTION 28 20 02

INTERNET PROTOCOL SURVEILLANCE SYSTEM

PART 1 – GENERAL

1.0 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 77 00 – Project Closeout
Section 26 05 11 – General Electrical Requirements
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 05 83 – Electrical Equipment Installation
Section 27 10 00 – Building Telecommunications Cabling System
Section 40 66 11 – Network Systems
Section 40 66 33 – Metallic and Fiber Optic Communication Cable and Connectors

1.1 IP SURVEILLANCE SYSTEM DESIGN CONCEPT

A. The entire IP surveillance system shall monitor entrances, exits and other selected areas of the Umatilla Intake Pump Room surrounding area including the Roadway, electrical equipment area, parking lot.

B. Two types of cameras shall be installed to monitor the movement of the people as follows:

   1. IP fixed PTZ camera.

   2. IP fixed camera outdoor type, dome or turret.

C. All outdoor items for cameras like junction boxes, power supply, media converter etc. shall be in waterproof and dust proof housings.

D. Surveillance system shall include centralized recording solution with Video Management Software and Network Video Recorder.

E. Approximate camera locations are shown on the drawings. CONTRACTOR shall select camera locations based on optimal field of vision and coverage.

F. All cameras shall have connectivity to OWNER'S dedicated local area network.

G. System shall use Cat6 cable and support PoE++.

1.2 SCOPE OF WORK

A. Supply, install, test and commission high quality IP CCTV surveillance system along with software, server(s), power supply, power distribution and required accessories throughout the Confederated Tribes of the Umatilla Reservation (CTUIR)/City of Umatilla (City) Joint Pump and Pipeline Project.

B. The entire system shall be as per technical specifications and drawings.

C. Video management software shall offer both video stream management and video stream storage management.

D. Cat 6 cable/fiber cable connectivity with all required hardware up to purchaser's networking switches of LAN, locations of networking switches.

E. Integrated testing and commissioning of CCTV system on LAN to be provided by CONTRACTOR.

F. Training & handing over of all materials, equipment and appliances.

G. Any other items/accessories required for installation, testing and commissioning of CCTV system.

1.3 SUBMITTALS

A. Drawings: Prior to installation, system supplier shall submit, in accordance with Section 01 33 00 – Contractor Submittals:

1. Installation drawing.
2. Cable connectivity drawings and cable schedule.
3. Power distribution scheme.
4. Specifications and data sheet for each item.
5. List of software and software licenses.
6. Test certificates, Internal test reports etc.

B. System Documentation

C. Upon completion of installation, system supplier shall submit:

1. System configuration diagrams in simplified block format.
2. Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
3. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.

4. A list of all functions available and a sample of function block programming that shall be part of delivered system.
5. Quality Assurance Plan.
6. Operation and maintenance manuals.

1.4 QUALITY ASSURANCE

A. The entire system shall be installed and commissioned from a single vendor to assure reliability and continued service.

B. The vendor shall be required to train and instruct client's personnel in the correct use, operation and supervision of the system, preferably prior to the handing over of the project.

C. The supplier shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship.

PART 2 – PRODUCTS

2.0 IP CCTV SURVEILLANCE SYSTEM

A. The system shall have the following minimum capabilities:

1. Cameras located and positioned to monitor all doors, gates, exterior walls and equipment, and all interior rooms. Cameras shall be located such that faces are clearly visible and identifiable in recordings. Camera quantity and location to be determined by CONTRACTOR and submitted to OWNER for review.
2. Transmit and Receive H.264 and H.265 video.
3. Capability to save/export videos in MPEG-4 Part 14 and/or Matroska digital multimedia container file formats for playback using third-party applications and tools.
4. Support for Multiple IP Video Streams. Each stream must allow independent configuration of bit rate, frame rate, rate control mode and motion data.
5. Provides real time recording at 15 or higher fps with no frame loss.
6. Must provide up to 90 days of motion-based archive footage from all cameras or 30 days of real time recording at 15 frames per second (FPS), whichever is greater. Provide a local storage solution with the option of cloud-based storage. Activity Controlled Frame rate and motion-based recording may be employed to reduce bandwidth and storage requirements.

B. The system should allow for live view, playback and system configuration of the IP video system without interfering with camera recording.

1. Should have facilities for play, forward, rewind, pause along with fast forward and rewind for reviewing the recorded videos.

2. The system must support video bookmarks, where the system allows the user to create textual bookmarks at various places in a recorded footage and allow access to these bookmarks through an intelligent bookmark management system.

C. Network switches:

1. Network switches providing power to cameras shall comply with IEEE 802.3bt standard, PoE++.

2. Network switches servicing camera equipment shall comply with IEEE 802.3ab standard, 1000BASE-T.

2.1 NVR SOFTWARE

A. Video and alarm management software under one single front end and should be on open platform with support to renowned IP camera brands.

B. Support for multi-user and multi-user group environment in addition to user hierarchy.

C. System should allow to be used as a distributed or centralized architecture with support to any number of cameras and any number of clients that may be added in the future.

2.2 IP CAMERAS

A. All cameras shall be true IP camera, 1080p or higher resolution, and shall utilize Power over Ethernet as needed. IEEE 802.3af (PoE), IEEE 802.3at (PoE+), or IEEE 802.3bt (PoE++) are acceptable.

B. All cameras shall be compliant with Open Network Video Interface Forum (ONVIF) Profile T.

C. Temperature Range: Minimum 25 degrees F – Maximum 90 degrees F.

D. Operating voltage: Power over Ethernet (802.3af).

E. All cameras shall use Integrated Infrared (IR) emitters for low-light conditions.

F. Support network protocol 802.3 and IETF Standards 10/100 Base-T Ethernet.

G. The IP Camera will have a built-in web server, making it accessible for configuration using a standard Internet browser.

H. Outdoor Cameras:

1. Outdoor cameras shall be rated IP 66 or higher.

2. Outdoor cameras shall be vandal-resistant and located such that they are inaccessible from outside of the facility.

2.3 UNINTERRUTIBLE POWER SUPPLY (UPS)

A. UPS shall be sized to supply the maximum power consumption of all surveillance system components for a minimum of 30 minutes.

B. Nominal Input Voltage: 1 Phase 120V AC, ±10%.

C. Output Characteristics:

1. Voltage: 1 Phase 120V AC ±5%.

2. Frequency: 60Hz ±1%, pure sine wave. Modified sine waves are not acceptable.

D. Power Efficiency: Ratio of output power to input power shall be 90% or greater.

E. UPS shall have the capability to provide remote alarm annunciation to a Programmable Logic Controller (PLC) or other device by contact closure or other OWNER approved means.

2.4 CAT6 CABLE

1. 23 AWG or larger bare solid copper, CAT-6 Shielded Industrial grade Cat6 cable. F/UTP Cable, Meets EIA/TIA 568A specifications.

2. Support for IEEE 802.3ab standard, 1000BASE-T.

PART 3 – EXECUTION

3.0 DESIGN

A. CONTRACTOR shall coordinate with the OWNER on camera placement, quantity, and capabilities prior to and throughout the design process. Drawings indicate the minimum number and location of Cameras.

B. Cameras should have the ability to see the areas including but not limited to the following: access road, fenced in electrical area including major electrical equipment (e.g., transformer, metering enclosure, ATS, grounding resistor, diesel genset), walkways along all 4 sides of the building, each entry door (interior and exterior views), Intake gate operator area, water surface in the intake area and surrounding the floating public safety barrier.

C. Centralized Network Video Recorder (NVR) shall be located in the Records Room with other controls and networking equipment.

D. NVR and camera video feeds shall be remotely accessible over the OWNER's network.

E. Power shall be provided to the IP CCTV system from a 120VAC 1PH 20A feeder cable run to the records room. CONTRACTOR shall design a system to distribute power from the UPS as required to support the PoE IP CCTV system. This shall include complete cabling and conduit work, dedicated network switches and patch panels as needed, required electrical accessories, and suitable protection devices as needed to provide a complete IP CCTV camera system.

3.1 INSTALLATION AND TESTING

A. Initial testing: Prior to installation of the system, CONTRACTOR shall install CONTRACTOR's proposed IP cameras for each type of camera specified in the proposed monitoring locations to demonstrate the image quality. CONTRACTOR shall provide temporary power for the initial testing.

B. Component Testing: Each component shall be individually tested prior to installation. The supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

C. Commissioning: CONTRACTOR and OWNER shall review video from each camera to confirm image quality and detail from each location at times that most critical to the OWNER for surveillance. Cameras shall be revised, relocated, or adjusted to the satisfaction of the OWNER.

– End of Section –

DIVISION 31 – EARTHWORK

SECTION 31 20 00

EARTHWORK

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Clearing and grubbing.

B. Excavation of materials that can be excavated without blasting or ripping, which is defined in Section 31 23 17 – Rock Excavation.

C. Minor structures: bedding, pipe zone, and backfill for pipeline and conduit trenches, including flow meter vault.

D. Major structures: backfill.

E. Base and surface course for parking lot and new access roads and trails.

F. Restoration fill: non-structural fill to restore excavated slopes to original condition.

G. Drain rock for subsurface drains.

H. Grading of bio-retention pond.

I. Riprap.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 57 01 – Stormwater Pollution Prevention
Section 01 57 19 – Spill Prevention, Control, and Countermeasures
Section 02 41 00 – Demolition
Section 03 30 00 – Cast-in-Place Concrete
Section 31 23 17 – Rock Excavation

1.2 DEFINITIONS

A. Per ODOT Section 00405.02 “Common Excavation” shall mean the removal of all materials not classified as Rock Excavation.

B. Per ODOT Section 00405.02 “Rock Excavation” shall mean all excavation of solid ledge rock that requires for its removal drilling and blasting, wedging, sledging, barring, or breaking up with power tools.

C. Other definitions per ODOT Section 00405.02.

1.3 REFERENCES

A. City of Umatilla (City) (2021), Design & Construction Standards & Specifications for Public Works Improvement.

B. Oregon Department of Transportation (ODOT) (2021), Standard Specifications for Construction.

1.4 GEOTECHNICAL INVESTIGATION

A. A geotechnical investigation report entitled "Geotechnical Engineering Evaluation, City of Umatilla Pump Station Improvements, Umatilla, Oregon" has been prepared by GeoProfessional Innovation Corporation.

B. A copy of the investigation report is included in Appendix A.

C. If conflicts occur between the investigation report and the drawings or specifications, the drawings and specifications shall govern.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Common fill: 3" minus pit run per ODOT Section 00330.14.

B. Aggregate base course: Per ODOT Section 02630.10 with grading selected by the CONTRACTOR or 3" minus pit run.

C. Aggregate surface course: 3/4"- 0 aggregate per ODOT Section 02630.10.

D. Pipe and conduit trench foundation: Per ODOT Section 00405.11.

E. Pipe and conduit bedding and pipe zone: 3/4"- 0 aggregate per ODOT Section 00405.12.

F. Pipe and conduit trench backfill: Per ODOT Section 00405.14 with Class A materials except in road crossings or parking areas where Class B materials shall be used.

G. Restoration fill: Clean washed 4" – 8" dia. quarry spalls.

H. Structural fill: Per ODOT Section 00596C.11.

I. Drain rock: 1-1/2" – 3/4" clean, coarse, granular drain back backfill material per ODOT Section 00430.11.

J. Riprap: Class 50 per ODOT Section 00390.

K. Drainage geotextile: Woven or non-woven geotextile per ODOT Section 02320.

L. Special Filter Material: Per ODOT Section 02610.

M. Topsoil: Topsoil native to the site or imported topsoil per ODOT Section 01040.14.

N. Amended Filter Soil:

1. The Amended Filter Soil for the bioretention pond shall conform to Table 6-2 of the Central Oregon Stormwater Manual as follows.

a. Silty loam or loamy soil with an infiltration rate between 0.25 to 0.5 in/hr.

b. The average cation exchange capacity of the amended filter soil shall be 15 Milliequivalent/100g, and the organic matter content shall be 2% or greater.

2. Submit one-gallon sample, source, and letter of certification from the supplier for approval prior to installation.

PART 3 – EXECUTION

3.0 GENERAL

A. Perform earthwork according to applicable sections of ODOT Standard Specifications or as shown herein.

3.1 CLEARING AND GRUBBING

A. Clear and grub per ODOT Section 00320.

B. Clearing and grubbing shall be completed prior to other earthwork activities within the designated area.

C. Stripping of topsoil:

1. Following clearing and grubbing, strip topsoil within excavation limits. Stockpile the topsoil on- or off-site and use during site restoration.

2. Do not mix stockpiled topsoil with other materials.

3.2 PIPE AND CONDUIT TRENCH EXCAVATION AND BACKFILL

A. Excavate pipe and conduit trenches, including flow meter vault and access manway, according to ODOT Section 01140.

B. Place bedding, pipe zone, and backfill materials as shown on drawings and per ODOT Section 01140.

3.3 PARKING AREA, ACCESS ROAD, AND TRAIL

A. Construct to conform to the typical sections shown on the drawings. Observe a width tolerance of 1 foot.

B. Place base course and surface course material within the parking area, access road, or trail prism as shown on drawings in lifts not exceeding 12 inches in compacted thickness.

C. Shape and finish the base course and surface course as shown on the drawings.

3.4 COMPACTION

A. Compact all earthwork materials as applicable per ODOT Section 00330.43.

3.5 SAMPLING AND TESTING OF COMPACTED MATERIALS

A. All soils testing of samples submitted by the CONTRACTOR will be done by a testing laboratory subject to the OWNER's approval and at the CONTRACTOR's expense. At its discretion, the OWNER or ENGINEER may request that the CONTRACTOR supply samples for testing of any material used in the WORK.

B. Sampling and testing compacted materials per Table 31 20 00-1.

Table 31 20 00-1 Fill Material Sampling and Testing Schedule

FILL MATERIAL	SAMPLING	MOISTURE CONTENT (OF OPTIMUM)	DENSITY/FREQUENCY
Foundation Fill	Min 3, 1/1000 CY	-4% to + 2%	95%, 1 per lift min, every 10,000 sf
Drain Rock and Riprap	Min 1, 1/1000 CY	NA	NA
Minor Structure Backfill	Min 3, 1/100 CY	-4% to + 2%	95%, 1 per lift min, every 1,000 sf
Major Structure Backfill	Min 3, 1/1000 CY	-4% to + 2%	95%, 1 per lift min, every 10,000 sf
Base Course and Surface Course	Min 3, 1/1000 CY	-4% to + 2%	95%, 1 per lift min, every 10,000 sf

– End of Section –

SECTION 31 23 17

ROCK EXCAVATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Excavation of materials (rock) that cannot be excavated without blasting or ripping.

B. The CONTRACTOR shall furnish all labor, materials, and equipment required to:

1. Dispose of all organic and non-organic waste materials in allowed locations on-site and off-site. Rock in excess of that incorporated into the WORK shall be disposed of off-site.

2. Temporarily stabilize rock slopes to achieve safe working conditions.

3. Perform:

a. Rock excavation.

b. All dental excavation within structure footprints.

c. All blasting.

1.1 RELATED SECTIONS

A. Related Specification Sections include but are not necessarily limited to:

Division 00 – Procurement and Contracting Requirements
Division 01 – General Requirements
Section 01 33 00 – Contractor Submittals
Section 01 57 10 – Stormwater Pollution Prevention
Section 01 57 19 – Spill Prevention, Control, and Countermeasures
Section 31 20 00 – Earthwork
Section 31 33 13 – Rock Bolting and Grouting

1.2 QUALITY ASSURANCE

A. Blasting and excavation shall not aggravate any existing structural conditions nor cause damage.

B. Referenced Standards:

1. United States Bureau of Mines

a. Report of Investigations 8507/1980, titled "Structure Response and Damage Produced by Ground Vibrations from Surface Mine Blasting."

2. Occupational Safety and Health Administration (OSHA)

a. 29 CFR Part 1926, Subpart P – Excavations, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

b. 29 CFR Part 1926, Subpart U – Blasting and the Use of Explosives, Occupational Safety and Health Standards, referred to herein as OSHA Standards.

3. Oregon Occupational Safety and Health Division

a. Oregon Occupational Safety and Health Standards, Oregon Administrative Rules, Chapter 437; Subdivision U Blasting and the Use of Explosives

4. Oregon Department of Transportation

a. Oregon Standard Specifications for Construction (2021)

5. ASTM International

a. A36, Standard Specification for Carbon Structural Steel.

b. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

c. F3125, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

6. Post-Tensioning Institute (PTI)

a. Recommendations for Prestressed Rock and Soil Anchors, 4th edition.

C. Blasting Lead/Consultant:

1. Retain the services of a qualified blasting lead or consultant to prepare the Blasting Plan and verify the blasting reports. The blasting lead may be a staff member of the blasting contractor or an independent, third-party blast consultant. The blasting lead or consultant's staff shall have the following minimum qualifications:

a. A minimum of 5 years of recent experience with excavation blasting projects of similar size, scope and complexity as required by this project.

b. Education, training, and experience with drilling and blasting operations, and understanding of local, state and federal regulations regarding the use of explosives for excavation and demolition.

2. The Blasting Lead/Consultant shall work with the blasting contractor to develop and review all blast plans and blast reports and shall review and approve any proposed deviations from blasting plans.

D. Blasting Contractor:

1. An experienced blasting contractor with experience in the supervising of loading and firing charges for rock excavation. The blasting contractor's staff shall have the following minimum qualifications:

a. A minimum of 5 years of recent experience with excavation blasting projects of similar size, scope and complexity as required by this project.

b. Licenses as required by local, State and Federal regulations for explosive use, storage, and handling as applicable.

2. The blasting contractor's staff shall include:

a. A qualified Blaster in Charge:

i. The Blaster in Charge shall carry a current Oregon State Blaster License with the blaster classification required for the type of blasting performed.

ii. The Blaster in Charge shall, at minimum, perform all responsibilities as required by State of Oregon.

b. A qualified pre-blast inspector specializing in pre-blast surveys.

c. A qualified seismic monitoring inspector specializing in blast vibration monitoring.

d. A qualified blasting inspector recognized as an expert in drilling and blasting. The blasting inspector's primary source of income shall be from providing specialized blasting and/or blasting consulting services. The blasting inspector shall observe all blasting operations, including loading of drill

holes, to verify blasting operations are in accordance with the approved plans and are conducted in accordance with applicable laws, regulations, and safety requirements.

e. The blasting contractor staff requirements above may be met by a single staff person, or by multiple persons as applicable. Inspector positions may be fulfilled by third party consultants as applicable.

E. The OWNER's Representative review of the CONTRACTOR's reports and blasting, excavation, and seismic monitoring plans shall not relieve the CONTRACTOR of any responsibilities under the Contract Documents or for ensuring the complete safety of personnel and adjacent improvements associated with excavation operations. The OWNER's Representative review of plans and reports shall not relieve the CONTRACTOR of any law, regulation, or permit obligation or condition.

1.3 DEFINITIONS

A. Rock excavation shall include solid ledge rock in its natural location that requires systematic quarrying, drilling and/or blasting for its removal and also boulders that exceed 1 cubic yard in volume.

B. Dental excavation includes removal and disposal of any soil, rock fragments, and soft or disintegrated rock from seams, faults, cracks, joints, caverns, and cavities beyond the lines of excavation shown in the Contract Documents that requires the use of hand tools and other methods.

C. Excavation for CONTRACTOR's convenience consists of excavation for temporary construction features such as WORK areas, haul roads, temporary access roads, and all excavation performed for the CONTRACTOR's convenience and approved by the OWNER's Representative.

1.4 SUBMITTALS

A. See Section 01 33 00 – Contractor Submittals for requirements for the mechanics and administration of the submittal process.

B. Following review and acceptance of the CONTRACTOR's blasting plan by the OWNER's Representative, the CONTRACTOR's blasting plan will be submitted to all permitting agencies having jurisdiction over blasting. The permitting agencies shall have up to 60 days to review to review the CONTRACTOR's blasting plan and provide comments. CONTRACTOR shall anticipate answering questions and providing additional information based on permitting agency review. The CONTRACTOR's blasting plan shall not be considered approved until the OWNER's Representative and all permitting

agencies having jurisdiction over the blasting plan have approved the blasting plan.

C. Blasting plans shall be updated at least 2 working days prior each blast.

D. Excavation Plan:

1. Submit a plan for all classifications of excavation, including those defined in Section 31 20 00 – Earthwork, at least 30 days prior to the start of the first excavation in the WORK area.

2. Excavation Plan shall include:

a. Proposed sequence and schedule.

b. Plans and diagrams for handling of excavation, fill, and spoil materials.

c. Description of the proposed excavating and hauling equipment, including make, model, and quantity of equipment to be used.

d. Description of excavation for the CONTRACTOR's convenience.

e. Sequence, schedule, duration, amount, and location of spoil material to be stored on-site.

E. Submit a plan for blasting at least 90 days prior to any planned blasting.

1. Blasting Plan shall be separated into sections by blasting area. Each section of the blasting plan shall include:

a. Plans and procedures, including:

i. Complete description of the proposed schedule including sequence of activities, staffing, and equipment.

ii. Complete description of drainage control. This section must describe how drainage will be controlled as it relates to blasting but may reference the CONTRACTOR's submitted erosion and stormwater control plan as appropriate.

iii. Plan for each test blast.

iv. Loading and hauling procedures.

v. Equipment and methods to be used for drilling, loading and firing blastholes.

vi. Equipment and methods to be used for blast monitoring.

vii. Locations, dimensions, sequence, and time of blasts, including:

1) Distance to nearest structure or project feature, such as pipeline, for each blast,
2) Explosive loading for each blast,
3) Delay periods between blasts
4) Distribution of blast
5) Unique, sequential number for each blast
6) Maximum pounds of explosives detonated per blast period.
7) Intended direction of rock movement and delay plan.
8) Methods of stabilizing or protecting adjacent structures and vegetation.
9) Proposed method of controlling flyrock and minimizing of dust.
10) Description of the pre-blast warning system to be used.

viii. Summary of proposed methods for transporting, handling, storage, security, and use of explosives.

ix. Documentation showing that the Blasting Lead/Consultant, Blasting Contractor, Blaster in Charge, and other blasting staff meet the required minimum experience in designing, supervising, loading and firing of blasts for rock slopes, as applicable, and have all

x. Licenses and permits required by local, state, and federal agencies.

xi. Contingency plan for misfires and spills.

xii. Drilling pattern, including diameters, spacing, depth, and orientation of drill holes.

xiii. Types, strengths and quantities of explosives proposed for use in each.

2. Detailed seismic monitoring plan describing procedures, including seismographic equipment specifications and verification of calibration within the last 60 days, monitoring locations, and testing agency.

    a. At a minimum, seismographs shall be installed at the existing diversion structures, the nearest permanent constructed feature to the blast, and at the two closest occupied structures on the site used to monitor each blast.

    b. A minimum of three seismographs shall be used at all times.

    c. Seismographs shall be capable of producing a permanent record, capable of internal dynamic calibration, and provide three components of particle velocity recorded and airblast overpressure recorded with the time history and frequency discrimination.

3. Copies of all blasting permits and noise variances, as required by state and local agencies.

4. Contract Closeout Information:

    a. Certificates.

F. Submit Pre- and Post-Blast Reports within 2 working days before and following each blast, respectively. Reports shall include the following at a minimum:

1. Actual locations, dimensions, sequence, and time of blasts, including:

    a. Distance to nearest structure or project feature, such as pipeline, for each blast,

    b. Explosive loading for each blast,

    c. Delay periods between blasts

    d. Distribution of blast

    e. Unique, sequential number for each blast

    f. Misfires

    g. Over- or under-loaded holes

    h. Water in holes

2. Seismographic monitoring results, including:

    a. Instrumentation

    b. Monitoring location

c. Frequency of ground motion

d. Peak particle velocity

e. Instantaneous peak pressure

f. Displacement

g. Air blast

h. Recorded wave forms

i. Date and time

j. Other relevant data

3. Unusual occurrences during or as a result of blast.

4. Elevation of the blast indicating areas of significant overbreak.

5. Name of the Blaster in Charge.

G. Temporary Rock Stabilization Plan:

1. Submit a Temporary Rock Stabilization Plan for temporary rock bolts and rock dowels.

2. The Temporary Rock Stabilization Plan for creating a safe WORK area shall be provided by the CONTRACTOR and prepared by a Professional engineer, licensed in the State of Oregon, with expertise in directing work to stabilize rock slopes to achieve safe working conditions.

3. The Rock Stabilization Plan shall include:

a. The proposed construction sequence and schedule

b. The proposed drilling method and equipment

c. The proposed drill hole diameter

d. The minimum bond zone length for the rock bolts

e. The proposed anchor steel bars, couplers, nut, bearing plate, flat washer, and beveled washer specifications, including manufacturer's data sheets and mill certificates

f. Manufacturer's verification for bearing plate thickness for the specified rock bolt and rock dowel capacities

g. The proposed grout mix design, including manufacturer's certificate of compliance and the procedures for placing grout

h. The proposed corrosion protection for the rock bolt and rock dowel systems

i. The proposed stressing procedures and stressing equipment

j. The proposed equipment for measuring and recording the volume of grout injected for production of rock bolts and rock dowels

k. The calibration data for each load cell, test jack, pressure gauge, and master pressure gauge to be used in the proof testing

H. Submit rock reinforcement testing records, as well as records of any corrective action taken, no more than five business after testing and at least 2 business days prior to backfilling or covering with concrete.

I. In addition to review by the OWNER, the Blasting Plan, and Pre- and Post-Blast Reports will be submitted to the National Marine Fisheries Service as part of their responsibilities under Section 7 of the Endangered Species Act.

1.5 GEOTECHNICAL INVESTIGATION

A. A geotechnical investigation report entitled "Geotechnical Engineering Evaluation, City of Umatilla Pump Station Improvements, Umatilla, Oregon" has been prepared by GeoProfessional Innovation Corporation.

B. A copy of the investigation report is included in Appendix A.

C. If conflicts occur between the investigation report and the drawings or specifications, the drawings and specifications shall govern.

PART 2 – PRODUCTS

2.0 MATERIALS AND EQUIPMENT

A. Furnish all materials and equipment necessary to complete the WORK, including blasting.

B. Ammonium nitrate shall not be used as the blasting agent.

2.1 TEMPORARY ROCK REINFORCEMENT

A. Provide temporary rock reinforcement complete with bolts, dowels, bearing plates, nuts, washers, and mortar pads. All rock bolts and dowels shall be certified that they meet the rated load elastic limit without yielding at the threads.

B. Rock bolts and rock dowels shall be a standard product of a company regularly engaged in the manufacture of rock bolts and dowels.

C. Rock bolts and rock dowels shall be CONTRACTOR designed items.

PART 3 – EXECUTION

3.0 PROTECTION

A. Erosion Control:

1. See Specification Section 01 57 10 – Stormwater Pollution Prevention Plan and 01 57 19 – Spill Prevention, Control, and Countermeasures.
2. Clean roadways daily of any spillage of dirt, rocks or debris from vehicles and equipment entering or leaving site.
3. Conduct WORK to minimize erosion of site. Remove eroded material washed off site.
    a. If necessary or requested by OWNER's Representative, construct stilling areas to settle and detain eroded material.

3.1 ROCK EXCAVATION

A. The rock excavation WORK includes the offsite disposition of all material:

1. That exceed quantities required for the project.
2. That the OWNER's Representative classifies as unclassified excavation.
3. That the OWNER's Representative classifies as unacceptable.
4. That the OWNER's Representative classifies as potentially contaminated.

B. Contract Drawings may indicate both existing grade and rough grade required for construction of Project.

1. Stake all units, structures, piping, roads, parking areas and walks and establish their elevations.
2. Perform other layout WORK required.
3. Replace property corner markers to original location if disturbed or destroyed.
4. Due to variability of geologic materials at the site, excavation lines and grades may require over-excavation to reach competent bedrock or the archive stable temporary slope conditions. Over-excavation shall be filled as defined in Section 31 20 00 – Earthwork.

C. Rock excavation by blasting is NOT permitted within the limits of the cofferdam or below ordinary high water elevation. Rock in those areas shall be removed by drilling, splitting and chipping, or other approved means.

D. When rock is encountered:

1. Strip free of earth.

E. Dust from excavation and blasting shall be controlled by the CONTRACTOR as required by applicable permits. Water shall be applied as weather and soil moisture conditions require. The CONTRACTOR is responsible for care and disposal of water. Any damage caused by traffic or erosion, including rutting, squeezing, or sloughing, shall be repaired at the CONTRACTOR's sole expense.

F. Over-excavation for the CONTRACTOR's convenience shall be approved prior to the start of such excavation. No compensation shall be made for over-excavation for the CONTRACTOR's convenience.

G. All excavation WORK shall be done in the dry. The CONTRACTOR shall dewater the excavations, if necessary.

3.2 TEST BLASTING PROGRAM

A. Establish maximum explosive charge weight per delay necessary to meet the specified vibration limits.

B. Confirm proposed blasting plan is within specified limits.

C. Start test blasts with smaller charges and progressively increase the charge to production levels.

D. Monitor blast parameters and evaluate after each blast before proceeding with the next larger blast.

E. Vibration levels from test blast shall not exceed the specified limits.

3.3 USE OF EXPLOSIVES

A. The use of explosives shall be limited to the magnitude and location of the charge that will not cause damage to adjacent existing construction and utilities through shock vibrations or other stress loadings.

B. Blast vibration limits:

1. Per U.S. Bureau of Mines' Report of Investigations 8507/1980, titled "Structure Response and Damage Produced by Ground Vibrations from Surface Mine Blasting", except the maximum peak particle velocity as measured by an engineering seismograph shall not exceed 4 inches per second.

2. Blast vibration level may change, depending on the presence of nearby structures and the results of the preconstruction survey.

3. Limit instantaneous peak pressures, as measured at the ordinary high water line, to no more than 200 dB.

4. In accordance with other federal, state, and local ordinances as applicable.

C. Provide adequate blanket protection to ensure that there will not be fragments of rock or other debris flying through the air when discharging explosives.

D. CONTRACTOR to employ personnel certified by local jurisdictions to execute blasting operations if the jurisdiction having authority requires such certification.

1. Any damage to existing construction or other features caused by blasting operations to be repaired and paid for by CONTRACTOR.

E. Explosive permits shall be obtained from all applicable authorities prior to the start of blasting.

F. Coordinate blasting with other WORK to avoid damage to new construction and possible decrease in the strength of concrete placed less than 28-days prior to the blast.

1. Conduct blasting outside of the irrigation season between April 1 and October 30 when the existing pump station and pipeline will be in operation.

G. Hold blasting charges above the design grades and minimize fractured rock from overblast.

1. Actual grades for setting charges selected by the CONTRACTOR.

H. Do not drill more than 2 feet below the proposed subgrades to minimize the presence of fractured rock below final grade.

I. Excavate and remove rock damaged by blasting. Submit replacement material for loose rock, such as structural fill per Section 31 20 00 – Earthwork or concrete, to the OWNER's Representative for approval.

J. The Contract price shall include all equipment and materials and other WORK necessary for rock excavation and hauling the rock from the site, and for furnishing and placing suitable replacement material as specified in its place.

K. Where explosives and blasting are used, comply with all laws and ordinances of municipal, state, and Federal agencies relating to the use of explosives.

1. Use qualified personnel for blasting and take proper precautions to protect persons, property or the WORK from damage or injury from blast or explosion.
2. Conduct preblast survey in the company of the OWNER's Representative to aid in determining any damage caused by blasting.
    a. Document the condition of all existing structures and access roads within 200 feet of the proposed blast area.
    b. Include interior walls, ceiling, floors, exterior walls, roofs and any other element that could be damaged from the blasting.
    c. Document condition using video tapes, written notes, measurements, sketches, and photographs.
    d. Re-examine all structures documented in the preblast survey after construction is complete.

L. It shall be the CONTRACTOR's sole responsibility to define safe zones for each and all blasts. Flyrock shall not extend more than half the distance from the blast holes to the perimeter of the safe zone. If flyrock extends more than half this distance, blasting shall be suspended until an appropriate method of control is developed, submitted to the OWNER's Representative for approval, and implemented by the CONTRACTOR.

M. The OWNER's Representative shall be present to witness each blast.

N. Following each blast, the Blaster in Charge and staff under their supervision shall make careful inspection to determine that all explosives have detonated before any other persons are allowed to return to the operation and within the safe zone.

O. Warning signals shall be sounded before each shot and an "all-clear" signal shall be sounded following each shot. Horn shall be sounded at 15, 5, and 1-minute intervals. The horn shall be audible for at least 0.5 miles. Additional warnings shall be performed as required by law.

P. Special care shall be taken when blasting within 100-feet of an existing, completed, or partially completed structure.

3.4 FIELD QUALITY CONTROL

A. All excavation, trenching, and related sheeting, bracing, etc. shall comply with the requirements of OSHA standards 29 CFR Part 1929 Subpart P, and state requirements. Where conflict between OSHA and state regulations exists, the more stringent requirements shall apply.

B. All use of explosives or blasting operations shall comply with the requirements of OSHA standards 29 CFR Part 1926, Subpart U, and state requirements. Where conflict between OSHA and state regulations exists, the more stringent requirements shall apply.

– End of Section –

SECTION 31 33 13

ROCK BOLTING AND GROUTING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Rock Dowels: Grade 60 rebar, grouting, and accessories for intake structure stabilization. Rock dowels are incidental to construction of the pump station.

B. Drilling holes for rock dowels.

C. Grouting rock dowels.

D. Water pressure testing and consolidation grouting holes for rock dowels are covered in Section 03 65 00 – Water Pressure Testing and Section 03 60 00 – Grouting.

1.1 RELATED SECTIONS

Section 03 30 00 – Cast-In-Place Concrete
Section 03 60 00 – Grouting
Section 03 65 00 – Water Pressure Testing
Section 31 23 17 – Rock Excavation

1.2 REFERENCE STANDARDS

A. American Society for Testing Materials (ASTM)

1. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

2. ASTM A934 Specification for Epoxy Coated Reinforcing Steel Bars

B. The following reference may apply to the WORK:

1. AISC - Manual of Steel Construction - Allowable Stress Design, 9th Edition

1.3 DEFINITIONS

A. Rock Dowels (ADH DWLS): Grade 60 rebar installed into drilled holes in rock or existing concrete with grout.

1.4 SUBMITTALS

A. Manufacturer's catalog data for materials and accessories.

B. Rock Dowel Installation and Grouting Procedures: Describe details of planned rock dowel installation and grouting procedures for intake structure stabilization.

PART 2 – PRODUCTS

2.0 ROCK DOWELS

A. Fabricated from Grade 60 deformed steel reinforcing bar (ASTM A615. The rock dowels shall meet the minimum length and strength requirements as indicated on the drawings. Submit certified mill tests that the dowels meet the requirements specified herein.

B. Grout: Non-shrink, cementitious grout conforming to ASTM C1107. The Water-cement ratio shall be less than 0.45. Minimum compressive strength: 5,000 psi at 28 days.

PART 3 – EXECUTION

3.0 GROUTING ROCK DOWELS

A. Mixing and Pumping Equipment:

1. Mixer: Capable of continuous mechanical mixing of grout which is free of lumps and undispersed cementitious material shall be used.

2. Pump: Positive displacement type which will produce an outlet pressure of at least 150 psig; sealed to prevent introduction of oil, air or other foreign substances into grout, and to prevent loss of grout or water shall be used.

3. Screen: Provide screen in grout equipment of 1/8-inch maximum clear opening to screen prior to introducing grout to the pump. Screen shall be located so that it is easily accessible for inspection and cleaning.

4. Pressure Gage: Gage with a full scale reading of not greater than 300 psi placed in the grout line between outlet and post-tension anchor hole inlet shall be used.

5. Utilize gravity feed to the pump inlet from a hopper attached to, and directly over the grout pump. Hopper shall be kept at no less than ¼ full at all times during grouting operation to prevent air from entering the post-tension anchor hole.

B. Mix rock dowel grout in accordance with grout manufacturer's written instructions.

– End of Section –

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 31 00

WELDED WIRE FENCE AND GATE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The CONTRACTOR shall provide all labor, materials and appurtenances necessary for installation of the commercial welded wire architectural fence system defined herein.

1.1 RELATED SECTIONS

Section 31 20 00 – Earthwork
Section 30 10 00 – Concrete Accessories

1.2 SYSTEM DESCRIPTION

A. The manufacturer shall supply a total commercial welded wire architectural fence system of the Ameristar® WireWorks Plus® design or approved equal. The system shall include all components (i.e., panels, brackets, posts, gates and hardware) required.

1.3 QUALITY ASSURANCE

A. The CONTRACTOR shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.4 REFERENCES

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process

B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus

C. ASTM D523 - Test Method for Specular Gloss

D. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint

E. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus

F. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

G. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates

H. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

I. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test

J. ASTM F2919/F2919M – Standard Specification for Welded Wire Mesh Fence Fabric with Variable Mesh Patterns or Meshes Greater than 6 in.2 in Panels

1.5 SUBMITTAL

A. The manufacturer's submittal package shall be provided prior to installation.

1.6 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

PART 2 – MATERIALS

2.0 MANUFACTURER

A. The fence system shall be equal or substantially similar to Ameristar WireWorks Plus design by Ameristar Fence Products, Inc. in Tulsa, Oklahoma.

2.1 MATERIAL

A. Steel material for fence posts shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi (310 MPa). The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.60 oz/ft2, Coating Designation G-60. Fence posts shall be 2.5" Sq. x 16 ga. and gate posts shall be 6" Sq. x 3/16".

B. Steel wire mesh fence panels shall be welded by resistance welding per ASTM A185 using 6 gauge (0.192 inch) pre-galvanized steel wire, welded at each crossing to form rectangles. Vertical 6 ga. (0.192) wires shall be spaced at 2 inches; horizontal 6 ga. (0.192) wires shall be spaced at 6 inches. The cold rolled wire shall have a tensile strength of at least 70,000 PSI and 74,000 PSI weld shear strength. Wire strand shall be galvanized before welded (GBW), .050 ounces per square foot zinc coating conforming to the ASTM A641.

2.2 FABRICATION

A. Panels and posts shall be precut to specified lengths. Panels shall be 96" in height and have 4 horizontal panel structural folds. Panel width shall be 96".

B. The manufactured panels and posts shall be subjected to the PermaCoat® thermal stratification coating process (high-temperature, in-line, multi-stage, multi-layer) including, as a minimum, a six-stage pretreatment/wash, an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder coating (gray in color) with a minimum thickness of 2 mils (0.0508mm). The topcoat shall be a "no-mar" TGIC polyester powder coat finish with a minimum thickness of 2 mils (0.0508mm). The color shall be Bronze or Desert Sand – confirm preferred color with City of Umatilla prior to ordering. The stratification-coated framework shall be capable of meeting the performance requirements for each quality characteristic shall be as follows:

QUALITY CHARACTERISTICS	ASTM TEST METHOD	PERFORMANCE REQUIREMENTS
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,000 hours (Scribed per D1654; failure mode is accumulation of 1/8" coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625" ball).
Weathering Resistance	D822 D2244, D523 (60˚ Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

C. Swing gates shall be fabricated using 2" x 12 ga square rails and gate ends. Gates shall have a 2" sq. x 12 ga. intermediate upright. All rail, upright, and gate end intersections shall be joined by welding. Steel gussets (1/4" x 2") shall be welded at each rail to gate end intersection and rail to intermediate

intersections (4 gussets per gate bay). Gusset shall be punched to accept gate trussing cable and turnbuckle.

PART 3 – EXECUTION

3.0 PREPARATION

A. Installation shall be laid out by the CONTRACTOR in accordance with the construction plans.

3.1 FENCE INSTALLATION

A. Fence post shall be spaced at 96 1/2" on center, plus or minus 1/4". Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" The "Earthwork" and "Cast-in-Place Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts set in rock may be grouted core-drilled footers with a minimum depth of 24".

B. Fence panels shall be stair stepped on sloping ground to maintain a vertical and horizontal wire direction. Fence clearance above ground shall not exceed 4 inches. Fence panels may be trimmed up to 6" on the bottom to follow the slope. Use half width (48") panels when necessary.

3.2 FENCE INSTALLATION MAINTENANCE

A. When cutting or drilling wire mesh, rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray.

3.3 GATE INSTALLATION

A. Gateposts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The submittal drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommendations. Gate clearance above ground shall not exceed 4 inches.

3.4 CLEANING

A. The CONTRACTOR shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

– End of Section –

SECTION 32 90 00

REVEGETATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Temporary Seeding for Erosion Control.

B. Permanent Seeding for Site Restoration.

C. Bioretention Pond Plantings.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 57 10 – Stormwater Pollution Prevention
Section 01 57 19 – Spill Prevention, Control, and Countermeasures
Section 02 41 00 – Demolition
Section 31 20 00 – Earthwork

1.2 REFERENCES

A. City of Umatilla (City) (2021), Design & Construction Standards & Specifications for Public Works Improvement.

B. Oregon Department of Transportation (ODOT) (2024), Standard Specifications for Construction.

C. Confederated Tribes of the Umatilla Indian Reservation (CTUIR) (2018), Integrated Weed Management Plan.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Temporary and Permanent Seeding: native plant seeding per ODOT Section 01030. Soil Conditioners, Amendments, Bio-Amendments and Pesticides are not required. Seed Mixes and Mulch shall be as recommended by the CONTRACTOR and approved by the OWNER's Representative. Recommended seed species and application rates are listed in the table below; these species are native, drought-tolerant, and appropriate for the Columbia Gorge. If the plant species proposed for revegetation differ from the table below, approval from the CTUIR plant ecologist will be required prior to replanting activities.

Proposed Seed Species and Application Rates.

COMMON NAME	SCIENTIFIC NAME	BIOTYPE	POUNDS/ACRE TRUAXTM DRILL
Bluebunch Wheatgrass	*Pseudoroegneria spicata*	Wahluke	8
Sandburg Bluegrass	*Poa secunda*	Rattlesnake or Umatilla	4
Bottlebrush Squirreltail	*Elymus elymoides*	Deschutes	2

PART 3 – EXECUTION

3.0 GENERAL

A. Perform seeding according to applicable sections of ODOT Standard Specifications or as shown herein. All ground surface areas disturbed by construction activities will require seeding, these areas are referred to hereafter as the "restoration/rehabilitation area."

B. Prior to any restoration treatment, the OWNER will complete clearances for locally important or special status plants.

C. Prior to seeding desired species, the majority of existing vegetation shall be eliminated, along with invasive species seed that is likely to compete with young seedlings. This will involve controlling invasive species seed production, cheatgrass in particular, and spot-spraying perennial grasses.

3.1 SEEDING

A. Conduct temporary and permanent seeding per ODOT Section 01030. Do not seed rock cut slopes or gravel surfaced areas.

B. Seeding shall occur in the fall season, as recommended by the CTUIR (2018). A native seed mix consisting of drought-resistant grasses shall be used for the restoration/rehabilitation areas. Other materials, such as straw mulch and fertilizer, shall be added as recommended in consultation with CTUIR. No irrigation systems or supplemental watering is proposed.

C. Seeds will be obtained from a certified invasive/weed-free source.

3.2 MONITORING

A. The CONTRACTOR shall be responsible for monitoring the restoration/rehabilitation areas for invasive plants and progress of revegetation following construction completion and seeding.

B. Monitoring events will occur bi-annually in the spring and fall for a 2-year period. The CONTRACTOR shall develop an annual memo/report presenting the results of the bi-annual revegetation monitoring events, any supplemental seeding/planting, and any invasive species treatment activities performed.

3.3 RESTORATION GOALS

A. Restoration will follow general guidelines described in the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Ecological site R007XY012OR near the Columbia River.

B. The CONTRACTOR shall assess herbaceous vegetation coverage during monitoring events in the restoration/rehabilitation areas.

C. If at least 50 percent of the vegetation coverage is not established in the restoration/rehabilitation areas after 2 years, a reinforcement planting shall be performed. In addition, re-application of hydroseed, hand application of native, drought-tolerant grass seeds, or planting established grass plugs may be needed semi-annually to improve vegetation coverage.

3.4 INVASIVE PLANT MANAGEMENT

A. All surface-disturbing equipment moved in or out of invasive species infested areas shall be cleaned before and after use.

B. Surface-disturbing equipment brought in from off-site is required to be cleaned of potential invasive seed before use in the restoration/rehabilitation area.

C. Invasive shrubs (e.g., Himalayan blackberry or Scotch broom) may encroach disturbed/hydroseeded areas. Restoration/rehabilitation areas shall be monitored for the spread of invasive shrubs or new populations of invasive plant species. These species shall be removed and treated as appropriate, if observed in the restoration/rehabilitation areas. Invasive species treatment shall follow CTUIR's Integrated Weed Management Plan (2018).

D. The CONTRACTOR will be responsible for invasive plant identification and shall report any populations of noxious weeds in or near work areas. Any invasive plant sighting information shall be forwarded to the appropriate

Oregon State Noxious Weed Coordinator assigned for Umatilla County or central Oregon.

– End of Section –

DIVISION 33 – UTILITIES

SECTION 33 05 24

GENERAL PIPING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of general pipework. The CONTRACTOR shall provide the piping systems indicated, complete and in place, in accordance with the Contract Documents.

B. The mechanical Drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. The mechanical Drawings are not pipe construction or fabrication drawings. Where pipe supports and spacing are indicated on the Drawings and are referenced to a Standard Detail, the CONTRACTOR shall use that Detail. Where pipe supports are not indicated on the Drawings, it is the CONTRACTOR's responsibility to develop the details necessary to design and construct mechanical piping systems to accommodate the specific equipment provided, and to provide spacers, adapters, and connectors for a complete and functional system.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 65 60 – Pressure Pipe Testing and Disinfection
Section 05 50 00 – Metal Fabrication
Section 33 05 33 – HDPE Pipe
Section 40 05 07 – Hangers and Supports
Section 40 05 24 – ASTM Steel Pipe
Section 40 05 26 – AWWA Steel Pipe

1.2 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, Installation, Operation, and Maintenance Manuals.

B. Shop Drawings: Shop Drawings shall contain the following information:

1. Drawings: Layout drawings including necessary dimensions, details, pipe joints, fittings, specials, bolts and nuts, gaskets, valves, appurtenances, anchors, guides, and material lists. Fabrication

drawings shall indicate spacers, adapters, connectors, fittings, and pipe supports to accommodate the equipment and valves in a complete and functional system.

2. Thermoplastic Pipe Joints: Submit solvent cement manufacturer's catalog indicating that the recommended product is suitable for each fluid service application.

3. Gasket Material: Submit gasket manufacturer's catalog indicating that the recommended product is suitable for each fluid service application.

4. Modular Seals for Pipe: Manufacturer's catalog sheet showing materials and installation procedures.

C. Samples: Performing and paying for sampling and testing as necessary for certifications are the CONTRACTOR's responsibility.

D. Certifications:

1. Necessary certificates, test reports, and affidavits of compliance shall be obtained by the CONTRACTOR.

2. A certification from the pipe fabricator that each pipe will be manufactured subject to the fabricator's or a recognized Quality Control Program. An outline of the program shall be submitted to the Contracting Officer for review prior to the manufacture of any pipe.

3. Current welder certifications are required for all individuals performing field and shop welds.

PART 2 – PRODUCTS

2.0 GENERAL

A. Extent of Work: Pipes, fittings, and appurtenances shall be provided in accordance with the requirements of the applicable Sections of Divisions 2 and 15 and as indicated.

B. Materials in contact with potable water shall be listed as compliant with NSF Standard 61.

C. Pipe Supports: Pipes shall be adequately supported, restrained, and anchored in accordance with Section 40 05 07 – Hangers and Supports for Plumbing and Piping Equipment, and as indicated. Supports shall resist stresses created by a 0.28g maximum seismic load.

D. Lining: Application, thickness, and curing of pipe lining shall be in accordance with Section 40 05 26, unless otherwise indicated.

E. Coating: Application, thickness, and curing of coating on buried pipe shall be in accordance with the applicable Sections of Division 2, unless otherwise indicated. Pipes above ground or in structures shall be coated in accordance with Section 09 90 00 – Painting and Coatings.

F. Pressure Rating: Piping systems shall be designed for the maximum expected pressure as defined in Section 01 65 60 - Pressure Pipe Testing and Disinfection, or as indicated on the Piping Schedule, whichever is greater.

G. Inspection: Pipe shall be subject to inspection at the place of manufacture. During the manufacture, the Contracting Officer shall be given access to areas where manufacturing is in progress and shall be permitted to make inspections necessary to confirm compliance with requirements.

H. Tests: Except where otherwise indicated, materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards. Welds shall be tested as indicated. The CONTRACTOR shall be responsible for performing material tests.

I. Welding Requirements: Qualification of welding procedures used to fabricate pipe shall be in accordance with the provisions of AWS D1.1 - Structural Welding Code. Welding procedures shall be submitted for the Contracting Officer ’s review.

J. Welder Qualifications: Welding shall be done by skilled welders and welding operators who have adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9, by an independent local, approved testing agency not more than 6 months prior to commencing WORK on the piping. Machines and electrodes similar to those used in the WORK shall be used in qualification tests. Qualification testing of welders and materials used during testing is part of the WORK.

2.1 PIPE FLANGES

A. General: Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise indicated. Attachment of the flanges to the pipe shall conform to the applicable requirements of AWWA C207. Flange faces shall be perpendicular to the axis of the adjoining pipe. Flanges for miscellaneous small diameter pipes shall be in accordance with the standards indicated for these pipes.

B. Pressure Ratings:

1. 150 psi or less: Flanges shall conform to either AWWA C207 - Steel Pipe Flanges for Waterworks Service-Sizes 4 In. Through 144 In., Class D, or ASME B16.5 - Pipe Flanges and Flanged Fittings, 150 lb class.

2. 150 psi to 275 psi: Flanges shall conform to either AWWA C207 Class E or Class F, or ASME B16.5 150 lb class.

3. 275 psi to 700 psi: Flanges shall conform to ASME B16.5, 300 lb class.

4. Selection based on test pressure: AWWA flanges shall not be exposed to test pressures greater than 125 percent of rated capacity. For higher test pressures, the next higher rated AWWA flange or an ANSI-rated flange shall be selected.

C. Blind Flanges: Blind flanges shall be in accordance with AWWA C207, or as indicated for miscellaneous small pipes. Blind flanges for pipe sizes, 12-inches and greater shall be provided with lifting eyes in the form of welded or screwed eye bolts.

D. Flange Coating: Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

E. Flange Bolts: Bolts and nuts shall conform to Section 05 50 00 – Metal Fabrication. All-thread studs shall be used on valve flange connections where space restrictions preclude the use of regular bolts.

F. Insulating Flanges: Insulated flanges shall have bolt holes 1/4-inch diameter greater than the bolt diameter.

G. Insulating Flange Sets: Insulating flange sets shall be provided where indicated. Each insulating flange set shall consist of an insulating gasket, insulating sleeves and washers, and a steel washer. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2 inch or smaller and shall be made of acetal resin. For bolt diameters larger than 1-1/2 inches, insulating sleeves and washers shall be 2 piece and shall be made of polyethylene or phenolic material. Steel washers shall be in accordance with ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. Insulating gaskets shall be full-face.

H. Insulating flange manufacturers, or equal:

1. JM Red Devil, Type E

2. Maloney Pipeline Products Co., Houston

3. PSI Products, Inc., (Frost Engineering Service Co., Costa Mesa, California

I. Flange Gaskets:

1. Gaskets for flanged joints used in general water and wastewater service shall be full-faced type, with material and thickness in accordance with AWWA C207, suitable for temperatures to 700 degrees F, a pH of one to 11, and pressures to 1000 psig. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring gaskets shall not be permitted unless otherwise indicated. Flange gaskets shall be as manufactured by John Crane, Style 2160, Garlock, Style 3000, or equal.

2.2 THREADED INSULATING CONNECTIONS

A. General: Threaded insulating bushings, unions, or couplings, as appropriate, shall be used for joining threaded pipes of dissimilar metals and for piping systems where corrosion control and cathodic protection are involved.

B. Materials: Threaded insulating connections shall be of nylon, Teflon, polycarbonate, polyethylene, or other non-conductive materials, and shall have ratings and properties to suit the service and loading conditions.

2.3 SLEEVE-TYPE COUPLINGS

A. General: Sleeve-type couplings shall be provided where indicated. The CONTRACTOR will not be allowed to substitute a sleeve-split coupling for the sleeve coupling unless approved by the Contracting Officer.

B. Construction: Sleeve couplings shall be in accordance with AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. Couplings shall be steel with steel bolts, without pipe stop. Couplings shall be of sizes to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch thick or at least the same wall thickness as the pipe to which the coupling is connected. If the strength of the middle ring material is less than the strength of the pipe material, the thickness of the middle ring shall be increased to have the same strength as the pipe. The coupling shall be either 5- or 7- inches long for sizes up to and including 30-inches and 10-inches long for sizes greater than 30-inches, for standard steel couplings, and 16-inches long for long-sleeve couplings. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive

rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket. Bolts and nuts shall conform to the requirements of Section 05 50 00. Buried sleeve-type couplings shall be epoxy-coated at the factory as indicated.

C. Pipe Preparation: Where indicated, the ends of the pipe shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12-inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof- test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.

D. Gaskets:

1. Gaskets for sleeve-type couplings shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. Gaskets for wastewater and sewerage applications shall be Buna "N," Grade 60, or equivalent suitable elastomer. The rubber in the gasket shall meet the following specifications:

    a. Color - Jet Black

    b. Surface - Non-blooming

    c. Durometer Hardness - 74 plus and minus 5

    d. Tensile Strength - 1000 psi Minimum

    e. Elongation - 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. Gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Where sleeve couplings are used in water containing chloramine or other fluids which attack rubber materials, gasket material shall be compatible with the piping service and fluid utilized.

E. Piping Connection to Equipment: Where piping connects to mechanical equipment such as pumps, compressors, and blowers, the piping shall be brought to the equipment connection aligned and perpendicular to the axis of the flange or fitting for which the piping is to be connected. The piping shall not impose excessive stress to the equipment connection to cause misalignment of the equipment. The CONTRACTOR shall assign the

responsibility to the equipment manufacturer to review the piping connection to the equipment and submit any modifications to the Contracting Officer for review.

F. Insulating Sleeve Couplings: Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket, which assembles over a sleeve of an insulating compound material compatible with the fluid service in order to obtain insulation of coupling metal parts from the pipe.

G. Restrained Joints: Sleeve-type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be designed by the pipe manufacturer in accordance with Manual M11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. Where harness sets are installed near the suction and discharge of the pump, harness bolts shall have zero elongation to prevent misalignment of the pump imparted by the thrust within the piping system.

H. Manufacturers, or equal:

1. Dresser, Style 38
2. Ford Meter Box Co., Inc., Style FC1 or FC3
3. Smith-Blair, Style 411

2.4 PIPE THREADS

A. Pipe threads shall be in accordance with ASME B1.20.1 - Pipe Threads, General Purpose (inch), and be made up with Teflon tape unless otherwise indicated.

2.5 PIPE INSULATION

A. Hot and cold liquid piping shall be insulated as indicated, in accordance with the requirements of Section 40 46 16 – Polyethylene Tape Coating.

2.6 MODULAR MECHANICAL SEALS FOR PIPING PENETRATIONS

A. Where indicated and where required to prevent flow of water or air, the passages of piping through wall sleeves and cored openings shall be sealed with modular interlocking link mechanical closures. Individual links shall be constructed of EPDM rubber, be suitable for temperatures between minus 40 and plus 250 degrees F, and be shaped to fill the annular space between the outside of the pipe and the inside of the wall sleeve or cored opening. Links shall be assembled with type 316 stainless steel bolts and nuts to form a continuous rubber belt around the pipe. Pressure plates under each bolt

and nut shall be fabricated of a corrosion-resistant composite material. After the seal assembly is positioned in the sleeve, tighten the bolts against the pressure plates to expand the rubber links and form the watertight seal. Sizing and installation of sleeves and assemblies shall be in accordance with the manufacturer's recommendations.

B. Manufacturers, or equal:

1. Thunderline Corporation, Link-Seal

PART 3 – EXECUTION

3.0 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. Piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground for protection against oxidation caused by ground contact. Defective or damaged materials shall be replaced with new materials.

3.1 GENERAL

A. Piping, fittings, and appurtenances shall be installed in accordance with the requirements of applicable Sections of Division 1. Proprietary manufactured couplings shall be installed in accordance with the coupling manufacturer’s recommendation.

B. Care shall be taken to ensure that piping flanges, mechanical-type couplings, sleeve-type couplings, flexible connectors, and expansion joints are properly installed as follows:

1. Gasket surfaces shall be carefully cleaned and inspected prior to making up the connection. Each gasket shall be centered properly on the contact surfaces.

2. Connections shall be installed to prevent inducing stress to the piping system or the equipment to which the piping is connected. Contact surfaces for flanges, couplings, and piping ends shall be aligned parallel, concentric, and square to each axis at the piping connections.

3. Bolts shall be initially hand-tightened with the piping connections properly aligned. Bolts shall be tightened with a torque wrench in a staggered sequence to the AISC recommended torque for the bolt material.

4. Groove ends shall be clean and free from indentations, projections, and roll marks in the area from the pipe end to the groove.

5. After installation, joints shall meet the indicated leakage rate. Flanges shall not be deformed nor cracked.

C. Lined Piping Systems: The lining manufacturer shall take full responsibility for the complete, final product and its application. Pipe ends and joints of lined pipes at screwed flanges shall be epoxy-coated to assure continuous protection.

D. Core Drilling: Where core drilling is required for pipes passing through concrete, core drilling locations shall be determined by radiograph of concrete construction to avoid damage to embedded raceways and reinforcing bars.

E. Cleanup: After completion of the WORK, cuttings, joining and wrapping materials, and other scattered debris shall be removed from the Site. The entire piping system shall be handed over in a clean and functional condition.

– End of Section –

SECTION 33 05 33

HDPE PIPE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of AWWA standard high-density polyethylene (HDPE) pipe. The CONTRACTOR shall provide HDPE pipe and appurtenances, complete and in place, in accordance with the Contract Documents.

1.1 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, Installation, Operation, and Maintenance Manuals.

B. Certifications: Furnish a certified affidavit of compliance for pipe and other products or materials furnished under this Section:

1. Pressure test plan and procedure.

2. Hydrostatic proof test reports.

3. Sustained pressure test reports.

4. Burst strength test reports.

C. Expenses incurred in making samples for certification of tests shall be borne by the CONTRACTOR as part of the WORK.

1.2 QUALITY ASSURANCE

A. Each manufacturer shall have an approved in-house QA/QC program for compliance with the testing specifications and requirements of AWWA C906 for both pipe and fittings.

B. Inspection: Pipe shall be subject to inspection at the place of manufacture in accordance with the provisions of the referenced standards as supplemented by the requirements herein. The CONTRACTOR shall notify the OWNER's Representative in writing of the manufacturing start date not less than 14 calendar days prior to the start of any phase of manufacture.

C. During manufacture of the pipe, the OWNER's Representative shall be given access to areas where manufacturing is in process confirm compliance with the Specifications.

D. Tests: Except as modified herein, materials used in the manufacture of the pipe shall be tested in accordance with the requirements of this Section and in the referenced standards, as applicable.

E. The CONTRACTOR shall perform said material tests in accordance with the requirements of the Contract Documents. The OWNER's Representative shall have the right to witness testing conducted by the CONTRACTOR, provided that the CONTRACTOR's schedule will not be delayed for the convenience of the OWNER's Representative.

F. In addition to those tests specifically required, the OWNER's Representative may request additional samples of any material for testing. The additional samples shall be furnished as part of the WORK.

PART 2 – PRODUCTS

2.0 GENERAL

A. Scope: The pipe shall be the nominal diameter shown, meeting the specifications and requirements of AWWA C 906. Pipe shall be in iron pipe size (IPS), unless otherwise noted.

B. Materials: Pipe and fittings shall be made from prime virgin resins (PE 4710) exhibiting a cell classification of PE 445574C as defined in ASTM D 3350, with an established hydrostatic-design basis of 1600 psi for water at 73 degrees F. The resin shall be listed by the PPI (Plastic Pipe Institute) in its pipe-grade registry Technical Report (TR) 4, "Listing of Plastic Pipe Compounds.

C. Pipe and Fittings: The pressure rating or SDR shall be DR 13.5 as indicated on the drawings. Laying lengths shall be 40-ft standard. Both pipe and fittings shall be listed as compliant with NSF Standard 61 and shall bear the "NSF-pw" logo or mark. Fittings and electrofusion couplings shall be manufactured from PE 4710 resin with a minimum DR of 13.5. Backup rings for flanges shall be stainless steel.

D. Joints: Pipe sections shall be joined by heat fusion, except where electro-fusion or bolted flange connections are called for on the drawings.

E. Marking: Pipe and fittings shall be marked as prescribed by AWWA C906. Pipe markings shall include nominal size, OD base (i.e.: 36-inch iron pipe sizing, IPS), dimension ratio, pressure class, AWWA C906, manufacturer's

name, manufacturer's production code including day, month, and year extruded, manufacturer's plant and extrusion line, and NSF - pw logo. In addition, a purple stripe, integral to the pipe material, shall be made at the time of fabrication in order to identify that this is a raw water pipeline.

2.1 PLASTIC MARKING TAPE

A. The pipeline shall be marked with a magnetically detectable marking tape labeled "Caution Waterline Below." The tape shall be placed along the trench centerline approximately 12 inches above the pipe.

PART 3 – EXECUTION

3.0 GENERAL

A. Laying, jointing, and testing for defects and for leakage shall be performed in the presence of the OWNER's Representative and shall be subject to approval before acceptance. All material found to be defective will be rejected and the CONTRACTOR shall promptly remove such materials from the Site.

B. Installation shall conform to AWWA M23, instructions furnished by the pipe manufacturer, and to the supplementary requirements or modifications herein. Wherever the provisions of this Section and the aforementioned requirements are in conflict, the more stringent provision shall apply.

3.1 HANDLING AND STORAGE

A. Laying, jointing, and testing for defects and for leakage shall be performed in the presence of the OWNER's Representative and shall be subject to approval before acceptance. All material found to be defective will be rejected and the CONTRACTOR shall promptly remove such materials from the Site.

B. Storage: Pipe shall be stored, if possible, at the Site in unit packages provided by the manufacturer. Caution should be exercised to avoid compression damage or deformation to the pipe. Pipe shall be stored in such a way as to prevent sagging or bending, and it shall be protected from exposure to direct sunlight by covering with an opaque material that allows adequate air circulation above and around the pipe. Gaskets shall be stored in a cool, dark place out of the direct rays of the sun, preferably in original cartons.

3.2 TRENCHING AND BACKFILL

A. Trench excavation and backfill shall conform to specification Section 31 20 00 Earthwork.

3.3 JOINING

A. Prior to installation of any pipe, the manufacturer shall provide training in the recommended butt fusion and saddle fusion procedures, testing procedures, and any other installation methods required by the WORK. Training shall include the CONTRACTOR's installation personnel, the OWNER's Representative, and any other personnel chosen by the OWNER's Representative. The CONTRACTOR shall record the names of trained personnel.

B. On every day that butt fusion joints are to be made, the first fusion of the day shall be a test. The test fusion shall be allowed to cool completely, then fusion test straps shall be cut out. Test strap length shall be 12-inches (min) or 30 times the wall thickness with the fused area in the center and width shall be 1-inch (min) or 1.5 times the wall thickness. The CONTRACTOR shall bend the test strap until the ends of the strap touch. If the test strap fails at the joint, the CONTRACTOR shall perform a new test to be cooled completely and bent as before. The CONTRACTOR shall not commence installation of pipe until a test fusion has passed the bent strap test.

C. The fusion machine used in the joining of the pipe shall incorporate a data logging device that records information related to each individual joint for the construction of the entire pipeline. The recorded information shall include at least the date and time of the fusion, the employee ID of the machine operator, the machine ID, the machine model, the piston area, pipe material, pipe size, the interfacial pressures (including heat, soak, fuse, cool), recommended gauge pressures (including heat, soak, fuse, cool), drag pressure, data logger probe temperature, and the external probe temperature.

D. Electrofusion couplings shall be installed in accordance with the manufacturer's instructions.

E. Flanged joints shall be in accordance with Section 33 05 24. Gaskets are not required on HDPE pipe to HDPE pipe joints.

3.4 INSTALLATION

A. Trench shall be graded in straight lines, taking care to avoid formation of any dips or low points. Pipe shall not be laid when the conditions of trench

or weather are unsuitable. At the end of each day's work, open ends of pipe shall be closed temporarily with wood blocks or bulkheads.

B. Pipe shaft be cut by means of saws, power driven abrasive wheels, pipe cutters, or other manufacturer recommended methods that will produce a clean, square cut.

C. Pipe shall be supported uniformly and firmly at its proper elevation. Wood support blocking will not be permitted. The full length of each section of pipe and fittings shall rest solidly on the soil, with recesses to accommodate joints and couplings. Anchors and supports shall be provided where necessary and where indicated for fastening WORK into place. Fittings shall be independently supported.

D. Joints shall be installed according to the manufacturer's recommendations. Trenches shall be kept free of water until joints have been properly made. The maximum combined deflection at any coupling shall be in accordance with the manufacturer's recommendations.

E. Particular care shall be taken in laying the pipe as it approaches the connection to the pipeline across Section 7. The pipeline alignment, grade and elevation shall be such that the deflection angle at the electrofusion coupling does not exceed the coupling manufacturer's specifications.

3.5 PRESSURE TESTING

A. Pressure testing shall conform to the requirements Section 01 65 60.

– End of Section –

DIVISION 35 – WATERWAYS AND MARINE CONSTRUCTION

SECTION 35 22 26

SLUICE GATES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers Stainless Steel Gates and Operators. The equipment provided under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer.

B. Gates and operators shall be supplied with all the necessary parts and accessories indicated on the drawings, specified, or otherwise required for a complete, properly operating installation, and shall be the latest standard product of a manufacturer regularly engaged in the production of fabricated gates.

1.1 APPROVED MANUFACTURERS

A. Gates supplied under this section shall be Model GH-46ME Stainless Steel Gates as manufactured by Golden Harvest Inc. (800-338-6238) or approved equal.

1.2 GOVERNING STANDARDS

A. Except as modified or supplemented herein, all gates and operators shall conform to the applicable requirements of AWWA-C561 standards.

1.3 PERFORMANCE

A. Leakage:

1. Sluice gates shall be substantially watertight under the design head conditions. Under the design seating head, the leakage shall not exceed 0.05 US gallons per minute per foot of seating perimeter. Under the design unseating head, leakage shall not exceed 0.05 US gallons per minute per foot of seating perimeter.

1.4 SUBMITTALS

A. Submit in accordance with section 01 30 00 – Contractor Submittals.

B. The manufacturer shall submit for approval drawings showing the principal dimensions, mounting details, general construction, and materials used in the gate and lift mechanism.

C. The manufacturer shall submit for approval engineering design calculations showing that lift and stem as well as slide deflection calculations at a minimum are in compliance with AWWA standards.

D. The manufacturer shall submit field testing plan and procedures, along with test results.

1.5 QUALITY ASSURANCE

A. The manufacturer shall have 5 years' experience in the production of substantially similar equipment and shall show evidence of satisfactory operation in at least 10 installations. The manufacturer's shop welds, welding procedures and welders shall be qualified and certified in accordance with the requirement of the latest edition of AWS Sections D1.1, 1.2 and 1.6.

B. The assembled gates shall be shop inspected, tested for operation, and adjusted before shipping. For self-contained gates, there shall be no assembling or adjusting on the jobsite other than the lifting mechanisms.

C. To ensure quality and consistency, the slide gates listed in this section shall be manufactured and assembled in a facility owned and operated by the slide gate manufacturer. Third-party manufacturers contracted for fabrication and assembly of the slide gates will not be permitted.

PART 2 – PRODUCTS

2.0 GENERAL DESIGN

A. Gates shall be non-self-contained of the rising stem configuration as indicated on the drawings.

B. All parts of the gate shall have a minimum thickness of 1/4 inch.

2.1 FRAME

A. The gate frame shall be stainless steel and designed for maximum rigidity.

B. The frame configuration shall be flange mounted, flush-bottom type and shall allow the replacement of the top and side seals without removing the gate frame from the wall or wall thimble.

2.2 SLIDE

A. The slide shall consist of Stainless Steel plate reinforced to limit its deflection to the lesser of L/360 of the span or 1/16-in under the design head condition.

2.3 GUIDES AND SEALS

A. The guides shall be provided with UHMW-PE seats on both sides of the slide and shall be of such length as to retain and support at least two thirds (2/3) of the vertical height of the slide in the fully open position. Guide frame shall not weigh less than 13 lbs. per foot.

B. Gate seals shall be of the UHMW-PE self-adjustable type. A continuous compression cord shall ensure contact between the slide and UHMW-PE in all positions which will slow the water to flow only through the open part of the gate. As an alternate, fully adjustable J or P-bulb seals will be considered equivalent.

C. Side and top seals shall be frame mounted. A flush bottom resilient neoprene seal shall be mounted to formed pocket at invert portion of the gate frame.

2.4 WALL THIMBLE

A. The gates may be mounted to the Stainless Steel wall thimbles provided by the Retrievable Drum Screen Supplier. Coordinate the mounting bolt pattern and bolt size with the Supplier.

B. At the CONTRACTOR's option, the gates may be wall mounted to the concrete with a grout pad for sealing. Coordinate the gate frame size with the Retrievable Drum Screen Supplier to avoid conflicts.

2.5 PEDESTAL

A. Non-self-contained gates shall be provided with pedestal mounted lifts. Pedestal and wall bracket shall be powder coated steel or Stainless Steel.

2.6 LIFTING ASSEMBLIES

A. Stem and Couplings:

1. The operating stem shall be of Stainless Steel designed to transmit in compression at least 2 times the rated output of the operating manual mechanism with a 40 lb effort on the crank or handwheel.

2. The stem shall have a slenderness ratio (L/R) less than 200. The threaded portion of the stem shall have Acme type cold rolled threads with a maximum surface of 16 micro-inches.

3. Where an electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the electric motor in the stalled condition.

4. Stems in more than one piece shall be joined together by solid couplings.

B. Stem Guides:

1. Stem guides shall be fabricated from Stainless Steel. Stem guides shall be equipped with a UHMWPE bushing. Guides shall be adjustable and spaced in accordance with the manufacturer's recommendation.

C. Stem Cover:

1. Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents and a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.

2.7 MANUAL ACTUATORS

A. Each manual operator shall be designed to operate the gate under the maximum specified seating and unseating heads by using a maximum effort of 40 lb on the crank or handwheel, and shall be able to withstand, without damage, an effort of 80 lb.

B. Gearboxes shall be provided when required to maintain the operating force below 40 lb. All bearings and gears shall be totally enclosed in a weather tight housing. Operator housing shall be cast steel or cast iron. The pinion shaft of crank-operated mechanisms shall be supported by roller bearings. The operating shaft shall be fitted with a 2-inch square operating nut and removable crank. The crank shall be fitted with a corrosion-resistant rotating handle. The maximum crank radius shall be 15 inches and the maximum handwheel diameter shall be 24 inches.

2.8 ELECTRIC MOTOR ACTUATORS

A. General:

1. Equipment Requirements: Where electric motor actuators are indicated, an electric motor-actuated control unit shall be attached

to the actuating mechanism housing, gate frame or operator pedestal by means of a flanged motor adapter piece.

2. Gearing: The motor actuator shall include the motor, reduction gearing, reversing starter, torque switches, and limit switches in a weather-proof NEMA 4 assembly. The actuator shall be a single or double reduction unit consisting of spur or helical gears and worm gearing. The spur or helical gears shall be of hardened alloy steel, and the worm gear shall be alloy bronze. Gearing shall be accurately cut with hobbing machines. Power gearing shall be grease- or oil-lubricated in a sealed housing. Ball or roller bearings shall be used throughout.

3. Starting Device: The unit shall be so designed that a hammer blow is imparted to the stem nut when opening a closed gate or closing an open gate. The device should allow free movement at the stem nut before imparting the hammer blow. The actuator motor must attain full speed before stem load is encountered.

4. Switches:

    a. Electronic Type Switches: Limit switches, or gate position, shall be sensed by a 15 bit, optical, absolute position encoder. The open and closed positions shall be stored in a permanent, non-volatile memory. The encoder shall measure gate position continuously, including both motor and hand wheel operation, with or without use of a battery. An electronic torque sensor shall be furnished. The torque limit may be adjusted from 40 to 100 percent of rating in 1 percent increments. The motor shall be de-energized if the torque limit is exceeded. A boost function shall be included to prevent torque trip during initial gate unseating, and a "jammed gate" protection feature with automatic retry sequence shall be incorporated to de-energize the motor if no movement occurs.

    b. The actuator shall be wired in accordance with the schematic diagram. Wiring for external connections shall be connected to marked terminals. One 1-inch and one 1-1/4 inch conduit connection shall be provided in the enclosing case. A calibration tag shall be mounted near each switch correlating the dial setting to the unit output torque. Switches shall not be subject to breakage or slippages due to over-travel. Traveling-nuts, cams, or micro switch tripping mechanisms

shall not be used. Limit switches shall be of the heavy-duty open contact type with rotary wiping action.

5. Handwheel Operation: A permanently attached handwheel shall be provided for emergency manual operation. The handwheel shall not rotate during electrical operation. The maximum torque required on the handwheel under the most adverse conditions shall not exceed 60 lb. ft, and the maximum force required on the rim of the handwheel shall not exceed 60 lb. An arrow and either the word "open" or "close" shall be cast or permanently affixed on the handwheel to indicate the appropriate direction to turn the handwheel. A clutch lever shall be provided to put actuator into handwheel operation.

6. Motor: The motor shall be of the totally enclosed, non-ventilated, high-starting torque, low-starting current type for full voltage starting. It shall be suitable for operation on 480 volt, 3 phase, 60 Hz current, and have Class F insulation and a motor frame with dimensions in accordance with the latest revised NEMA MG Standards. The observed temperature rise by thermometer shall not exceed 55 degrees C above an ambient temperature of 40 degrees C when operating continuously for 15 minutes under full rated load. With a line voltage ranging between 10 percent above to 10 percent below the rated voltage, the motor shall develop full rated torque continuously for 15 minutes without causing the thermal contact protective devices imbedded in the motor windings to trip or the starter overloads to drop-out. Bearings shall be of the ball type and thrust bearings shall be provided where necessary. Bearings shall be provided with suitable seals to confine the lubricant and prevent the entrance of dirt and dust. Motor conduit connections shall be watertight. Motor construction shall incorporate the use of stator and rotor as independent components from the gate operation such that the failure of either item shall not require actuator disassembly or gearing replacement. Two Class B thermal contacts or solid state thermistors imbedded within the motor windings shall be provided to protect against over-temperature damage. The motor shall be provided with a space heater suitable for operation from the control power circuit unless the entire actuator is a hermetically sealed, non-breathing design with a separately sealed terminal compartment which prevents moisture intrusion. Each electric motor actuator shall be provided with a local disconnect switch or circuit breaker to isolate power from the motor and controller during maintenance activities.

B. Electric Motor Actuators (AC Reversing Control Type):

1. General: Electric motor actuators shall be the AC reversing type complete with a local or integral control station.

2. Actuator Appurtenances: The actuator for each gate shall be supplied with open and close status lights.

3. Starter: The starter shall be a suitably sized amperage rated reversing starter with its coils rated for operation on 480 volt, 3 phase, 60 Hz current. A control power transformer shall be included to provide a maximum 120 volt source, unless otherwise indicated. The starter shall be equipped with 3 overload relays of the automatic reset type. Its control circuit shall be wired as indicated. The integral weatherproof compartment shall contain a suitably sized electric space heater to prevent moisture condensation on electrical components. A close-coupled, padlockable power disconnect switch shall be provided with each actuator.

4. Local Control Station: Each actuator shall be provided with a local control station with the gate actuator assembly. The station shall include open, close, and stop push buttons or spring return selector switch. The local control station and local power disconnect may be provided as an integral part of the actuator or as otherwise indicated or required to permit operation by a person at floor elevation and within sight of the actuator.

5. Manufacturers, or approved equal:

   a. Rotork

   b. Auma Actuators, inc.

   c. Limitorque Corp.

2.9 MATERIALS

PART	MATERIAL
Slide, Spigot, Frame, Stiffeners, Yoke, Guide Angles, Stem Brackets	Stainless Steel Type 304L or 316L ASTM A276 / A240
Seals and Guide Seats, Stem Guide Bushing	Ultra-High Molecular Weight Polyethylene ASTM D4020
Invert Seal	Neoprene ASTM D-2000
Compression Cord	Nitrile or Neoprene, ASTM D2000
Threaded stem, Stem Guides	Stainless Steel Type 304L or 316L ASTM A-276

PART	MATERIAL
Fasteners	Stainless Steel Type 304 or 316 ASTM - F593 / F594
Pedestal, Wall Bracket	Powder Coated Mild Steel ASTM A-36 or 304, 316 Stainless Steel ASTM A312/276. **ALUMINUM IS NOT ACCEPTABLE**.
Stem cover	Butyrate ASTM D-2411
Lift and stop nut	Bronze ASTM B584, B505

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine the complete set of plans, the process fluids, pressures, and temperatures and furnish instruments that are compatible with installed process condition.

B. Examine the installation location for the instrument and verify that the equipment will work properly when installed.

C. Perform field test to validate actuator operation, range of motion, and gate effectiveness.

3.1 PREPARATION

A. Mounting:

1. As shown in the design drawings

3.2 INSTALLATION

A. As shown on installation details and mechanical Drawings.

B. As recommended by the manufacturer's installation and operation manual.

3.3 SERVICES OF MANUFACTURER

A. Field Adjustments: Field representatives of manufacturers of gates with electric actuators shall adjust actuator controls and limit switches in the field for the required function.

– End of Section –

SECTION 35 59 13

PUBLIC SAFETY BARRIER

PART 1 – GENERAL

1.0 DESCRIPTION

A. This section covers the requirements for the floating Public Safety Barrier. The equipment provided under this section shall be fabricated, assembled, and installed in proper operating condition in full conformity with the drawings, specifications, engineering data, instructions, and manufacturer recommendations.

1.1 RELATED SECTIONS

Section 03 10 00 – Concrete Accessories
Section 03 20 00 – Concrete Reinforcing
Section 03 30 00 – Cast-in-Place Concrete

1.2 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. ASTM INTERNATIONAL (ASTM)
    a. ASTM A479/A479M - (2013b) Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
    b. ASTM D1667 - (2005; R 2011) Flexible Cellular Materials - Poly (Vinyl Chloride) Foam (Closed-Cell)
    c. ASTM D2856 (1994; R 1998) - Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer
    d. ASTM F593 (2013a) - Stainless Steel Bolts, Hex Cap Screws, and Studs
2. INTERNATIONAL MARITIME ORGANIZATION (IMO)
    a. IMO Resolution A.689 - Recommendation on Testing Life-Saving Appliances
3. U.S. COAST GUARD (USCG)

a. USCG Guideline 202 - Rigid Buoyancy Foam for Lifeboats, Rescue Boats, Life Rings and Buoyant Apparatus

b. USCG Regulation 33CFR - Federal Navigation Regulations

1.3 SUBMITTALS

A. Shop Drawings: The submittal shall include sufficient information to construct the safety barrier and attach it to the super structure. Such information shall include a plan showing the layout of the barrier, material properties of all hardware, connection details for the barrier and its anchorage to the structure, and all other necessary information that is required to construct the barrier and what is required by the jurisdiction.

B. Engineering Calculations: Calculations for the barrier and the concrete anchorage shall be provided and stamped by a professional engineer registered in the state of Oregon.

1.4 OWNER DELIVERY, HANDLING AND STORAGE

A. All safety barrier components shall be new and undamaged when delivered and shall be handled and stored so, as to prevent damage. Protect booms from exposure to damaging liquids, oils, greases, and extended exposure to sunlight.

B. Handling Coated Material:

1. Store, handle and place coated material in a manner that will minimize damage to the coating and will not reduce its effective protective value. Repair damaged surfaces as directed and per the Manufacturer's recommendations. Handle coated work that is flexible in a manner that will prevent flexing sufficient to crack coating, especially when temperature is below 40 degrees F. Do not place coated surfaces on strips or skids until coating has hardened thoroughly. Wide fabric slings used for lifting, and strips, slings, blocks, skids, cradles, and other supports shall provide ample bearing areas. In transporting, fasten and protect coated materials in a manner that will prevent movement and preclude chafing and rubbing, and when unloading, do not dump or drop. Place coated material in position carefully on suitably prepared beds and with a minimum of handling.

1.5 QUALITY ASSURANCE

A. Safety Barrier Skin:

1. The polyethylene shell of the safety barrier shall be free from cracks, burrs, warpage, checks, chipped or blistered surfaces, and shall have a smooth surface.

B. Foam Core:

1. The foam core shall be internal foam fill. The foam core shall not contain scraps, strips, or sheets of foam either rolled or stuffed into the required shape. Foam fill must take up a minimum of 95% of the interior volume of the safety barrier. The CONTRACTOR shall show a minimum 5-year performance of similar safety barriers.

1.6 SAFETY BARRIER – WARRANTY

A. Furnish the manufacturer's warranty. The warranty shall be issued directly to the OWNER and shall not be limited in dollar value. The warranty period shall be not less than 1 year from the date of OWNER acceptance of the WORK.

PART 2 – PRODUCTS

2.0 SAFETY BARRIER SYSTEM

A. General Requirements:

1. Provide a complete floating public safety barrier system to prevent the public using the river from encroaching on the pump station.

a. The safety barrier shall be supplied by a manufacturer with not less than 5-years' experience providing safety barrier for the specified purpose.

b. Safety barrier and other components shall be new units not previously used for any other purpose.

c. The system shall be a manufactured product consisting of foam filled modular units interconnected using stainless steel framing or fasteners such that the rectangular shape shown on drawings is maintained during operational conditions.

d. Manufacturer shall submit calculations to verify that safety barrier meets the design operational conditions. See drawings for proposed safety barrier layout. Operational conditions are as follows:

LOCATION:	FRESH WATER RIVER
Approximate Total Boom Length:	92 ft
Max Surface Water Velocity (any direction):	15 ft/s
Applied Wind Speed (any direction):	145 mph
Max Water Elevation:	343.3 feet
Min Water Elevation:	338.3 feet
Anchor Type:	Concrete Embedded

2. The safety barrier system shall be provided with a float riser assembly such that the safety barrier elevation is allowed to match the changing water elevation. The float riser shall extend 12" above maximum water elevation and 12" below the minimum water elevation.

3. If safety barrier components recommended by the manufacturer differ from the specifications herein, provide reasoning for differences and provide examples of currently installed systems to prove the safety barrier system will function as intended.

B. Configuration:

1. Safety barrier layout, type, anchors and all miscellaneous hardware shall be designed to conform to the layout shown in the plans. Anchor assembly and float riser configuration shall be determined by the safety barrier manufacturer based on design parameters. Connecting hardware strength requirements shall meet or exceed that of the safety barrier requirements.

C. Foam Core:

1. The foam core shall be polyurethane foam with the following properties:

   a. Density, ASTM D1667, maximum of 2 lbs/ft^3

   b. Approved as Rigid Buoyancy Foam for Lifeboats, Rescue Boats, Life Rings and Buoyant Apparatus per USCG Guideline 202 and IMO Resolution A.689

   c. Meets USCG Regulation 33CFR, Section 183.114

D. Safety Barrier Skin:

1. The outer safety barrier skin shall be a polyethylene shell and shall be UV-stabilized for long-term environmental exposure. The nominal minimum wall thickness of the polyethylene encasement shall be .2 inches.

2. Color:

   a. Safety barrier skin color shall be international orange (RAL 2009) or yellow (Fed Std 13655) throughout the entire thickness. Stainless steel hardware shall be unpainted.

3. Repairability:

   a. The safety barrier shell shall be replaceable in the event of tears or punctures in the shell. Required repair materials shall be readily available from the safety barrier manufacturer.

E. Internal Hardware:

1. All miscellaneous steel shall be stainless steel in accordance with ASTM A479/A479M or ASTM F593 as appropriate.

F. Safety Barrier Float Requirements:

1. The safety barrier shall have a minimum visible portion of 15” above the water level.

G. Connecting Components Hardware:

1. All connecting components such as chain, cable and shackles shall be 300 series stainless steel in accordance with ASTM A479/A479M or ASTM F593, as appropriate.

2. All connecting bolts and pins shall be of stainless steel 300 series and secured in place with stainless steel (300 series) cotter pins or locking pins.

3. All hardware shall be provided with a minimum breaking strength greater than or equal to the components to which it is attached unless specified otherwise.

H. Concrete Anchor Embedments:

1. The public safety barrier anchor embedments located in the intake structure wall and barrier pier face shall be designed by the CONTRACTOR or boom manufacturer. The concrete embedments that support the safety barrier may be cast-in place. Post-installed concrete embedments are acceptable as long as adequate installation tolerances are provided for the anchorage layout to mitigate drilling through rebar in the concrete wall.

I. Safety Barrier Failure Mechanism:

1. The safety barrier shall have a "failure" mechanism that prevents the safety barrier load from exceeding the anchor maximum load limit.

This mechanism shall be sized to also prevent catastrophic damage from occurring to the safety barrier. The mechanism shall be located on all anchor locations. Load limit of this mechanism shall be determined by the safety barrier manufacturer. CONTRACTOR shall provide replacement mechanism for site personnel to install if failure occurs.

PART 3 – EXECUTION

3.0 PUBLIC SAFETY BARRIER INSTALLATION

A. Install safety barrier and accessories as indicated on the drawings and in accordance with the manufacturer's specifications and shop drawings.

3.1 CONNECTIONS

A. Antiseize Compound:

1. Coat threads of bolts prior to applying washers and nuts. Recoat bolt thread projection beyond nut after tightening.

3.2 CALCULATIONS AND INSTALLATION PLAN

A. Submit calculations performed to size components of the safety barrier. Include calculations performed to determine safety barrier length, float buoyancies and how assumed loadings will result in final positioning of system components according to the drawings and specifications. Provide details of all items permanently attached or supported from the Intake Structure as well as all incidental items. Submit calculations concurrent with the drawings and product data specific to the anchoring components. Include in the calculations a list of assumptions made, a list of all codes and standards referenced, equations, factors of safety, source of values used, and free body diagrams or sketches of each load case. Calculations shall be stamped by a registered Professional Engineer registered in the state of Oregon.

– End of Section –

DIVISION 40 – PROCESS INTEGRATION

SECTION 40 05 06

FLEXIBLE COUPLINGS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. USE: To flexibly couple pipe of the same diameters.

B. Sleeve-type couplings shall be provided where indicated. The CONTRACTOR will not be allowed to substitute a sleeve-split coupling for the sleeve coupling.

C. Dismantling joints shall be provided where indicated.

1.1 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, description of operation, Installation, Operation, and Maintenance Manuals.

PART 2 – PRODUCTS

2.0 MATERIALS

A. Construction: Sleeve couplings and dismantling joints shall be in accordance with AWWA C219 - Standard for Bolted Sleeve-Type Couplings for Plain-End Pipe. Couplings shall be steel with steel bolts, without pipe stop. Couplings shall be of sizes to fit the pipe and fittings indicated. The middle ring shall be not less than 1/4-inch thick or at least the same wall thickness as the pipe to which the coupling is connected. If the strength of the middle ring material is less than the strength of the pipe material, the thickness of the middle ring shall be increased to have the same strength as the pipe. The coupling shall be either 5- or 7- inches long for sizes up to and including 30-inches and 10-inches long for sizes greater than 30-inches, for standard steel couplings, and 16-inches long for long-sleeve couplings. The followers shall be single-piece contoured mill sections welded and cold- expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to

provide positive confinement of the gasket. Bolts and nuts shall be stainless steel type 304 or 316 and conform to the requirements listed in the manufacturer's installation instructions. Buried sleeve-type couplings and dismantling joints shall be epoxy-coated at the factory as indicated.

B. Pipe Preparation: Where indicated, the ends of the pipe shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12-inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof- test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.

C. Gaskets:

1. Gaskets shall be rubber-compound material that will not deteriorate from age or exposure to air under normal storage or use conditions. The rubber in the gasket shall meet the following specifications:

   a. Color – Jet Black

   b. Surface - Non-blooming

   c. Durometer Hardness – 74 plus and minus 5

   d. Tensile Strength – 1000 psi Minimum

   e. Elongation – 175 percent Minimum

2. The gaskets shall be immune to attack by impurities normally found in water or wastewater. Gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above.

D. Piping Connection to Equipment: Where piping connects to mechanical equipment such as pumps, compressors, and blowers, the piping shall be brought to the equipment connection aligned and perpendicular to the axis of the flange or fitting for which the piping is to be connected. The piping shall not impose excessive stress to the equipment connection to cause misalignment of the equipment. The CONTRACTOR shall assign the responsibility to the equipment manufacturer to review the piping connection to the equipment and submit any modifications to the Contracting Officer for review.

E. Restrained Joints: Sleeve-type couplings and dismantling joints on pressure lines shall be harnessed unless thrust restraint is provided by other means.

Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. Where harness sets are installed near the suction and discharge of the pump, harness bolts shall have zero elongation to prevent misalignment of the pump imparted by the thrust within the piping system.

2.1 MANUFACTURERS, OR EQUAL

A. Dresser, Style 38 or Style 131

B. Ford Meter Box Co., Inc., Style FC1, FC3 or FDJ

C. Smith-Blair, Style 411 or Style 975

D. Romac Industries Inc., Model 501 or Model DJ400

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine the complete set of plans, the process fluids, pressures, and temperatures and furnish instruments that are compatible with installed process condition.

B. Examine the installation location for the instrument and verify that the instrument will work properly when installed.

3.1 PREPARATION

A. Mounting:

1. As shown on the design drawings

B. Connection Sizes:

1. As shown on the design drawings

3.2 TRANSPORTING

A. Care shall be taken when handling and transporting to prevent damage to the equipment.

– End of Section –

SECTION 40 05 07

HANGERS AND SUPPORTS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. General:

1. The CONTRACTOR shall provide pipe supports, hangers, guides, and anchors, complete in accordance with the Contract Documents.
2. Where pipe support systems are not indicated on the Drawings, the CONTRACTOR shall design and provide the supports in accordance with this Section.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 05 50 00 – Metal Fabrication
Section 09 90 00 – Painting and Coating

1.2 SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Shop Drawings:

1. Shop Drawings shall be provided for all pipe supports, hangers, anchors, and guides.

PART 2 – PRODUCTS

2.0 GENERAL REQUIREMENTS

A. Manufacturers, or Approved Equal:

1. Basic Engineers Inc., Pittsburgh, PA;
2. Bergen-Paterson Pipe support Corp., Woburn, MA;
3. Grinnell Corp. (Anvil International), Cranston, RI;
4. NPS Products, Inc., Westborough, MA;
5. Power Piping Company, Pittsburgh, PA.
6. Tolco Incorporated, Corona, CA
7. Unistrut

B. Stock Parts:

1. Where not specifically indicated, designs which are generally accepted as exemplifying good engineering practice and use stock or production parts, shall be utilized wherever possible. Such parts shall be locally available, new, of best commercial quality, designed and rated for the intended purpose.

C. Code Compliance:

1. All piping systems and pipe connections to equipment shall be properly anchored and supported to prevent undue deflection, vibration, dislocation due to seismic events and line pressures, and stresses on piping, equipment, and structures. All supports and parts thereof shall conform to the requirements of ANSI/ASME B31.1 – Power Piping, except as supplemented or modified below. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code or local administration requirements.

D. Structural Members:

1. Wherever possible, pipes shall be supported from structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided by the CONTRACTOR. All supplementary members shall be in accordance with the requirements of the building code and the American Institute of Steel Construction and shall be acceptable to the OWNER's Representative.

E. Pipe Hangers:

1. Pipe hangers shall be capable of supporting the pipe in all conditions of operation, allowing free expansion and contraction of the piping, and preventing excessive stress on equipment. All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed to prevent becoming disengaged by any movement of the supported pipe. Hangers subject to shock, seismic disturbances, or thrust imposed by the actuation of safety valves, shall include hydraulic shock suppressors. All hanger rods shall be subject to tensile loading only.

F. Riser Supports:

1. Where practical, risers shall be supported on each floor with riser clamps and lugs, independent of the connected horizontal piping.

G. Freestanding Piping:

1. Free-standing pipe connections to equipment such as chemical feeders and pumps shall be firmly attached to steel frames fabricated from angles, channels, or I-beams anchored to the structure. Exterior, free-standing overhead piping shall be supported on fabricated pipe stands consisting of pipe columns anchored to concrete footings, with horizontal, welded steel angles and U-bolts or clamps securing the pipes.

H. Materials of Construction:

1. General: All pipe support assemblies, including framing, hardware, and anchors, shall be steel construction, galvanized after fabrication, unless otherwise indicated.

2. Submerged Supports: All submerged piping, as well as piping, conduits, and equipment in the wet well shall be supported with support, assemblies, including framing, hardware, and anchors, constructed of Type 316 stainless steel, unless otherwise indicated.

I. Concrete Anchors:

1. Unless otherwise indicated, concrete anchors for pipe supports shall be according to the following table. Consult the OWNER's Representative for any anchor applications not on the table. Anchor embedment shall comply with Section 05 50 00 – Metal Fabrication.

PIPE SUPPORT APPLICATION	**TYPE OF CONCRETE ANCHOR**
New Concrete	Use embedded concrete insert anchors on a grid pattern. Use Grinnell (Anvil International), Tolco, or equal.

2.1 SUPPORT SPACING

A. General:

1. Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending, and shear stresses in the piping, with special consideration given where components such as flanges and valves impose concentrated loads. Pipe support spacing shall not exceed the maximum spans in the tables below.

For temperatures other than ambient temperatures, or those listed, and for other piping materials or wall thicknesses, the pipe support spacing shall be modified in accordance with the pipe manufacturer's recommendations. Vertical supports shall be provided to prevent the pipe from being overstressed from the combination of all loading effects.

2. Where support spacing is not indicated on the Drawings, the CONTRACTOR shall use the spacing below.

B. Support Spacing for Schedule 40 and Schedule 80 Steel Pipe:

NOMINAL PIPE DIAMETER (INCHES)	MAXIMUM SPAN (FEET)
1/2	6
3/4 and 1	8
1-1/4 to 2	10
3	12
4	14
6	17
8 and 10	19
12 and 14	23
16 and 18	25
20 and greater	30

C. Support Spacing for Welded Fabricated Steel Pipe:

1. Maximum Spans for Pipe Supported in Minimum
2. 120-degree Contact Saddles (feet)
3. Nominal Pipe Diameter (inches)
4. Wall Thickness (inches)

NOMINAL PIPE DIAMETER (INCHES)	WALL THICKNESS (INCHES)					
	3/16	1/4	5/16	3/8	7/16	1/2
30	34	38	42	45	48	49

5. For steel pipe sizes not presented in this table, the support spacing shall be designed so that the stress on the pipe does not exceed 5,000 psi. Maximum deflection of pipe shall be limited to 1/360th of the span and shall be calculated by using the formula:

$$L = (7500tD/(32t+D))1/2$$

where: t = Thickness (inches)
D = Diameter (inches)
L = Maximum span (feet)

2.2 COATING

A. Galvanizing:

1. Unless otherwise indicated, all fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123 – Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

B. Other Coatings:

1. Other than stainless steel or non-ferrous supports, all supports shall receive protective coatings in accordance with the requirements of Section 09 90 00 – Painting and Coating.

PART 3 EXECUTION

3.0 INSTALLATION

A. General:

1. All pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions and ANSI/ASME B31.1 – Power Piping. All concrete inserts for pipe hangers and supports shall be coordinated with the formwork.

B. Appearance:

1. Pipe supports and hangers shall be positioned to produce an orderly, neat piping system. All hanger rods shall be vertical, without offsets. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, without interference with other Work.

3.1 FABRICATION

A. Quality Control:

1. Pipe hangers and supports shall be fabricated and installed by experienced welders and fitters, using the best welding procedures available. Fabricated supports shall be neat in appearance without sharp corners, burrs, and edges.

– End of Section –

SECTION 40 05 24

ASTM STEEL PIPE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of ASTM standard steel and Stainless Steel pipe. The CONTRACTOR shall provide steel pipe and appurtenances, complete and in place, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 65 60 – Pressure Pipe Testing and Disinfection
Section 09 90 00 – Painting and Coatings
Section 33 05 24 – General Piping
Section 40 05 26 – AWWA Steel Pipe

1.2 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include fabrication drawings, catalog cuts, and material compliance certificates.

1.3 DELIVERY, STORAGE, AND HANDLING

A. General:

1. All pipes shall be handled, protected, and stored as recommended by the manufacturer.

B. Shipping:

1. All pipes shall be protected with packaging to resist moisture, dust, handling, or other cause during shipping. Packaging shall include a unique number that include the specification number as a reference.
2. Pipe and accessories damaged during shipping shall be replaced at the CONTRACTOR's expense.

C. Storage:

1. Storage requirements shall comply with the manufacturer's written instructions for weather protection, temperature, humidity, and ventilation.
2. Any pipes damaged during storage shall be replaced at the CONTRACTOR's expense.

PART 2 – PRODUCTS

2.0 PIPE MATERIAL

A. Raw Water Service: Unless otherwise indicated, black steel pipe shall conform to ASTM A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless or ASTM A 106 - Seamless Carbon Steel Pipe for High Temperature Service, Grade B.

B. Sample Service: Stainless steel pipe shall conform to ASTM A312, Type 304L.

2.1 PIPE JOINTS

A. Black steel pipe shall have welded joints, or flanged joints as shown on the drawings. Welded joints may have butt-weld fittings, socket-weld fittings, or flanges.

B. Stainless steel pipe shall have welded joints.

2.2 FITTINGS

A. Common Use: The following fittings shall be provided:

1. Forged steel socket welded fittings conforming to ASME B 16.11 - Forged Fittings, Socket - Welding and Threaded.
2. Butt welding fittings conforming to ASME B 16.9 - Factory-Made Wrought Steel Butt Welding Fittings, Schedule 40 or 80, as indicated.
3. Flanged steel fittings conforming to ASME B 16.5 - Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys.
4. Stainless steel fittings conforming t ASTM A403, Class CR, Type 304L.

PART 3 – EXECUTION

3.0 INSTALLATION

A. General: Pipes shall be installed in a neat and workmanlike manner, properly aligned, and cut from measurements taken at the Site to avoid interferences with structural members, architectural features, openings, and equipment. Exposed pipes shall afford maximum headroom and access to equipment,

and where necessary," piping shall be installed with sufficient slopes for venting or drainage of liquids and condensate to low points. Installation shall be free from defects.

B. Supports and Anchors: Piping shall be firmly supported with fabricated or commercial hangers or supports in accordance with Section 40 05 07 – Hangers and Supports. Where necessary to avoid stress on equipment or structural members, the pipes shall be anchored or harnessed.

3.1 PREPARATION

A. Prior to installation, each pipe length shall be carefully inspected, be flushed clean of any debris or dust, and be straightened if not true. Fittings shall be equally cleaned before assemblage.

3.2 PIPE JOINTS

A. Welded Joints: Welded joints shall conform to the specifications and recommendations of ASME B 31.1 - Power Piping. Welding shall be done by skilled and qualified welders per Section 33 05 24 – General Piping.

3.3 INSPECTION AND FIELD TESTING

A. Inspection: Finished installations shall be carefully inspected for proper supports, anchoring, interferences, and damage to pipe, fittings, and coating. Any damage shall be repaired.

B. Field Testing: Prior to enclosure or burying, piping systems shall be pressure tested. The CONTRACTOR shall furnish test equipment, labor, materials, and devices as part of the WORK. For testing requirements, refer to Section 01 65 60 – Pressure Pipe Testing and Disinfection.

1. Leakage may be determined by loss of pressure, soap solution, chemical indicator, or other positive and accurate method. Fixtures, devices, or other accessories which are to be connected to the lines and which would be damaged if subjected to the test pressure shall be disconnected and ends of the branch lines plugged or capped as required during the testing procedures.

2. Leaks shall be repaired, and the system shall be re-tested until no leaks are found.

– End of Section –

SECTION 40 05 26

AWWA STEEL PIPE

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of AWWA standard steel pipe. The CONTRACTOR shall provide steel pipe and appurtenances, complete and in place, in accordance with the Contract Documents.

B. A single pipe manufacturer shall be made responsible for furnishing steel pipe, special items, fittings, and appurtenances such as bolts and gaskets for the WORK.

1.1 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

B. Shop Drawings:

1. Certified dimensional drawings of fittings and appurtenances.

2. Joint and pipe/fitting wall construction details which indicate the type and thickness of cylinder; the position, type, size, and area of reinforcement; coating and lining holdbacks, manufacturing tolerances; and other pertinent information required for the manufacture of the product. Joint details shall be submitted where deep bell or butt strap joints are required for control of temperature stresses.

3. Details for elbows, wyes, tees, outlets, connections, test bulkheads, and nozzles or other specials that indicate amount and position of reinforcement. Fittings and specials shall be properly reinforced to withstand the internal pressure, both circumferential and longitudinal, and the external loading conditions as indicated in the Contract Documents.

4. Material lists and steel reinforcement schedules that describe materials to be utilized. Submit metallurgical, chemical, and physical test reports from each heat of steel to verify the steel conforms to the Specifications.

5. Line layout and marking diagrams which indicate the specific number of each pipe and fitting, the location of each pipe, and the direction of each fitting in the completed line. In addition, the line layouts shall include:

    a. The pipe station and invert elevation at every change in grade or horizontal alignment.

    b. The station and invert elevation to which the bell end of each pipe will be laid.

    c. Elements of curves and bends, both in horizontal and vertical alignment.

    d. The limits within each reach of restrained and/or welded joints or of concrete encasement.

    e. Location and dimensional allocations for each valve, fitting, and appurtenance identified in the Contract Documents.

6. Full and complete information regarding location, type, size, and extent of welds shall be shown on the Shop Drawings. The Shop Drawings shall distinguish between shop and field welds. Shop Drawings shall indicate by welding symbols or sketches the details of the welded joints and the preparation of parent metal required to make them. Joints or groups of joints in which welding sequence or technique are especially important shall be carefully controlled to minimize shrinkage stresses and distortion.

7. Drawings showing the location, design, and details of bulkheads for hydrostatic testing of the pipeline, and details for removal of test bulkheads and repair of the lining.

8. Details and locations of closures for length adjustment and for construction convenience.

9. Detail drawings indicating the type, number, and other pertinent details of the slings, strutting, and other methods proposed for pipe handling during manufacturing, transport, and installation.

10. Overall installation procedure for pipe diameters sized 30" and larger.

C. Certifications: The CONTRACTOR shall furnish a certified affidavit of compliance for pipe and other products or materials as specified in AWWA C200 - Steel Water Pipe 6 in and Larger, AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in and Larger-Shop Applied, AWWA C207 - Steel Pipe Flanges for Waterworks Service - Sizes 4 In Through 144 in, AWWA C208 - Dimensions for Fabricated Steel Water

Pipe Fittings, AWWA C209 - Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipe, AWWA C214 - Tape Coating Systems for the Exterior of Steel Water Pipelines, AWWA C218 - Coating the Exterior of Aboveground Steel Water Pipelines and Fittings, AWWA C219 - Bolted, Sleeve-Type Couplings for Plain-End Pipe, AWWA C221 - Fabricated Steel Mechanical Slip-Type Expansion Joints, and the following supplemental requirements:

1. Physical and chemical properties of steel.
2. Hydrostatic test reports.
3. Welder qualifications.
4. Results of production weld tests.
5. Sand, cement, and mortar tests.
6. Rubber gasket tests.
7. Compliance with AWWA C-200 Standards and/or compliance with the additional requirements included in these Contract Documents as applicable.
8. Records of coating application.

D. Performing and paying for sampling and testing necessary for certification are the CONTRACTOR's responsibility as part of the WORK.

E. Manufacturer’s Qualifications: Furnish a copy of manufacturer’s certification to ISO 9000, SPFA, or LRQA, and documentation of manufacturer’s experience in fabricating AWWA C200 pipe.

F. Design Calculations of Pipe, Fittings, and Specials: Furnish a copy of design calculations for fittings and specials including miters, welds, and reinforcement, prior to manufacture of pipe, fittings, and specials. Design calculations shall be provided with an Oregon PE stamp, from a current license holder.

1.2 QUALITY ASSURANCE

A. Pipe Manufacturer Qualifications: The pipe manufacturer shall be certified to ISO 9000, the Steel Plate Fabricator’s Association (SPFA), or Lloyd’s Register Quality Assurance (LRQA) and shall be experienced in fabrication of AWWA C200 pipe of similar diameters, lengths, and wall thickness to this WORK. Experience shall be in the production facilities and personnel, not the name of the company that owns the production facility or employs the personnel.

B. Inspection: Pipe shall be subject to inspection at the place of manufacture in accordance with the provisions of AWWA C200, C205, and C214 as supplemented by the requirements herein. The CONTRACTOR shall notify the OWNER's Representative in writing of the manufacturing start date not less than 14 Days prior to the start of any phase of the pipe manufacture.

C. Tests: Except as modified herein, materials used in the manufacture of the pipe shall be tested in accordance with the requirements of AWWA C200, C205, and C214 as applicable.

1. After the joint configuration is completed and prior to lining with cement mortar, each length of pipe of each diameter and pressure class shall be shop-tested and certified to a pressure of at least 75 percent of the yield strength of the steel. The test pressure shall be held for 2 minutes and the pipe visually inspected to confirm that welds are sound and leak-free.

2. In addition to the tests required in AWWA C200, weld tests shall be conducted on each 5,000-feet of production welds and at any other times there is a change in the grade of steel, welding procedure, or welding equipment.

3. Fittings fabricated from straight pipe previously passing a hydrostatic test need not have an additional hydrostatic test provided welds are tested by nondestructive means and shown to be sound.

D. Shop Testing of Steel Plate Specials:

1. If any special has been fabricated from straight pipe not previously tested and is of the type listed below, the special shall be hydrostatically tested with a pressure equal to 1-1/2 times the design working pressure: bends, wyes, crosses, tees with side outlet diameter greater than 30 percent of the main pipe diameter, and manifolds.

2. Specials not required to be hydrostatically tested shall be tested by liquid dye penetrant inspection method in accordance with ASTM E 165 - Standard Test Methods for Liquid Penetrant Examination, Method A or the magnetic particle method in ASME Section VIII, Division 1, Appendix VI.

3. Reinforcing plates shall be tested by the solution method using approximately 40 psi air pressure introduced between the plates through a threaded test hole. Test hole shall be properly plugged following successful testing.

4. Any weld defects, cracks, leaks, distortion, or signs of distress during testing shall require corrective measures. Weld defects shall be gouged out and rewelded. After corrections, the special shall be retested.

5. Where welded test heads or bulkheads are used, extra length shall be provided to each opening of the special. After removal of each test head, the special shall be trimmed back to the design points with finished plate edges ground smooth, straight, and prepared for the field joint.

6. Testing shall be performed before joints have been coated or lined.

7. Ultrasonic examination shall be performed in accordance with the following:

    a. Steel plate that will be in welded joints or welded stiffener elements shall be examined ultrasonically for laminar discontinuities where both of the following conditions exist:

        i. Any plate in the welded joint has a thickness exceeding 1/2-inch.

        ii. Any plate in the welded joint is subject to transverse tensile stress through its thickness during the welding or service.

    b. Ultrasonic examination may be waived where joints are designated to minimize potential laminar tearing.

    c. The ultrasonic examination shall be in accordance with ASTM A 578 - Straight Beam Ultrasonic Examination of Plain and Clad Steel Plates for Special Applications with a Level I acceptance standard.

8. Plates that are not in conformance with the acceptance criteria in ASTM A 578 may be used in the WORK if the areas that contain the discontinuities are a distance at least 4 times the greatest dimension of the discontinuity away from the weld joint.

E. The CONTRACTOR shall be responsible for performing and paying for said material tests. The OWNER's Representative has the right to witness testing conducted by the CONTRACTOR; provided, that the CONTRACTOR's schedule is not delayed for the convenience of the OWNER's Representative.

F. In addition to those tests specifically required, the OWNER's Representative may request additional samples of any material including mortar lining and

coating for testing by the OWNER's Representative. The additional samples shall be furnished as part of the WORK.

G. Field Testing: Field testing shall conform to the requirements of Section 01 65 60 - Pressure Pipe Testing and Disinfection.

H. Welding Requirements: Welding procedures used to fabricate and install pipe shall be prequalified under the provisions of ANSI/AWS D1.1 - Structural Welding Code-Steel or the ASME Boiler and Pressure Vessel Code, Section 9. Welding procedures shall be required for longitudinal and girth or spiral welds for pipe cylinders, spigot and bell ring attachments, reinforcing plates and ring flange welds, and plates for lug connections.

I. Welder Qualification's: Welding shall be done by skilled welders, welding operators, and tackers who have had adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9 by an independent local, approved testing agency not more than 6 months prior to commencing WORK on the pipeline. Machines and electrodes similar to those used in the WORK shall be used in qualification tests.

PART 2 – PRODUCTS

2.0 GENERAL

A. Lined and coated steel pipe and specials shall conform to AWWA C200, C205, C209, C214, and C218, subject to the following supplemental requirements. The pipe, specials, and fittings shall be of the diameter and class indicated and shall be provided complete with rubber gaskets or welded joints as indicated in the Contract Documents. For pipe, specials, and fittings 14-inches diameter and larger, the nominal inside diameter after lining shall not be less than the diameter indicated on the Drawings, allowing for tolerances according to AWWA C200 and C205. Pipe, specials, and fittings smaller than 14-inches diameter may be furnished in standard outside diameters. When indicated as a minimum, wall thickness tolerance shall be as allowed by AWWA C200 or the ASTM nominal sheet or plate tolerance, whichever is less.

B. Markings: The manufacturer shall legibly mark pipe, specials, and fittings in accordance with the laying schedule and marking diagram. Each pipe, special, and fitting shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation. Each pipe, fitting, and special shall be marked at each end with top field centerline.

C. Handling and Storage: The pipe, specials, and fittings shall be handled by use of wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment that might injure the pipe coating/exterior will not be permitted. Stockpiled pipe, specials, and fittings shall be supported on padded skids, sand or earth berms free of rock exceeding 3- inches diameter, sand bags, or suitable means so that the pipe including coating and lining coating will not be damaged. Pipe, specials, and fittings shall not be rolled and shall be secured to prevent accidental rolling.

D. The CONTRACTOR shall replace or repair damaged pipe, specials, and fittings.

E. Strutting: Adequate strutting shall be provided on specials, fittings, and straight pipe so as to avoid damage to the pipe, specials, and fittings during handling, storage, hauling, and installation. For mortar-lined steel pipe, specials, or fittings the following requirements shall apply:

1. The strutting shall be placed as soon as practicable after the mortar lining has been applied and shall remain in place while the pipe, special, or fitting is loaded, transported, unloaded, installed, and backfilled at the Site.

2. The strutting materials, size, and spacing shall be adequate to support the earth backfill plus any greater loads that may be imposed by the backfilling and compaction equipment.

3. Any pipe, special, or fitting damaged during handling, hauling, storage, or installation due to improper strutting shall be repaired or replaced.

F. Laying Lengths: Maximum pipe laying lengths shall be 48-ft with shorter lengths provided as required.

G. Lining: The pipe, specials, and fittings shall have smooth, dense interior surfaces and shall be free from fractures, excessive interior surface crazing, and roughness.

H. Closures and Correction Pieces: Closures and correction pieces shall be provided as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing indicated.

2.1 MATERIALS

A. Mortar: Materials for mortar shall conform to the requirements of AWWA C205; provided, that cement for mortar lining shall be Type II or V. Cement

in mortar lining shall not originate from kilns that burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement. Admixtures shall contain no calcium chloride.

B. Steel for Cylinder and Fittings: Pipe, specials, and fittings manufactured under AWWA C200 shall satisfy the following requirements:

1. Minimum yield strength of steel is 42,000 psi. Be manufactured by a continuous casting process.
2. Be fully killed.
3. Be fine grain practice.
4. Have maximum carbon content of 0.25 percent.
5. Have maximum sulfur content of 0.015 percent.
6. Have minimum elongation of 22 percent in a 2-inch gauge length.
7. Be in accordance with one of the following:
    a. ASTM A 1011 - Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High- Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
    b. ASTM A 283 - Low and Intermediate Tensile Strength Carbon Steel Plates
    c. ASTM A 572 - High Strength Low-Alloy Columbium-Vanadium Structural Steel
    d. ASTM A 1018 - Steel, Sheet and Strip, Heavy Thickness Coils, Hot-Rolled Carbon, Structural, High-Strength Low-Alloy Columbium or Vanadium, and High-Strength Low-Alloy with Improved Formability

C. Epoxy Lining: The interior surfaces of 10-inch and 12-inch pipe, fittings, and specials may, at CONTRACTOR's option, be lined with epoxy in accordance with AWWA C210 and the following:

1. Surface preparation: Grit blast to near white metal condition, SSPC SP 10.
2. Application: Total primer and epoxy coating thickness shall be 16-mils DFT minimum. No single coat thickness shall exceed the manufacturer's recommendations.
3. Manufacturer: Tnemec Series 139 Pota-Pox II, Devoe 233H, or equal.

D. Epoxy Coating: The exterior surfaces of exposed pipe shall be epoxy coated in accordance with Section 09 90 00 – Painting and Coating.

E. Prefabricated Multi-layer Cold-Applied Tape Coating: The coating system for buried pipe shall be in accordance with Section 40 46 16 – Polyethylene Tape Coating and AWWA C214.

2.2 DESIGN OF PIPE

A. General: The pipe shall be suitable to transmit raw water under the conditions indicated in the Contract Documents. The steel pipe shall have field welded or flanged (restrained) joints below and above grade. The pipe shall consist of a steel cylinder, shop-lined with Portland cement mortar and an exterior coating of polyethylene tape or epoxy paint.

B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and, except as hereinafter modified, shall conform to AWWA C200.

C. Pipe Dimensions: Pipe shall be of the diameter indicated on the drawings, designed according to AWWA M11 with a design working pressure of 120 psi and a design transient pressure of 190 psi. Fitting Dimensions: Fittings shall be of the diameter and class indicated.

D. Joint Design: Unless indicated otherwise, the standard field joint for steel pipe shall be as indicated in the following table. Butt-strap joints shall be used only where required for closures or where indicated.

PIPE DIAMETER	APPLICATION	JOINT TYPE
60-inches and less		
	Restrained Areas	Lap Welded Joint or Butt Joint
	Closures	Butt Strap Joint or Sleeve-Type Coupling

E. Lap joints prepared for field welding shall be in accordance with AWWA C200. The method used to form, shape, and size bell ends shall be such that the physical properties of the steel are not substantially altered. Unless otherwise approved by the OWNER's Representative, bell ends shall be formed by an expanding press or by being moved axially over a die in such a manner as to stretch the steel plate beyond its elastic limit to form a truly round bell of suitable diameter and shape. Faying surfaces of the bell and spigot shall be essentially parallel except for mitered bells, but the bell slope shall not vary more than 2 degrees from the longitudinal axis of the pipe.

F. Shop-applied interior linings and exterior coatings shall be held back from the ends of the pipe as indicated or as otherwise acceptable to the OWNER's Representative.

G. Restrained Joints:

1. Above and below grade joints shall be field-welded joints, either single, or inside and outside lap-weld, or flanged. Designs shall include stresses created by the greater of:
   a. Temperature differential of 40 degrees F plus Poisson's effect in combination with hoop stress, or;
   b. Thrust due to bulkheads, bends, reducers, and line valves resulting from working pressure in combination with hoop stress.
2. For field welded joints, design hoop stresses shall not exceed 21,000 psi.
3. Flanged joints shall be provided where shown on the drawings, and may be provided at other locations approved by the OWNER's Representative. Flanges shall be Class 250. Flange bolts and gaskets shall be in accordance with Section 33 05 24 – General Piping.

2.3 SPECIALS AND FITTINGS

A. Design: Except as otherwise indicated, materials, fabrication and shop testing of specials and fittings shall conform to the requirements stated above for pipe and shall conform to the dimensions of AWWA C208. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the greatest of those determined by the following 3 criteria:

1. Working and Transient Pressure Design:
2. $T = (P_W D/2)/(Y/S_W)$
3. $T = (P_t D/2)/(Y/S_t)$
4. Where:
5. T = Steel cylinder thickness in inches
6. D = Outside diameter of steel cylinder in inches
7. $P_W D$ = Design working pressure in psi – 120 psi
8. $P_t D$ = Design transient pressure in psi – 190 psi
9. Y = Specified minimum yield point of steel in psi
10. S_W = Safety factor of 2.5 at design working pressure S_t = Safety factor at design working pressure; for elbows 1.875 and 2.0 for other specials.
11. Pipe Thickness: Plate thickness for specials shall not be less than for the adjacent mainline pipe.

B. Specials installed on saddle supports shall be designed to limit the longitudinal bending stress to a maximum of 10,000 psi. Design shall be in accordance with the provisions of Chapter 7 of AWWA Manual M11.

C. Reinforcement for wyes, tees, outlets, and nozzles shall be designed in accordance with AWWA Manual M11. Reinforcement shall be designed for the design pressure indicated and shall be in accordance with the Drawings. Specials and fittings shall be equal in pressure design strength and shall have the same lining and coating as the adjoining pipe. Unless otherwise indicated, the minimum radius of elbows shall be 2.5 times the pipe diameter and the maximum miter angle on each section of the elbow shall not exceed 11-1/4 degrees.

D. Moderate deflections and long radius curves may be made by means of beveled joint rings, by pulling standard joints, by using short lengths or pipe, or a combination of these methods; provided that pulled joints shall not be used in combination with bevels. The maximum total allowable angle for beveled joints shall be 5 degrees per pipe joint. Bevels shall be provided on the bell ends. Mitering of the spigot ends will not be permitted. The maximum allowable angle for pulled joints shall be in accordance with the manufacturer's recommendations or the angle which results from a 3/4-inch pull out from normal joint closure, whichever is less. Horizontal deflections or fabricated angles shall fall on the alignment.

E. Vertical deflections shall fall on the alignment and be at locations adjacent to underground obstructions, points of minimum earth cover, and pipeline outlets and structures. The pipe angle points shall match the angle points indicated.

F. Outlets, Tees, Wyes, and Crosses:

1. Outlets 12-inches and smaller may be fabricated from Schedule 30 or heavier steel pipe in the standard outside diameters, i.e., 12-3/4 inch, 10-3/4 inch, 8-5/8 inch, 6- 5/8 inch, and 4-1/2 inch. Minimum plate thickness for reinforcements shall be 10- gauge.2. The design of outlet reinforcement shall be in accordance with the procedures given in Chapter 13 of AWWA Manual M11 and the design pressures and factors of safety above.

2. In lieu of saddle or wrapper reinforcement as provided by the design procedure in Manual M11, pipe or specials with outlets may be fabricated entirely of steel plate having a thickness equal to the sum of the pipe wall plus the required reinforcement.

3. Where Manual M11 requires the design procedure for crotch plate reinforcement, such reinforcement shall be provided.

4. Outlets shall be fabricated so that there is always at least a 12-inch distance between the outer edge of the reinforcing plate and any field welded joints. For outlets without reinforcing plates, outlets shall penetrate the steel cylinders so that there is at least a 12-inch clearance between the outlet and any field-welded joints.

5. Tees, wyes, crosses, elbows, and manifolds shall be fabricated so that the outlet clearances and reinforcing plates from any weld joints are a minimum of 5 times cylinder thickness or 2-inches, whichever is greater. Longitudinal weld joints in adjacent cylinder sections shall be oriented so that there is a minimum offset of 5 times cylinder thickness or 2-inches, whichever is greater.

G. Steel Welding Fittings: Steel welding fittings shall conform to ASTM A 234 - Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

2.4 CEMENT-MORTAR LINING

A. Cement-Mortar Lining for Shop Application: Unless indicated otherwise, interior surfaces of all buried pipe, specials, and fittings shall be cleaned and lined in the shop with cement mortar lining applied centrifugally in conformity with AWWA C205. During the lining operation and thereafter, the pipe, specials, and fittings shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be of a type that has been used successfully for similar WORK. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found defective at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

B. The minimum lining thickness and tolerance shall be in accordance with AWWA C205.

C. The pipe shall be left bare as indicated where field joints occur. Ends of the linings shall be left square and uniform. Feathered or uneven edges will not be permitted.

D. Defective linings, as determined by the OWNER's Representative, shall be removed from the pipe wall and shall be replaced to the full thickness required. Defective linings shall be cut back to a square shoulder in order to avoid feather edged joints.

E. The progress of the application of mortar lining shall be regulated in order that handwork, including the repair of defective areas, is cured in accordance with the provisions of AWWA C205. Cement mortar for patching shall be the same materials as the mortar for machine lining, except that a finer grading of sand and mortar richer in cement shall be used when field inspection indicates that such mix will improve the finished lining of the pipe.

F. Specials and fittings that cannot be mechanically lined and coated shall be lined and coated by hand-application using the same materials as used for the pipe and in accordance with the applicable AWWA or ASTM standards and this Section. Coating and lining applied in this manner shall provide protection equal to that for the pipe. Fittings may be fabricated from pipe that has been mechanically lined and/or coated. Areas of lining and coating that have been damaged by such fabrication shall be repaired by hand-application.

G. Cement-Mortar Lining for Field Application; Unless otherwise indicated, steel pipe shall be mortar lined. The materials and design of in-place cement mortar lining shall be in accordance with AWWA C602 and the following supplementary requirements:

1. Pozzolanic material shall not be used in the mortar mix.
2. Admixtures shall contain no calcium chloride.
3. The minimum lining thickness shall be as indicated for shop-applied cement mortar lining, and finished inside diameter after lining shall be as indicated.
4. Temperature and shrinkage cracks in the mortar less than 1/16-inch wide need not be repaired. Pipe, specials, or fittings with mortar cracks wider than 1/16-inch shall be rejected.

H. Protection of Pipe Lining/Interior: For pipe, specials, and fittings with plant-applied cement-mortar linings, the CONTRACTOR shall provide a 12-mil polyethylene sheet or other suitable bulkhead on the ends of the pipe and on each opening to prevent drying out of the lining. Bulkheads shall be substantial enough to remain intact during shipping and storage until the pipe is installed.

2.5 EPOXY LINING

A. The interior surfaces of 10-inch and 12-inch pipe, specials, and fittings shall, be epoxy lined

2.6 EXTERIOR COATING OF PIPE

A. Exterior Coating of Exposed Piping: The exterior surfaces of pipe, specials, and fittings that will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of primer compatible with the finish coating.

B. Exterior Coating of Buried Piping: Pipe for buried service shall have a flexible coating conforming to Section 40 46 16 - Polyethylene Tape Coating.

2.7 PIPE APPURTENANCES

A. Pipe appurtenances shall be in accordance with the requirements of Divisions 33 and 40 of the Specifications. Threaded outlets shall be forged steel suitable for 3,000 psi service and as manufactured by Vogt, or equal.

PART 3 – EXECUTION

3.0 INSTALLATION OF PIPE

A. Handling and Storage: Pipe, specials, and fittings shall be carefully handled and protected against damage to lining and coating/interior and exterior surfaces, and impact shocks and free fall. Pipe, specials, and fittings shall not be placed directly on rough ground but shall be supported in a manner that will protect the pipe against injury whenever stored at the Site or elsewhere. Pipe, specials, and fittings shall be handled and stored at the Site in accordance with the requirements stated in Part 2, above. No pipe shall be Installed when the lining or coating/interior or exterior surfaces show cracks that may be harmful as determined by the OWNER's Representative. Such damaged lining and coating/interior and exterior surfaces shall be repaired or a new undamaged pipe, special, or fitting shall be provided.

B. Pipe damaged prior to Substantial Completion shall be repaired or replaced.

C. The CONTRACTOR shall inspect each pipe, special, and fitting for damage. The CONTRACTOR shall remove or smooth out any burrs, gouges, weld splatter, or other small defects prior to laying the pipe, special, or fitting.

D. Before placement of pipe, specials, or fittings in the trench, each shall be thoroughly cleaned of any foreign substance that may have collected thereon and shall be kept clean thereafter. For this purpose, the openings of pipes, specials, and fittings in the trench shall be closed during any interruption to the WORK.

E. Test Pipe, specials, and fittings shall be laid directly on the imported bedding material. No blocking will be permitted, and the bedding shall be such that

it forms a continuous, solid bearing for the full length of the pipe, special, or fitting. Excavations shall be made as needed to facilitate removal of handling devices after the item is laid. Bell holes shall be formed at the ends of the pipe to prevent point loading at the bells or couplings. Excavation outside the normal trench section shall be made at field joints as needed to permit adequate access to the joints for field connection operations and for application of coating on field joints.

F. Installation Tolerances: Each section of pipe, special, or fitting shall be laid in the order and position on the laying diagram and in accordance with the following:

1. Each section of pipe, special, or fitting having a nominal diameter less than 48- inches shall be laid to line and grade, within plus or minus 2-inches horizontal deviation and plus or minus 1-inch vertical deviation.

2. In addition to the horizontal and vertical tolerances above, lay the pipe so that no high or low points other than those on the laying diagram are introduced.

3. After installation, pipe, specials, and fittings shall not show deflection greater than2.25 percent for mortar-lined and flexible-coated pipe, specials, and fittings. The allowable deflection shall be based on the design inside diameter.

G. Where necessary to raise or lower the pipe, specials, or fittings due to unforeseen obstructions or other causes, the OWNER's Representative may change the alignment and/or the grades. Such a change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in a joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount that will be detrimental to the strength and water tightness of the finished joint. In all cases the joint opening, before finishing with the protective mortar inside the pipe, shall be the controlling factor.

H. Except for short runs that may be permitted by the OWNER's Representative, pipes shall be laid uphill if on grades exceeding 10 percent. Pipe that is laid on a downhill grade shall be blocked and held in place until sufficient support is furnished by the following pipe to prevent movement. Bends shall be installed as indicated.

I. Struts in pipe smaller than 42-inches may be removed immediately after laying. A laboratory selected and paid by the OWNER's Representative may

monitor pipe deflection by measuring pipe inside diameter before struts are removed and 24 hours after struts are removed. Pipe deflection shall not exceed 3 percent 24 hours after the struts are removed. After the backfill has been placed, the struts shall be removed and shall remain the property of the CONTRACTOR.

J. Cold Weather Protection: No pipe, special, or fitting shall be installed upon a foundation into which frost has penetrated or at any time that there is a danger of the formation of ice or penetration of frost at the bottom of the excavation. No pipe, special, or fitting shall be laid unless it can be established that the trench will be backfilled before the formation of ice and frost occurs.

K. Pipe, Specials, and Fitting Protection: The openings of pipe, specials, and fittings with shop-applied mortar lining shall be protected with suitable bulkheads to maintain a moist atmosphere and to prevent unauthorized access by persons, animals, water, or any undesirable substance. The bulkheads shall be so designed to prevent drying out of the Interior of the pipe, specials, and fittings. The CONTRACTOR shall introduce water into the pipe to keep the mortar moist if moisture has been lost due to damaged bulkheads. Means shall be provided to prevent the pipe from floating due to water in the trench from any source. Pipe that has floated shall be repaired, including restoration to original condition and profile.

L. Pipe Cleanup: As pipe laying progresses, the CONTRACTOR shall keep the pipe interior free of debris. The CONTRACTOR shall completely clean the interior of the pipe of sand, dirt, mortar splatter, and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs prior to testing and disinfecting the completed pipeline.

3.1 WELDED JOINTS

A. General: Field welded joints shall be in accordance with AWWA C206 - Field Welding of Steel Water Pipe.

B. Where exterior welds are performed, adequate space shall be provided for welding and inspection of the joints.

C. Butt straps shall be as indicated.

D. A heat resistant shield shall be draped over at least 24-inches of coating beyond the holdback on both sides of the weld during welding to avoid damage to the coating by hot weld splatter. Welding grounds shall not be attached to the coated part of the pipe.

E. After the pipe and joint are properly positioned in the trench, the length of pipe between joints shall be backfilled to at least one foot above the top of the pipe. Care shall be exercised during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the joint.

F. To control temperature stresses, the unbackfilled joint areas of the pipe shall be shaded from the direct rays of the sun by the use of properly supported awnings, umbrellas, tarpaulins, or other suitable materials for a minimum period of 2 hours prior to the beginning of the welding operation and until the weld has been completed. Shading materials at the joint area shall not rest directly on the pipe but shall be supported to allow air circulation around the pipe. Shading of the pipe joints need not be performed when the ambient air temperature is below 45 degrees F.

G. Prior to the beginning of the welding procedure, any tack welds used to position the pipe during laying shall be removed. Any annular space between the faying surfaces of the bell and spigot shall be equally distributed around the. circumference of the joint by shimming, jacking, or other suitable means. The weld shall then be made in accordance with AWWA C206. Where more than one pass is required, each pass except the first and final ones shall be peened to relieve shrinkage stresses, and dirt, slag, and flux shall be removed before the succeeding bead is applied.

H. Prior to butt welding, the pipe and joint shall be properly positioned in the trench using line up clamps so that, in the finished joint, the abutting pipe sections shall not be misaligned more than 1/16-inch.

I. Unless double fillet welds are indicated, field welded lap joints may, at the CONTRACTOR'S option, be made on either the inside or the outside of the pipe.

J. Inspection of Field Welded Joints: An independent testing laboratory acceptable to the OWNER's Representative but paid by the CONTRACTOR shall inspect the joints. Inspection shall be as soon as practicable after the welds are completed.

1. Fillet welds shall be tested by the Magnetic Particle Inspection Method in accordance with ASME Section VIII, Division 1, Appendix VI.

2. In addition, double fillet welds on butt strap joints shall be tested by the soap solution method using approximately 40 psi air pressure introduced between the plates through a threaded hole as indicated.

Test holes shall be plugged by a threaded plug or welding following successful testing.

3. Butt welds shall be inspected by radiographic methods in accordance with API Standard 1104.

K. Following tests of the joint, the exterior joint spaces shall be coated In accordance with these specifications after which backfilling may be completed.

L. Repair of Welds: Welds that are defective shall be repaired by the CONTRACTOR to meet the requirements of this Specification. Defects in welds or defective welds shall be removed, and that section of the joint shall then be rewelded. Only sufficient removal of defective material that is necessary to correct the defect is required. After the repair is made, the joint shall be checked by repeating the original test procedure. Welds deficient in size shall be repaired by adding weld metal.

3.2 JOINT COATING AND LINING

A. General: The interior and exterior joint recesses shall be thoroughly wiped clean and water, loose scale, dirt, and other foreign material shall be removed from the inside surface of the pipe.

B. Joint Coating of Shop-Applied Tape-Coated Pipe: Joints shall be coated in accordance with Section 40 46 16 – Polyethylene Tape Coating.

C. Every joint will be tested by the OWNER's Representative with an electrical detector capable of at least a 12,000-volt output, furnished by the CONTRACTOR. The tests will be made using a voltage of 6,000 to 7,000 volts. Holidays shall be repaired by the CONTRACTOR.

D. Coating Repair: Coating repair shall be made using tape and primer conforming to AWWA C209. When visual inspection shows a portion of the tape-wrap system has sustained physical damage, the damaged area shall be subjected to an electrical holiday test of 6,000 to 7,000 volts.

E. Following repair of the damaged area, if the holiday test indicates a holiday still exists, the inner wrap shall be exposed and the exposed area shall be wiped clean with xylol solvent or equal, and the area coated with tape primer. A patch of 35-mil thick cold- applied tape of sufficient size to cover the damaged area plus a minimum lap of 2-inches in all directions shall then be applied. The patched area shall again be tested for holidays. If none are detected, a second layer of 35-mil thick tape shall then be applied over the first patch. The second layer of tape shall overlap the first layer a minimum of 2-inches in all directions.

F. When the area tests show no holiday, a notation shall be applied to the area indicating the test is satisfactory.

G. Coating of Fittings and Specials: Fittings and specials shall be coated in accordance with relevant specifications.

H. Joint Lining: After the backfill has been completed to final grade, the interior joint recess shall be filled with grout. The grout shall be tightly packed into the joint recess and troweled flush with the interior surface. Excess shall be removed. At no point shall there be an indentation or projection of the mortar exceeding 1/16-inch. With pipe smaller than 24-inches in diameter, before the spigot is inserted into the bell, the bell shall be daubed with grout. The joint shall be completed and excess mortar on the inside of the joint shall be swabbed out.

3.3 INSTALLATION OF PIPE APPURTENANCES

A. Protection of Appurtenances: Where the joining pipe is tape-coated, buried appurtenances shall be coated with cold-applied tape.

B. Installation of Valves: Valves shall be handled in a manner to prevent any injury or damage to the valve or any part of it. Joints shall be thoroughly cleaned and prepared prior to installation. The CONTRACTOR shall adjust stem packing and operate each valve prior to installation to verify proper operation.

C. Valves shall be installed so that the valve stems are plumb and in the location indicated.

D. Buried valves and flanges shall be coated and protected in accordance with relevant specifications.

E. Installation of Flanged Joints: Before the joint is assembled, the flange faces shall be thoroughly cleaned of foreign material with a power wire brush. The gasket shall be centered and the connecting flanges drawn up watertight without unnecessarily stressing the flanges. Bolts shall be tightened in a progressive diametrically opposite sequence and torqued with a suitable calibrated torque wrench. Clamping torque shall be applied to the nuts only. Full face reinforced rubber gaskets shall be applied to the inside face of blind flanges with adhesive.

F. Flexible Coupled Joints: When installing flexible couplings, care shall be taken that the connecting pipe ends, couplings, and gaskets are clean and free of dirt and foreign matter with special attention given to the contact surfaces of the pipe, gaskets, and couplings. The couplings shall be

assembled and installed in conformity with the recommendation and instruction of the coupling manufacturer.

G. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. Coupling bolts shall be tightened so as to secure a uniform annular space between the follower rings and the body of the pipe. Bolts shall be tightened approximately the same amount. Diametrically opposite bolts shall be tightened progressively and evenly. Final tightening shall be done with a suitable calibrated torque wrench set for the torque recommended by the coupling manufacturer. Clamping torque shall be applied to the nut only.

– End of Section –

SECTION 40 05 51

PIPING IDENTIFICATION

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of labels for exposed piping and valves. The CONTRACTOR shall provide identification for exposed piping and valves inside the buildings, complete and in place, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 33 05 24 – General Piping

1.2 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Shop Drawings: A list of suggested wording for each valve tag, prior to fabrication.
3. Samples:
   a. One sample of each type of identification device.
   b. Sample of each proposed color required by the pipe color schedule.

PART 2 – PRODUCTS

2.0 IDENTIFICATION OF PIPING

A. Except as indicated below for very short pipe lengths, identify exposed piping larger than 2-inches nominal size for the pipe contents and direction of flow.

1. Marker Type:
   a. Adhesive: Vinyl or polyester sheet with UV- resistant ink, shaped similar to pipe curvature and coated with pressure sensitive adhesive

2. Marker Area: Sized per pipe size according to ANSI A13.1; color from the table below.

3. Lettering: Sized per pipe size according to ANSI A13.1; color from the table below.

4. Arrows: at least 2 arrows at each marker area, showing direction of flow.

B. Pipe 2-inches and smaller shall be identified by plastic plates made from laminated 3- layer plastic with engraved black letters on white background.

C. Pipe identification shall be as manufactured by Brady, Seton, or equal.

2.1 IDENTIFICATION OF VALVES AND SHORT PIPE LENGTHS

A. Identifying devices for valves and the sections of pipe that are too short to be identified with markers and arrows shall be identified with metal or plastic tags.

B. Metal tags shall be stainless steel with embossed lettering. Plastic tags shall be solid black plastic laminate with white embossed letters. Tags shall be designed to be firmly attached to the valves or short pipes or to the structure immediately adjacent to such valves or short pipes.

C. Wording on the valve tags shall describe the exact function of each valve, e.g., "HWR- BALANCING," "CLS THROTTLING", "RAS-PUMP SHUT-OFF," etc.

PART 3 – EXECUTION

3.0 GENERAL

A. Markers and identification tags shall be installed in accordance with the manufacturer's printed instructions and shall be neat and uniform in appearance. Tags and markers shall be readily visible from all normal working locations.

3.1 VALVE TAGS

A. Valve tags shall be permanently attached to the valve or structure by means of 2 stainless steel bolts or screws.

3.2 MARKER LOCATIONS

A. Each pipe shall be marked at:

1. Intervals of 20-feet in straight runs.

2. At least once in every room.

3. Within 2-feet of turns, elbows, and valves.
4. On the upstream side of tees, branches, and other distribution points.
5. On both sides of walls and floors through which the piping passes.

3.3 IDENTIFICATION COLORS

A. Conform to the following color codes:

COLOR SCHEDULE				
PIPE CONTENTS		**PIPE COLOR**	**MARKER COLOR**	**LETTER COLOR**
ABBREVIATION	**IDENTIFICATION**			
D	Drain	Green	Yellow	Black
RW	Raw Water	Green	Yellow	Black
RFS	Refrigerant Suction	White	Green	White
RFD	Refrigerant Discharge	White	Green	White

– End of Section –

SECTION 40 05 63

BALL VALVES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of small diameter ball valves. The valves include a variety of un-named valves. The CONTRACTOR shall provide ball valves and appurtenances, complete and operable, in accordance with the Contract Documents.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance

1.2 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, product data sheet, description of operation, Installation, Operation, and Maintenance Manuals, for each type of valve and actuator.

1.3 DELIVERY, STORAGE, AND HANDLING

A. General:

1. All valves, actuators, and accessories shall be handled, protected, and stored as recommended by the manufacturer.

B. Shipping:

1. All valves, actuators, and accessories shall be protected with packaging to resist moisture, dust, handling, or other cause during shipping. Packaging shall include a unique number that include the specification number as a reference.
2. Any valves, actuators, and accessories damaged during shipping shall be replaced at the CONTRACTOR's expense.

C. Storage:

1. Storage requirements shall comply with the manufacturer's written instructions for weather protection, temperature, humidity, and ventilation.
2. Do not open the manufacturers packaging until the time of installation unless otherwise recommended by the manufacturer.
3. Store valves, actuators, and accessories in a protected area at least 6 inches above the ground or floor.
4. Store valves, actuators, and accessories in such a way that they are readily inspected.
5. Any valves, actuators, and accessories damaged during storage shall be replaced at the CONTRACTOR's expense.

PART 2 – PRODUCTS

2.1 GENERAL

A. Unless otherwise indicated, general purpose metal ball valves in sizes up to 4-inch shall have manual actuators that limit the operating pull on the handle or wheel to a maximum of 60 pounds.

2.2 MANUFACTURERS

A. The following Manufacturers, or approved equal, are accepted for use on the project:

1. Stainless Steel:
    a. Conbraco Industries, Inc. (Apollo)
    b. ITT Engineered Valves
    c. Neles-Jamesbury, Inc.
    d. Watts Regulator
    e. Worcester Controls
    f. Keckley

2.3 BODY

A. Stainless Steel:

1. Ball valves shall have Stainless Steel bodies with screwed ends for a pressure rating of not less than 600 psi WOG.

2. Valves 2-inch to 4-inch in size shall have bronze or Stainless Steel 2- or 3-piece bodies with screw ends for a pressure rating of ANSI 125 psi or 150 psi unless otherwise indicated.

2.4 BALLS

A. Stainless Steel:

1. The balls shall be Stainless Steel, with standard port (single reduction) or full port openings.

2.5 STEMS

A. Stainless Steel:

1. The valve stems shall be of the blow-out proof design, of bronze, Stainless Steel, or other acceptable construction, with reinforced Teflon seal.

2.6 SEATS

A. Stainless Steel:

1. The valve seats shall be of Teflon or Buna-N for bi-directional service and easy replacement.

PART 3 – EXECUTION

3.0 GENERAL

A. Installation:

1. Valves and accessories shall be installed in accordance with the manufacturer's written instructions and as specified.

– End of Section –

SECTION 40 05 64

BUTTERFLY VALVES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of Butterfly Valves. The CONTRACTOR shall provide valves and appurtenances, complete and operable, in accordance with the Contract Documents.

1.1 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. ASTM A536 Standard Specification for Ductile Iron Castings

1.2 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, product data sheet, description of operation, Operation and Maintenance Manual, for each device.

PART 2 – PRODUCTS

2.0 GENERAL

A. Ranges:

1. Differential pressure ratings: 150 psi.
2. Temperature range 0 to 100ºF.

B. Butterfly valves shall meet the requirements of AWWA C504.

2.1 MANUFACTURERS

A. The following Manufacturers, or approved equal, are accepted for use on the project:

1. Bray
2. Keystone
3. Pratt
4. Val-Matic.

5. Milwaukee

2.2 BODY

A. General:

1. Body shall be lug style with resilient seats and 150-pound flange bolt pattern.
2. Body of the butterfly valve shall be ductile iron conforming to ASTM A536.

2.3 DISC

A. General:

1. Disc shall be nylon coated ductile iron.

2.4 SHAFT

A. General:

1. Shaft shall be 304 or 316 Stainless Steel.

2.5 BEARING

A. General:

1. Stem bearings shall be Polytetrafluoroethylene (PTFE).

2.6 SEATS

A. General:

1. The valve seats shall be EPDM or Buna-N rubber.

2.7 STEM EXTENSION

A. General:

1. Provide valve stem extensions as shown on drawings to permit operation of inaccessible valves.
2. Provide valve stem mounts and supports as required per manufacturer recommendations.
3. Valve stems to be galvanized steel, or approved alternative.

2.8 MANUAL ACTUATORS

A. General:

1. All actuators shall be geared to allow continuous adjustment of valve position.
2. Actuators shall be sized to limit the maximum operating pull to 60 pounds on the rim of the hand wheel or valve key.
3. Actuators shall be traveling nut, worm-gear, spur or bevel gear assemblies with valve position indication.
4. All gearing shall be designed for 100 percent over-torque.

PART 3 – EXECUTION

3.0 GENERAL

A. Installation:

1. Valves, actuators, stem extensions, and accessories shall be installed in accordance with the manufacturer's written instructions and as specified.

– End of Section –

SECTION 40 05 65

CHECK VALVES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of Check Valves. The check valves are required at the seasonal intake pump assembly. The CONTRACTOR shall provide check valves and appurtenances, complete and operable, in accordance with the Contract Documents.

B. Check Valves:

SIZE	QUANTITY	LOCATION
10″	2	PMP-3&4 Outlet
12″	4	PMP-5-8 Outlet

1.1 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, equipment data sheets, description of operation, Installation, Operation, and Maintenance Manuals, for each type of valve and actuator.

1.2 DELIVERY, STORAGE, AND HANDLING

A. General:

1. All valves shall be handled, protected, and stored as recommended by the manufacturer.

B. Shipping:

1. All valves shall be protected with packaging to resist moisture, dust, handling, or other cause during shipping. Packaging shall include a unique number that include the specification number as a reference.

2. Any valves, actuators, and accessories damaged during shipping shall be replaced at the CONTRACTOR's expense.

C. Storage:

1. Storage requirements shall comply with the manufacturer's written instructions for weather protection, temperature, humidity, and ventilation.
2. Store valves in such a way that they are readily inspected.
3. Any valves damaged during storage shall be replaced at the CONTRACTOR's expense.

PART 2 – PRODUCTS

2.0 GENERAL

A. Check valves shall be a rubber flapper style swing check assembly to prevent the reverse flow of water with non-slam characteristics.

B. The valves shall be designed to meet the requirements of AWWA C508 and certified to meet NSF/ANSI 61 and NSF/ANSI 372.

2.1 MANUFACTURERS

A. The following Manufacturers, or approved equal, are accepted for use on the project:

1. Dezurik Apco CRF-100C
2. Val-Matic Swing-Flex Check-Valve 510A (10") and 512A (12")
3. Approved Equivalent

2.2 EQUIPMENT

A. Body:

1. The Body shall be ASTM A536 ductile iron. End connections shall be flanged class 125/150 or 250/300 per ASME B16.1. Valves 6" and larger shall have a drain plug located on the bottom of the valve.

B. Body Seat:

1. The body seat shall be on a 45-degree angle to the centerline of the pipe, permitting horizontal or vertical (flow up) installation. The valve shall be rated to 250 psi (1720 kPa) cold working pressure.

C. Rubber Flapper:

1. Rubber Flapper to have a steel disc encapsulated with Acrylonitrile-Butadiene (NBR), or Terpolymer of Ethylene Propylene and A Diene (EPDM). The flapper is captured between the body and valve cover

to permit the disc to flex open and closed. An integral “o-ring” shall be molded onto the face of the rubber flapper for positive sealing.

D. Hinge Section:

1. Hinge Section of the rubber flapper shall be designed to accelerate closing due to an elastic spring effect. High-strength fabric shall be integrally molded in the rubber over the disc and bar to form a flexible joint giving the flapper a high cycle life.

E. Testing:

1. Valve is to be tested by the manufacturer as a complete assembly per AWWA C508.

PART 3 – EXECUTION

3.0 GENERAL

A. Valves and accessories shall be installed in accordance with the manufacturer's written instructions and as specified.

B. Warranty:

1. Valve shall be warranted by the manufacturer for defects in materials and workmanship for a period of two years (24 months) from date of shipment.

– End of Section –

SECTION 40 05 67

ORIFICE SLEEVE VALVES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of energy dissipation valves. The CONTRACTOR shall furnish and install in-line orifice sleeve type pressure regulating/flow control valve assemblies complete and operable as shown and specified herein and in accordance with the requirements of the contract documents.

1.1 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Submittal information shall include dimensional drawings, equipment data sheets, Installation, Operation, and Maintenance Manuals.
3. Submittal shall also include field test plan and report.
    a. Layout drawings shall be drawings of the valve showing all envelope dimensions including material callout.

1.2 SUBSTITUTION

A. Where horizontal in-line orifice sleeve valves are shown or specified, the contractor shall not substitute globe style valves that are not pre-approved.

PART 2 – PRODUCTS

2.0 OPERATING REQUIREMENTS

A. Performance: The valve shall be designed and guaranteed for at least five years to operate throughout its range without cavitation damage, excessive noise, or vibration, for the conditions stated below. Material stresses shall not exceed 1/5 of the ultimate or 1/3 of the yield strength of the material. The valve shall be designed to accommodate and withstand the design head of 250 ft and design flow of 10,600 gpm.

B. Valve Assembly Components: The orifice assembly shall consist of a flanges cylinder and end cap. The orifice shall be fabricated from 304 stainless steel

and shall contain control orifices. The number and size of the orifices shall be determined by the valve manufacturer.

C. Valve manufacturer:

1. Orifice Sleeve Valve Model B-16 as manufactured by Bailey Valve Inc. or approved equal.

2.1 MATERIAL REQUIREMENTS

A. Assembly components shall be manufactured from the following materials:

1. Orifice: Type 304 Stainless Steel

a. ASTM A358

b. ASTM A276

c. ASTM A240 Type 304L

PART 3 – EXECUTION

3.0 INSTALLATION

A. Valve installation shall be in strict accordance with the manufacturer's printed recommendations, and the Contract Documents.

3.1 WORKMANSHIP

A. Valves shall be free from manufacturing defects and shall be manufactured in a workman like manner. Welds shall conform to ASME Section VIII or IX standards for pressure vessels and be free from mill and scale.

3.2 FIELD TESTING AND PERFORMANCE

A. Valves shall be field tested to the specified operating pressure. The pressure drop across the valve shall be measured to ensure that the valve is free of obstructions.

B. Any excessive noise or vibration shall be resolved by the manufacturer including possible replacement of the valve at the manufacturer’s expense.

– End of Section –

SECTION 40 05 78

COMBINATION AIR/VACUUM VALVES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of Air/Vacuum Valves. The CONTRACTOR shall provide air/vacuum valves and appurtenances, complete and operable, in accordance with the Contract Documents.

B. Air Valves for Vertical Turbine Pumps shall vent large quantities of air through the discharge orifice when the pump starts, close tight when liquid enters and permit large quantities of air to re-enter through the orifice when the pump stops to prevent vacuum forming in the pump suction column.

1.1 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, equipment data sheets, description of operation, Installation, Operation, and Maintenance Manuals, for each type of valve.

1.2 DELIVERY, STORAGE, AND HANDLING

A. General:

1. All valves and accessories shall be handled, protected, and stored as recommended by the manufacturer.

B. Shipping:

1. All valves and accessories shall be protected with packaging to resist moisture, dust, handling, or other cause during shipping. Packaging shall include a unique number that include the specification number as a reference.

2. Any valves, actuators, and accessories damaged during shipping shall be replaced at the CONTRACTOR's expense.

C. Storage:

1. Storage requirements shall comply with the manufacturer's written instructions for weather protection, temperature, humidity, and ventilation.
2. Any valves, actuators, and accessories damaged during storage shall be replaced at the CONTRACTOR's expense.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. General:

1. The following manufacturers and valves, or approved equal, are accepted for use on the project:
   a. For 1,500 gpm rated pumps:
      i. DeZURIK APCO 3" (Minimum) Air/Vacuum Valve with optional Air Release Valve and Double-Acting Throttling Device included.
   b. For 3,100 gpm rated pumps:
      i. DeZURIK APCO 4" (Minimum) Air/Vacuum Valve with optional Air Release Valve and Double-Acting Throttling Device included.

2.1 CONSTRUCTION

A. The main valve parts shall be a body, cover, baffle, float and seat. The baffle shall shield the float from direct impact of air and water to prevent premature float closure. The seat shall slip fit into the baffle or cover and lock in place without any distortion.

B. Sizes 1/2" (15 mm) through 4" (100 mm): the entire float and baffle assembly must be shrouded with a water diffuser to prevent water from slamming the float shut. Outlets to be flanged.

C. The float shall be stainless steel, center guided (not free floating) for positive seating.

D. The discharge orifice shall be fitted with a Double-Acting Throttling Device, to regulate and restrict air venting. This device will establish a pressure loading on the rising column of water to eliminate damaging shock to the pump, controls, and check valve on pump start. On pump stop, the Double-Acting Throttling Device shall automatically open allowing full line unrestricted air re-entry to prevent vacuum from forming in the suction column.

E. Materials of construction shall be certified conforming to following ASTM specifications:

1. Body and cover: Cast Iron ASTM A126 Gr. B (or Ductile Iron: ASTM A536 Gr. 65-45-12)
2. Baffle: Cast Iron ASTM A48 CL 30
3. Float: Stainless Steel ASTM A240
4. Seat: Buna-N
5. Water diffuser: Brass or stainless steel ASTM B16

PART 3 – EXECUTION

3.0 GENERAL

A. Installation:

1. Valves and accessories shall be installed in accordance with the manufacturer's written instructions and as specified.
2. Install steel drain pipe from each valve to nearest floor penetration.

– End of Section –

SECTION 40 46 16

POLYETHYLENE TAPE COATING

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of pipe tape coat. The CONTRACTOR shall provide a prefabricated, cold-applied, multilayer polyethylene tape coating system on pipe, complete and in place, in accordance with the Contract Documents.

B. Except as described in this Section, the coating system shall be in accordance with ANSI/AWWA C214 for straight pipe sections and ANSI/AWWA C209 for fittings, specials, and joints.

1.1 SUBMITTALS

A. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

B. Coating Materials List: A list of the tape coating materials that indicates the manufacturer, product numbers, technical information, and thickness of the materials.

C. Submittal shall include post installation coating inspection report.

1.2 QUALITY ASSURANCE

A. General: Furnish the OWNER's Representative a minimum of 7 days advance notice of the start of any shop coating work and a minimum of 3 days advance notice for field work.

B. Inspection Devices: The CONTRACTOR shall furnish inspection devices that are calibrated and in good working condition for the detection of holidays and measurement of coating film thicknesses.

C. Inspection: The CONTRACTOR shall retain the services of trained technicians to test the coating system in the shop and field and prepare reports. As a minimum, the tests shall include holiday detection and coating film thickness.

D. Tape application to straight pipe sections shall be monitored using instrumentation devices that continuously measure and record the tape width drawdown and the tape temperature. Each tape application station shall be equipped with the instrumentation devices. The tape tensions and

temperatures shall be controlled using the data obtained from the instrumentation devices.

E. Manufacturer Representative: The CONTRACTOR shall require the tape material manufacturer to furnish a qualified factory technical representative to visit the pipe coating shop for technical support at the beginning of the tape coating operation and as may be necessary to resolve shop or field problems.

F. Holiday Detection: Prior to application of the first layer of mechanical protection tape, the inner layer tape shall be electrically tested for coating flaws with a holiday detector approved by the OWNER's Representative. Holidays shall be immediately repaired and detested before application of the first layer of mechanical protection tape.

G. Immediately before the coated pipe is lowered into the trench, the CONTRACTOR shall provide a visual and holiday inspection of the coating on the underside of the pipe.

PART 2 – PRODUCTS

2.0 COATING SYSTEMS

A. Straight pipe sections shall be provided with a multi-layer polyethylene tape system as described below:

1. Primer layer.
2. Filler tape, extruded butyl rubber compound compatible with the primer and tape.
3. Weld stripping tape, if required (25 mils).
4. Inner layer, corrosion protection tape (20 mils).
5. Middle layer, mechanical protection tape (30 mils).
6. Outer layer, mechanical protection tape (30 mils) with ultraviolet light stabilizers.
7. Total system thickness shall be at least 80 mils.
8. Coating materials shall be supplied by a single manufacturer, whose products have a successful application and service history on pipe fabricated in accordance with AWWA C200.
9. The coating system materials shall be as manufactured by Polyken Technologies, or equal, as itemized below:

Primer	1019
Filler tape	939
Weld stripping tape	933-25 black
Inner layer tape	989-20 black
Middle layer tape	955-30 gray
Outer layer tape	956-30 white

B. Fittings, specials, and field joints shall be provided a three-layer polyethylene tape system as described below:

1. Primer layer
2. Filler tape, extruded butyl rubber compound compatible with the primer and tape.
3. Inner layer, corrosion protection tape (50 mils).
4. Outer layer, mechanical and ultraviolet light protection tape (30 mils).
5. Total system thickness shall be at least 80 mils.
6. The coating materials shall be supplied by the same manufacturer as the materials for straight pipe.
7. The coating system materials shall be as manufactured by Polyken Technologies, or equal, as itemized below:

Primer	1019
Filler tape	939
Inner layer tape	930-50 black
Outer layer tape	955-30 white

C. Storage of Materials: Materials shall be stored within the temperature ranges indicated for application, using heated storage areas if necessary. Tape shall be stored at a minimum temperature of 70 degrees F.

PART 3 – EXECUTION

3.0 TAPE APPLICATION

A. Tape coating materials shall be applied in accordance with this Section, the product application instructions of the tape manufacturer, and the field technical support instructions from the manufacturer.

3.1 WELD SURFACE PREPARATION

A. To provide for an effective, long-term bond between the tape coating system and the substrate, the following pipe weld surface preparation shall be provided.

1. Weld surfaces with a reinforcement greater than 1/32-inch and all longitudinal and coil splice welds shall be ground to provide a smooth surface with a reinforcement not exceeding 1/32-inch. The resulting weld surface shall have a cross-section shape that is free of discontinuities, abrupt changes in curvature, with no ridges or valleys that may promote bridging or disbondment of the tape from the substrate.
2. Weld Stripping Tape: Weld stripping tape, 6-inches wide, shall be used if any of the following conditions are present.
    a. If the CONTRACTOR elects to use stripping tape in lieu of grinding or part of the grinding required above. In such a case, the weld reinforcement shall not exceed 3/32-inch, and the weld surface shall have a cross-section shape that is free of discontinuities, abrupt changes in curvature, with no ridges or valleys that may promote bridging or disbondment of the tape from the substrate.
    b. If the initial pipe sections taped have indications that the inner tape layer is not bonding completely to the pipe at the welds.
    c. If the tape bond to the welds or adjacent surfaces is less than the tape bond to the pipe surface away from the welds.
3. Welds that have any of the following require no additional preparation:
    a. A reinforcement less than 1/32-inch.
    b. A cross-section slope that is free of discontinuities and abrupt changes in curvature.
    c. No ridges or valleys that may promote bridging or disbondment of the tape from the substrate.
4. The tape shall be applied with the center of the tape at the weld.

3.2 PIPE SURFACE PREPARATION

A. Surfaces to be coated shall be detergent cleaned in accordance with SSPC-SP1 prior to abrasive blasting.

B. Burrs, sharp edges, and weld splatter shall be removed prior to abrasive blasting.

C. Immediately before application of the primer, abrasive blasting shall be performed using sand, metallurgical slag, or a combination of steel grit and shot to produce a surface in conformance with SSPC-SP6. Steel grit shall

comprise at least 60 percent of the working mix of abrasive if a centrifugal wheel abrasive blaster is used. The prepared surface shall have a surface profile not exceeding 2 mils.

D. Abrasive blasting and primer application shall be done when the substrate surface is at least 5 degrees F above the dew point. Abrasive blasting, priming, and inner layer tape application shall be done during the same working day for each pipe section.

3.3 PIPE AND PREPARATION

A. Coating cut-backs at the pipe ends shall be 6-inches, with the cuts parallel to the pipe ends. Exposed substrate surfaces shall be protected with a storage primer applied immediately after taping and before flash rusting of the surface.

B. Spiral or longitudinal pipe welds within 2-feet of the pipe ends shall be ground flush prior to abrasive blast cleaning.

3.4 APPLICATION OF TAPE

A. Pipe shell temperature shall be maintained within a range of 45 degrees F to 100 degrees F during application of the tape system.

B. Inner layer tapes shall be maintained at a minimum temperature of 70 degrees F during application. Middle and outer layer tapes shall be maintained at a minimum temperature of 90 degrees F during application.

C. Tape application tension shall be maintained at a value that produces a tape width reduction equal to 1.0 to 2.0 percent of the tape width during application, as recommended by the tape manufacturer. This width reduction shall be maintained simultaneously with the minimum tape temperature.

D. At the point of tape application, all tape, including weld stripping tape, shall be pressed onto the pipe with a pressure roller that maintains a constant pressure. Enough pressure shall be used to fully bond the tape at welds.

E. Filler tape shall be used at lap joints, weld step-downs, and other discontinuities.

F. The tape application equipment and materials shall result in a fully bonded tape coating system, without blisters, voids, wrinkles or any areas that have a lack of bond to the pipe.

G. Electrically holiday test each section of pipe after application of the innerwrap with a holiday tester per the tape manufacturer's directions in

accordance with National Association of Corrosion Engineers (NACE) Standard RP-02-74. Repair holidays (defects), if detected, before application of additional tape layers. Repair the holiday area by priming and applying a patch of repair tape. Cover with repair tape a minimum of 4 inches in all directions from damaged area. Retest the repaired area for holidays. Test holidays in middle and outer wrap layers in accordance with tape manufacturer's directions. Make repairs in the Field Tape Coating Repair section of the specifications.

H. Succeeding layers of tape shall be applied so that the laps are staggered by at least 2-inches.

I. Before tape application, the primer shall be dried sufficiently so that the primer is in a tacky to dry condition.

J. Primer shall be applied while it is in a temperature range of 50 to 80 degrees F, using airless spray equipment and a drum agitator. The primer application shall be of uniform thickness on all pipe surfaces.

K. Inspect and test factory-applied tape coating system per AWWA specification or pipe manufacturer. Coating systems shall adhere tightly to the pipe surface and previous tape layers. Remove and replace tape layers with visual damage, wrinkles, voids, disbonded layers, surface contamination, or areas where holidays are detected at the factory.

3.5 REPAIR PATCHES

A. Repair patches shall be applied by wrapping tape completely around the pipe, using the tape system for joints.

3.6 STORAGE AND SHIPMENT

A. Pipe shall be square-stacked on padded supports or racks. Lifting equipment shall be padded and wide fabric slings shall be used. To the extent possible, the coated pipe shall be handled from the cut-back ends.

B. Tie down devices shall be padded where in contact with the pipe.

3.7 ELECTRICAL COATING INSPECTION

A. Electrically test areas of damaged or questionable pipe coating, or pipe tape coating repairs with a portable high-voltage holiday detector. Test areas as directed by the OWNER's Representative. Provide equipment and conduct testing in accordance with NACE Standard RP-02-74 and the coating manufacturer's written directions for type and thickness of coating being

tested. Furnish one portable high-voltage detector for each pipe laying crew.

B. Set electrical holiday test equipment at voltage as recommended by coating manufacturer. The minimum test voltage for a particular coating type and thickness shall be within 20 percent of the voltage as determined by the following formula:

Testing Voltage = 1250 √T
Where T = Average coating thickness in mils (0.001 inch)

C. Provide the type of detector with the minimum and maximum voltage setting, inspection speed, and holiday detector electrode type (wire brush or electrically conductive silicone or coil spring) as recommended by the coating manufacturer for the coating type and thickness being tested. Maintain the holiday test equipment in good working condition per detector manufacturer's recommendations.

D. Adjust the holiday detector during testing to the correct voltage setting and operate in accordance with the holiday detector manufacturer recommendations. Recheck voltage setting at start of each day and a minimum of two times during day and when requested by the OWNER's Representative.

E. The holiday detector shall provide an audible signal when electrical contact is made between the pipeline and the electrode at holidays (defects) in the coating. Provide a good ground and a low electrical resistance between the holiday detector and the pipeline. Make only direct connections to uncoated areas or the pipe ends at the pipe joint cut back areas.

F. The pipe surface shall be clean and dry when tested. To avoid damage to the coating, the electrode should always be kept in motion while test voltage is being applied. Always keep the electrode in firm contact with the coated surface. Move the electrode in an even manner over the surface at an appropriate rate of 0.5 to 1 foot of travel per second. Do not exceed 1 foot of travel per second as the maximum rate of speed during holiday testing.

G. Mark location of detected holidays for repair. Retest after repair.

3.8 TAPE APPLICATION TO FITTINGS, SPECIALS, AND JOINTS

A. Filler tape shall be used to fill voids on fittings, specials, welds, and pipe joints.

B. Lap joints, and other locations where voids will otherwise exist shall be provided specially shaped, filler tape applied after priming.

C. Field pipe joints shall be prepared as required by the paragraph above entitled "Pipe Surface Preparation," except that shop blasted surfaces that have been coated with a storage primer may be power tool cleaned instead of abrasive blast cleaned. The power tool cleaning shall be done in accordance with SSPC-SP2. Pipe ends not effectively protected with a storage primer shall be abrasive blasted to SSPC-SP6.

– End of Section –

SECTION 40 61 11

INSTRUMENTATION AND CONTROL SYSTEMS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of new instrumentation and control components that are to be integrated into an existing system designated as the Supervisory Control and Data Acquisition System (SCADA). This system includes the instrumentation.

B. The components shall be furnished as specified, complete with the input/output and processing hardware, instrumentation, and all devices, accessories, appurtenances, testing, and training necessary for proper operation.

C. Equipment furnished and installed under this, and related sections shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer as a complete system, unless exceptions are noted by OWNER.

D. Section 01 60 60 – Facility Startup shall apply to all equipment and materials furnished under this section and related sections. If requirements in this specification differ from those in the Facility Startup specification, the requirements specified herein shall take precedence.

E. The Drawings indicate locations and general arrangement of equipment and may include installation details and block and one-line diagrams showing connections and interfaces with other equipment.

F. The CONTRACTOR shall provide necessary coordination and support to the OWNERS System Integrator for all RIVER PUMP STATION equipment system software integration for the SCADA, including SCADA computer, PLC, and HMI programming.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Products Requirements
Section 01 60 60 – Facility Startup
Section 26 05 11 – General Electrical Requirements
Section 40 64 00 – Programmable Logic Controllers

Section 40 66 11 – Network Systems
Section 40 66 33 – Metallic and Fiber Optic Communication Cable and Connectors
Section 40 67 11 – Panels, Consoles, And Appurtenances

1.2 REFERENCE STANDARDS

A. The publications listed below form a part of this specification and related sections to the extent referenced. The publications are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition available shall be used, except as they are modified and supplemented herein. In addition to the above codes and standards, CONTRACTOR shall comply with all pertinent State and local ordinances, laws, and regulations. In the event of any apparent conflict among codes, standards or this specification, CONTRACTOR shall refer the conflict to OWNER for written resolution.

B. CONTRACTOR shall, as part of their work, arrange for and obtain all necessary permits, inspections, and approvals by the authorities having local jurisdiction of such work. This shall include any third-party inspections and testing of panels and equipment.

ANSI	American National Standards Institute.
ANSI C37.90	Standard for Relays and Relay Systems.
IEEE 472	Surge withstand standard.
IEEE 519	Harmonic Specifications
NEC-NFPA 70	National Electrical Code (NEC).
NECA 301-2009	Standard for Installing and Testing Fiber Optic Cable.
NEMA 250	Enclosures for Electrical Equipment (1000 Volts Maximum).
NEMA ICS 6	Enclosures for Industrial Control and Systems.
NEMA IA 2.2-2005	Programmable Controllers Part 2: Equipment Requirements
NEMA ICS-1-109.60 – 109.66	Meet or exceed electrical noise tests.

C. Standards and codes of the following organizations will also govern, where applicable:

1. American National Standards Institute (ANSI)
2. International Society of Instrumentation (ISA)
3. National Electrical Manufacturers Association (NEMA)

4. Institute of Electrical and Electronics Engineers (IEEE)
5. Insulated Cable Engineers Association (ICEA)
6. Occupational Safety and Health Administration (OSHA)
7. American Society for Testing and Materials (ASTM)
8. Underwriters Laboratories (UL)

1.3 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Additional submittal requirements for instrumentation and Control:

1. Submittal for this section shall include a copy of specification section, with addendum updates included, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations from requirements. Check marks shall denote full compliance with a paragraph as a whole.
2. If deviations from the specifications are indicated, and therefore requested by the CONTRACTOR, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The number in the margin shall refer to a detailed written explanation of the reasons for requesting the deviation. OWNER shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the CONTRACTOR with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.
3. The CONTRACTOR shall provide review comments attached to the submittal identifying compliance or non-compliance with each section, confirming that he has verified that submittals meet specified requirements.
4. Submittal information shall be manufacturer's catalog descriptive literature with identifying arrows pointing to the specific equipment, devices, and materials to be supplied. Catalog information shall include technical specifications and application information, including NEMA and electrical ratings, range, weight, accuracy, etc. Catalog cuts shall be edited to show only the items, model numbers,

and information which apply and include all information as described below.

C. SUBMITTAL IDENTIFICATION

1. Submittal data shall be grouped and submitted in three separate stages as described below. Individual drawings and data sheets submitted at random intervals will not be accepted for review. Equipment tag numbers or identifications used on the Drawings shall be referenced where applicable.

2. Equipment and material descriptive literature and drawings shall show the specification paragraph for which the equipment applies.

3. Sheets or drawings covering more than the item being considered shall have all inapplicable information crossed out.

4. A suitable notation shall identify equipment and material descriptive literature not readily cross referenced with the Drawings or Specifications.

5. Schematics and connection diagrams for all equipment shall be submitted for review. A manufacturer's standard connection diagram or schematic showing more than one scheme of connection will not be accepted.

D. FIRST STAGE SUBMITTAL

1. The first stage submittal shall be submitted with or prior to the second stage submittal. If there are any alternate equipment being proposed other than what is specified, the first stage submittal shall be submitted one month prior to the second stage submittal. The first stage submittal shall include the following items:

   a. A detailed list of any exceptions, functional differences, or discrepancies between the system proposed by CONTRACTOR, the OWNERS System Integrator, and this specification.

   b. Product catalog cut sheets on all hardware and software items, clearly marked to show the model number, optional features, and intended service of each device.

   c. A brief, concise description of the proposed system, including major hardware and software components and personnel training.

d. A block diagram or schematic drawing showing the principal items of equipment furnished, including model numbers, and their interrelationships.

e. Drawings showing floor and wall space or desktop area requirements for all equipment items, including allowances for door swings and maintenance access.

f. Environmental and power requirements, including heat release information for each equipment item.

g. Standard field termination drawings for all process input/output equipment, showing typical terminations for each type of point available in the system.

h. A copy of the proposed software licenses for all software associated with the system (if applicable).

i. Outline for training classes.

j. Additional Requirements identified in other Division 40 - Instrumentation sections.

E. SECOND STAGE SUBMITTAL

1. Before any equipment is procured or constructed and before factory testing is scheduled, the following data shall be submitted. The first and second stage submittals may be combined only with prior approval from OWNER.

a. Complete panel fabrication drawings and details of panel wiring, piping, and painting. Panel and subpanel drawings shall be to scale and shall include overall dimensions, metal thickness, door swing, mounting details, weight, and front of panel arrangement to show general appearance, with spacing and mounting height of instruments and control devices.

b. Wiring and installation drawings for all interconnecting wiring between components of the system and between related equipment and the equipment furnished under this section. Wiring diagrams shall show complete circuits and indicate all connections.

c. If panel terminal designations, inter-device connections, device features and options, or other features are modified during the fabrication or factory testing, revised drawings shall be submitted before shipment of the equipment to the site.

d. Fiber termination diagrams to show all fiber terminations at fiber patch panels and final termination at equipment. Fiber termination diagrams shall show individual fiber type (single or multimode), fiber core/cladding dimensions, fiber colors, circuit identifications, and type of terminator.

e. Review of drawings submitted prior to the final determination of related equipment shall not relieve CONTRACTOR from supplying systems in full compliance with the specific requirements of the related equipment.

f. Proposed lesson plans or outlines for all training courses specified herein, including schedule, instructors' qualifications and experience, and recommended prerequisites.

g. Additional Requirements identified in other Division 40 - Instrumentation sections.

F. THIRD STAGE SUBMITTAL (OPERATION AND MAINTENANCE MANUALS)

1. Complete system documentation, in the form of Operation and Maintenance Manuals, shall be submitted before the commencement of field acceptance testing. Operation and Maintenance Manuals shall include complete instruction books for each item of equipment and software furnished. Where instruction booklets cover more than one specific model or range of device, product data sheets shall be included which indicate the device model number and other special features. A complete set of "as-built" wiring, fabrication, and interconnection drawings shall be included with the manuals. If field-wiring modifications are made after these drawings are submitted, the affected drawings shall be revised and resubmitted. Additional requirements are identified in other Division 40 - Instrumentation specification sections.

1.4 QUALITY ASSURANCE

A. Equipment and software furnished under this section and under other related sections listed in Paragraph 1.1 – RELATED SECTIONS above, shall be designed, coordinated, and supplied by a single manufacturer or supplier, the CONTRACTOR. The CONTRACTOR shall be regularly engaged in the business of supplying computer-based monitoring, control, and data acquisition systems with a minimum of five (5) years of experience that can be demonstrated upon request by OWNER. The CONTRACTOR and OWNERS System Integrator shall coordinate all control system related

items, check-out and calibrate instruments, and perform all testing, training, and startup activities specified to be provided.

B. Systems supplied under this section shall be designed and coordinated by CONTRACTOR and OWNERS System Integrator for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications, under other contracts, and, where applicable, with related existing equipment. All equipment shall be designed and installed in full conformity with the Drawings, specifications, engineering data, instructions, and recommendations of the manufacturer, and the manufacturer of the related equipment.

C. CONTRACTOR shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.

D. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts, furnished at any time, can be installed in the field.

E. Like parts of duplicate units shall be interchangeable. Equipment shall not have been in service at any time prior to delivery, except for testing.

1.5 GENERAL REQUIREMENTS

A. The drawings and specifications indicate the extent and general arrangement of the systems. If any departures from the Drawings or Specifications are deemed necessary by CONTRACTOR, details of such departures and the reasons shall be submitted to OWNER for review with or before the first stage submittal. No departures shall be made without prior written acceptance.

B. The specifications describe the minimum requirements for hardware and software. Where CONTRACTOR'S standard configuration includes additional items of equipment or software features not specifically described herein, such equipment or features shall be furnished as a part of the system and shall be warranted as specified herein.

C. Layout dimensions will vary between manufacturers and the layout area indicated on the Drawings is based on typical values. The CONTRACTOR shall review the Drawings, the manufacturer's layout drawings and installation requirements, and make any modifications requisite for proper installation subject to acceptance by OWNER. At least three (3) feet of clear

access space shall be provided in front of all instrumentation and control system components.

D. Signal converters, signal boosters, amplifiers, special power supplies, special cable, special grounding, and isolation devices shall be furnished as needed for proper performance and protection according to manufacturer recommendations of the equipment.

E. A programming or system-configuring device shall be provided for systems that contain any equipment that requires such a device for routine calibration, maintenance, and troubleshooting. The programming device shall be complete, newly purchased for this project, and shall be in like-new condition when turned over to OWNER at completion of startup.

F. All devices shall be provided with permanent identification tags. The tag numbers shall agree with CONTRACTOR'S equipment drawings and shall be as close as practical to the tag numbers used on the Drawings and device schedules. All field-mounted transmitters and devices shall have stamped stainless steel identification tags. Panel, subpanel, and rack-mounted devices shall have laminated phenolic identification tags securely fastened to the device. Hand-lettered or tape labels will not be acceptable.

1.6 DELIVERY, STORAGE AND HANDLING

A. All electronic equipment and instruments shall be suitably packaged to facilitate handling and to protect against damage during transit and storage. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements, shall be kept dry at all times, and shall not be exposed to adverse ambient conditions.

B. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted surfaces that are damaged prior to acceptance of equipment shall be repainted to the satisfaction of OWNER.

C. Each shipment shall include an appropriate shipping list that indicates the contents of the package, including the specific instrument tags. The shipping list shall be accessible without exposing the instruments to the atmosphere. The shipping list shall also contain any cautionary notes regarding storage of the instruments, including requirements to protect the instrument from static discharge, desensitizing chemicals (solvents, paints, etc.), or ambient atmospheric conditions.

D. Individual instruments shall be appropriately tagged or labeled to positively identify the device. All identification shall be visible without the need to unpack the instrument from its protective packaging.

E. Instrument shipment and storage requirements shall be coordinated with OWNER prior to shipment. CONTRACTOR shall provide adequate storage and be ready to accept the shipment before shipping any equipment to the site. Additional shipping and storage requirements shall be as detailed in the individual instrument specifications.

F. Components which are shipped loose due to transportation limitations shall be assembled and disassembled by the manufacturer prior to shipment to assure that all components fit together and are adequately supported.

1.7 SPARE PARTS

A. Spare parts and consumable items are specified in other Division 40 – Instrumentation sections.

B. All spare parts shall be delivered to OWNER before final acceptance of the system. Packaging of spare parts shall provide protection against dust and moisture and shall be suitable for storage. Circuit boards and other electronic parts shall be enclosed in anti-static material. All packages shall be clearly marked with the manufacturer's name, part number or other identification, date of manufacture, and approximate shelf life.

C. CONTRACTOR may utilize spare parts and supplies during system installation, de bugging, startup, or training, but shall restore all such materials and supplies to the specified quantities before final acceptance of the systems.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. As listed in subsequent sections.

B. Substitutions: Substitutions shall comply with specified requirements.

2.1 MATERIALS AND EQUIPMENT

A. CONTRACTOR shall furnish all labor, materials, and components, and shall provide all design, assembly, testing, and start-up services required as described herein and in other related sections.

2.2 GENERAL REQUIREMENTS

A. All equipment furnished under each Division 40 specification is a part of this section and shall be selected by CONTRACTOR for its superior quality and intended performance. Equipment and materials used shall be subject to review.

B. The systems furnished shall be standard products. Where two (2) or more units of the same type of equipment are supplied, they shall be the products of the same manufacturer; however, all components of the systems furnished hereunder need not be the products of one manufacturer unless specified herein.

C. To the extent possible, instruments used for similar types of functions and services shall be of the same brand and model line. Similar components of different instruments shall be the products of the same manufacturer to facilitate maintenance and stocking of repair parts. Whenever possible, identical units shall be furnished.

2.3 PERFORMANCE AND DESIGN REQUIREMENTS

A. The design of the systems furnished hereunder shall utilize concepts, techniques and features that provide maximum reliability and ease of maintenance and repair. The systems shall include board-level devices such as light emitting diodes or other indicators to facilitate quick diagnosis and repair. Diagnostic software shall be furnished to facilitate system-level troubleshooting.

B. Where redundant hardware is provided, the system shall be capable of performing all specified functions, without reconfiguring hardware or software, with only one (1) device of each category in service.

C. Equipment shall be shipped completely factory assembled, except where its physical size, arrangement, configuration, or shipping and handling limitations make the shipment of completely assembled units impracticable.

2.4 POWER SUPPLY AND INSTRUMENT SIGNAL

A. Power supply to all control system equipment will be 120 Volts, 60 Hz, single phase, unless shown otherwise on Drawings. CONTRACTOR shall be responsible for distribution of power among enclosures, consoles, peripherals, and other components of the system from the power supply receptacles and junction boxes indicated on the Drawings. Power distribution hardware shall include cables and branch circuit overcurrent protection installed in accordance with the Section 26 05 11 – General Electrical Requirements.

B. Unless otherwise indicated, power supply to the instrumentation will be regulated 24 Volts DC. Unless otherwise indicated, all transmitted electronic analog instrument signals shall be 4-20 mA dc and shall be linear with the measured variable.

C. Equipment not indicated to be powered from an uninterruptible power source shall be suitable for being supplied from the facility distribution system and shall be capable of withstanding voltage variations of ± 10 percent and harmonics up to the limits of IEEE 519 without affecting operation. CONTRACTOR shall provide voltage conditioning or filtering equipment if necessary to meet the requirements specified.

D. Power supplies for voltages other than those listed above shall be an integral part of the equipment furnished. Internal power supplies shall be regulated, current limiting, and self-protected.

E. All equipment shall meet all surge withstand capability tests as defined in ANSI C37.90 without damage to the equipment.

F. An uninterruptible power supply (UPS) shall be furnished hereunder to power the equipment indicated on the Drawings or will be furnished under another section. CONTRACTOR shall be responsible for coordinating the size of the UPS unit with the equipment furnished hereunder and shall advise OWNER if a unit of higher capacity is necessary.

2.5 SERVICE CONDITIONS AND ENVIRONMENTAL REQUIREMENTS

A. The equipment provided for the instrumentation and control system shall be suitable for the service conditions specified in the Division 40 – Instrumentation sections.

B. All equipment shall be designed and selected to operate without degradation in performance throughout the environmental extremes specified. Equipment shall be designed to prevent the generation of electromagnetic and radio frequency interference and shall be in compliance with FCC Rules and Regulations, Part 15, for Class A computing devices.

C. All system equipment located in air-conditioned rooms shall be suitable for operation in ambient temperatures from 10 degrees C to 35 degrees C and a relative humidity of 10 to 80 percent, noncondensing. All equipment located in non-air-conditioned indoor areas shall be suitable for an ambient temperature range of 0 degrees C to 50 degrees C and a relative humidity of 10 to 95 percent, noncondensing. All equipment located outdoors shall be suitable for operation in an ambient temperature range minus 20 degrees C to 60 degrees C and a relative humidity of 5 to 100 percent. Heaters and air conditioning/cooling equipment shall be provided where essential to maintain equipment within its manufacturer-recommended operating ranges.

D. All equipment and instruments shall be designed to operate at the site elevation of 360 feet.

E. All system equipment will be installed in areas without anti-static floor construction and without any provisions for control of particulates or corrosive gases other than ordinary office-type HVAC filtering. CONTRACTOR shall furnish any additional air cleaning equipment, anti-static chair pads, or other protective measures necessary for proper operation of the system.

All input/output hardware shall meet or exceed, without false operation, all requirements of NEMA ICS-1-109.60, Electrical Noise Tests.

F. The equivalent "A" weighted sound level for any system equipment located in the control room, except printers, shall not exceed 35 dBA. Sound reduction enclosures shall be provided where necessary to comply with these limits.

G. In addition to other environmental protection specified herein, the entire system shall be provided with lightning protection. Lightning protection measures shall include the following:

1. All major components of the system shall have a low resistance ground connection. Grounding system provisions indicated on the Drawings shall be modified as recommended by CONTRACTOR.

2. Surge and lightning suppressors shall be non-faulting, non-interrupting, and shall protect against line-to-line and line-to-ground surges. Devices shall be solid-state metal oxide varistor (MOV) or silicon junction type, with a response time of less than 50 nanoseconds. Surge protective devices shall be applied for the following:

a. All 120 VAC power connections to RTUs, PLCs, DCUs, instruments and control room equipment. Surge arresters shall be Transtector "ACP-100-HW Series", Power Integrity Corporation “ZTA Series”, Phoenix Contact “Mains PlugTrab”, or MCG Surge Protection “400 Series”.

b. All connections to coaxial-based networked equipment (including CCTV, CATV, Ethernet, Arcnet, and satellite) where any part of the circuit is outside of the building envelope. Surge arresters shall be Telematic “VP08”, Transtector CCTV-PTZ Series”, Phoenix Contact “CoaxTrab Series”, or Northern Technologies “TCS-CP3 Series”.

c. All analog signal circuits where any part of the circuit is outside of the building envelope. Circuits shall be protected at both the transmitter and the control system end of the circuit.

d. Surge protection devices shall not impede or interfere with the use of smart transmitter calibration/communication. Protection devices located near the transmitter shall be Telematic "TP48." Protection devices in control panels shall be Transtector "PDS Series or FSP Series", Telematic "SD Series", Phoenix Contact "PipeTrab Series", or Citel "BP1-24."

e. All metallic pair (twisted and untwisted) conductor local area network and data highway termination points, where any part of the data highway cable is routed outside of the building envelope. Single-port protective devices shall be Phoenix Contact "PlugTrab Series", Transtector "FSP" Series", or Telematic "NP Series."

f. All serial, PLC data highway, and remote I/O network termination points where any part of the circuit is routed outside of the building envelope. Surge protection devices shall be Transtector "DRDC Series" (RS-232); Transtector "FSP Series" (RS-422), Phoenix Contact "PlugTrab Series" or Citel "E280 Series".

g. All telephone lines at points of connection to the system. Protection devices for dial-up circuits shall be Transtector "TSJ Series", Telebyte "Model 22PX", Citel "BP1-T", or equal. Protection devices for full period circuits shall be Transtector "LMP Series", Northern Technologies "DLP-S Series", Phoenix Contact "TeleTrab Series", or Circuit Components, Inc. "SPR-TM Series."

2.6 SCADA PANEL

A. SCADA panel shall be a C-more EA9-T8CL mounted on the front of the control system cabinet.

PART 3 – EXECUTION

3.0 INSTALLATION REQUIREMENTS

A. The installation of equipment furnished hereunder shall be by the CONTRACTOR or their assigned subcontractors.

B. Field wiring materials and installation shall be in accordance with the Section 26 05 11 – General Electrical Requirements.

C. Instruments shall be mounted so that they can be easily read and serviced and so that all appurtenant devices can be easily operated. Installation details for some instruments are indicated on the Drawings.

D. All outdoor instrumentation shall be protected from direct sun exposure. Instruments shall be placed in locations to limit south and west sun exposure. Sunshades shall be:

1. Provided on instruments that are subject to the direct sun exposure.
2. Located so the opening faces north or east where possible.
3. Provided as shown on the Drawings.

E. All necessary testing equipment for calibration and checking of system components shall be provided by CONTRACTOR. CONTRACTOR shall also furnish calibration and maintenance records for all testing and calibration equipment used on the site if requested by OWNER.

3.1 SYSTEM SOFTWARE CONFIGURATION

A. The SCADA and PLC programming software will be provided configured by the CONTRACTOR and OWNERS System Integrator who shall be responsible for the following tasks:

1. Provide complete startup, checkout, and calibration of all system hardware and I/O specified herein.

B. Configure the POD Project PLC (POD PLC) with the following analog inputs. Scale analog inputs to gpm for flow, inches for level, and degrees F for temperature for the following analog inputs:

1. Analog Input: Intake Screen River Water Level
2. Analog Input: Intake Screen Wet Well Level
3. Analog Input: Discharge Raw Water Turbidity
4. Analog Input: Discharge Raw Water Header Pressure
5. Analog Input: Pump Station Raw Water Flow
6. Analog Input: Pump Station Indoor Air Temperature
7. Analog Input: Pump Station Outdoor Air Temperature

C. Configure the POD PLC with the following analog outputs. Scale analog output as described below:

1. Economizer Fan Run and Speed
    a. 1-10VDC Signal; 0-2V Fan Off, 2-10V Fan 0-100% Speed

D. Configure POD PLC with the following digital inputs.
1. For the Intake Screen Panel provide digital inputs for the following:
    a. Intake Screen Alarm/Fault
    b. Intake Screen Status Clearing
    c. Intake Screen Status Auto
    d. Intake Screen Status Ready
2. For the High-Resistance ground system provide digital inputs for the following:
    a. HRG system normal
    b. HRG system ground fault alarm
    c. HRG system failure alarm
    d. HRG system loss of control power
3. For Intrusion alarming and security provide digital inputs for the following:
    a. South Roll-up Door limit switch
    b. South Door limit switch
    c. North Door limit switch
    d. Records Room Door limit switch
    e. Station fire alarm control panel trouble
    f. Station Fire Alarm control panel alarm
    g. Station camera system UPS alarm
4. For the water hydraulic pressure tank, provide digital inputs for the following:
    a. Water hydraulic pressure tank compressor running
    b. Water hydraulic pressure tank system pressure low
    c. Water hydraulic pressure tank heater on
    d. Water hydraulic pressure tank system alarm
5. For the ATS provide digital inputs for the following:
    a. ATS Mode Normal

b. ATS Mode Standby Generator

c. ATS Mode Test

d. ATS Alarm

6. For the standby Engine-Generator, provide digital inputs for the following:

a. Standby Generator Off

b. Standby Generator On

c. Standby Generator Alarm

E. Configure POD PLC with the following digital outputs:

1. Economizer Fan Enable

2. Unit Heaters Run

3. Mini split cooling system fan run

4. Mini split cooling system cooling run

F. The CONTRACTOR and OWNERS System Integrator will provide a detailed functional specification for the POD PLC system operation. This system will need to be designed to meet the following objectives:

1. Provide manual controls to adjust individual VFD setpoints and operation for direct operator control of the water supply.

2. Provide automatic controls to supply water to the WTF at an adjustable flow rate or maintain an adjustable tank level.

3. Provide water to the Wanaket wetlands in accordance with the OWNERS Water Infrastructure Development Agreement.

4. Provide system statuses, data, alarms, controls and telemetry to the system operators via the POD SCADA system.

3.2 SYSTEMS CHECK OUT

A. CONTRACTOR shall provide the services of a field manager to assist the installation contractor during installation, and to calibrate, test, and advise others of the procedures for installation, adjustment, and operation.

B. CONTRACTOR shall appoint a field services manager who shall be available during all system check-out and startup activities, and who shall be immediately available to OWNER by phone or on site for the duration of this project.

C. After each instrument has been installed, a technical representative of CONTRACTOR shall calibrate each instrument as part of the prestart up testing and shall provide a written calibration report for each instrument, indicating the results and final settings. The adjustments of calibrated instruments shall be sealed or marked, insofar as possible, to discourage tampering. Instrument calibration shall be done before checkout of the system operation.

D. After installation and wiring connections are complete, the field supervisor, with additional CONTRACTOR'S personnel shall verify that each external connection to the system is correctly wired and field process components and devices are functioning as intended. CONTRACTOR shall be responsible for completing the following scope of work:

1. Analog Signals. Analog input signals shall be simulated at the transmitting source and verified to be received at the proper register address in the control system. Analog outputs shall be generated at the control system, and verified to be received with the correct polarity, at the respective receiving device.

2. Discrete Signals. Discrete input and output signals shall be simulated and verified that they are received at the respective receiving device, and at the proper voltage.

3. Devices by Other Suppliers. If interrelated devices furnished by other suppliers, under other contracts, or by OWNER, such as valve actuators, motor controls, and instruments, do not perform properly at the time of system checkout, the field manager shall use suitable test equipment to introduce simulated signals to and/or measure signals from these devices to locate the sources of trouble or malfunction.

E. The CONTRACTOR shall submit a written report on the results of such tests to the OWNER. Additional documentation shall be furnished as requested by the OWNER to establish responsibility for corrective measures. CONTRACTOR shall verify, in writing, to the OWNER that CONTRACTOR has successfully completed the external connection check before beginning system startup or field acceptance testing.

F. After the field manager has completed the system check and submitted his “Systems Check Out” report, CONTRACTOR and OWNERS System Integrator shall supply a factory-trained engineer to provide on- site start up assistance. During the startup period, these personnel shall thoroughly check all equipment, correct any deficiencies, and verify the proper

operation of all components. A Minimum of five (5) working days shall be included for this task.

3.3 FACTORY ACCEPTANCE TESTING

A. The system shall be acceptance tested at the factory and on site.

B. CONTRACTOR and OWNERS System Integrator shall prepare a testing procedure to be approved by OWNER that shall demonstrate that the system conforms to the specifications. The testing procedure shall be submitted at least thirty (30) days in advance of testing. The testing shall be conducted by CONTRACTOR and OWNERS System Integrator, and witnessed by OWNER.

C. CONTRACTOR shall notify OWNER in writing at least twenty-one (21) days before the proposed testing date. If the factory acceptance test is concluded unsuccessfully, the test shall be repeated. CONTRACTOR shall reimburse OWNER for all expenses incurred in connection with attending repeated factory or site testing necessitated by system failure or inadequate preparation.

D. After system assembly and debugging at CONTRACTOR'S facility, the system shall be tested before the system is shipped to the site.

E. The system shall operate continuously for at least 72 hours without faults. This operational test may run concurrently with the demonstration of hardware functions. The test procedure shall also include at a least four-hour period for discretionary tests to be conducted by OWNER.

F. For systems with software configuration by the OWNER, a preliminary version of such configured software may be used as part of the factory acceptance test.

1. Processors, processor modules, and peripheral devices associated with the system shall be assembled together as they will be installed in the field and shall be tested. The test shall demonstrate proper operation of each hardware device and communications among devices, and shall include verification of selected analog and discrete inputs and outputs.

3.4 SITE ACCEPTANCE TESTING

A. After installation and checkout by CONTRACTOR'S personnel and OWNERS System Integrator, the system shall be subjected to an acceptance test.

B. Site acceptance testing shall be scheduled after receipt of the “System Check Out” Report. CONTRACTOR and OWNERS System Integrator shall

verify that all field signal changes are reflected in the proper address locations in the system database.

C. The site acceptance testing shall follow the same procedure as the factory testing and shall operate without loss of basic functions. In addition, the CONTRACTOR and OWNERS System Integrator shall support Functional and Operational testing as required in Section 01 60 60 - Facility Startup.

D. The Functional demonstration shall confirm that the status, alarm, and process variable signals are valid and are being updated appropriately, and that the discrete and analog output signals from the control system are being correctly transmitted and implemented. Any errors or abnormal occurrences shall be recorded by CONTRACTOR'S field representative for the Test Manager.

E. CONTRACTOR'S field representative need not be continuously present during the site acceptance testing but shall be available to respond to the site within one (1) hour of notification. The representative shall inspect the system for faults at least once every twenty-four (24) hours and shall log or record any noted problems. The log shall include a description of the problem, its apparent cause, and any corrective action taken.

1. Failure of Redundant Equipment. Failure of redundant equipment shall not be considered downtime provided that automatic failover occurs as specified and, in the opinion of the OWNER, the failure was not caused by deficiency in design or installation. In the event of repeated failure of any hardware component or software module, the acceptance test shall be terminated and re-started.

2. Completion of Test. Successful completion of the site acceptance test, including the operational demonstration per Section 01 60 60 - Facility Startup.

3.5 TRAINING

A. CONTRACTOR and OWNERS System Integrator shall conduct training courses for personnel selected by the OWNER. Training shall be provided. Training shall be conducted by experienced instructors who are familiar with the specific instrumentation supplied.

B. In general, CONTRACTOR'S standard training courses may be used to meet the training objectives specified. Where standard courses do not meet these objectives, additional coursework shall be developed. Clock hour requirements for each level of training shall be as listed. A "clock hour" is defined as one (1) hour of instruction or supervised training exercise. Training hour requirements are the number of hours of training to be

provided for each student. Additional training time shall be provided if considered necessary to meet the training objectives.

1. Training Costs. All costs associated with the training program; excluding travel, lodging, and per diem expenses for OWNER's personnel to attend off-site training programs; shall be the responsibility of CONTRACTOR and shall be included in the contract price.

2. Lessons. Training lesson plans and other information for the second stage submittal as defined herein shall be submitted at least thirty (30) days prior to the start of training.

C. Training on the calibration, maintenance, troubleshooting, and repair for the instrument devices provided under this project shall be provided. Training shall also be provided for any hand-held or computer-based calibration devices and their associated software. Eight (8) hours of training for six (6) students shall be provided at the OWNER's facility.

D. CONTRACTOR and OWNERS System Integrator shall provide additional training to the OWNER's personnel on topics of OWNER's choosing. Supplemental training shall be conducted in one (1) session at the OWNER's facilities using the hardware and software installed for this project. The training shall consist of eight (8) hours of instruction for six (6) students.

– End of Section –

SECTION 40 64 00

PROGRAMMABLE LOGIC CONTROLLERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers programmable logic controllers (PLCs), including associated input/output hardware and panel mounted operator interface to control process equipment and serve as the interface to field devices.

B. The Instrumentation and Control System section shall apply to all equipment furnished in this section.

C. Equipment furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by OWNER.

D. The General Equipment Stipulations shall apply to all equipment and materials furnished under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

E. Supplementing this section, the Drawings indicate the number and types of PLCs, locations of PLCs, and provide diagrams and schematics regarding connection and interaction with other equipment. All hardware, including power supplies, special cables, and other appurtenant equipment, shall be provided to meet the functional requirements described herein and indicated on the Drawings.

F. The CONTRACTOR shall provide necessary coordination and support to the OWNERS System Integrator for all RIVER PUMP STATION equipment system software integration for the SCADA, including SCADA computer, PLC, and HMI programming.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 60 00 – Products Requirements
Section 01 43 00 – Contractor Quality Assurance
Section 40 61 11 – Instrumentation and Control System
Section 40 66 11 – Network Systems
Section 40 66 33 – Metallic and Fiber Optic Communication Cable and Connectors

Section 40 67 11 – Panels, Consoles, and Appurtenances

1.2 CONTRACTOR SUBMITTALS

A. Submit in accordance with section 01 33 00 – Contractor Submittals and as detailed in Section 40 61 11 – Instrumentation and Control System.

B. Product Literature: Submit the product literature for the PLC and the software used for programming.

1.3 DELIVERY, STORAGE, AND SHIPPING

A. Delivery, storage and shipping shall be as specified in Section 40 61 11 – Instrumentation and Control System.

1.4 SPARE PARTS

A. Spare parts shall be furnished as follows:

SPARE PART	QUANTITY
Power supply modules	Two (2) of each type used
I/O modules	One (1) of each type used
Communications modules	One (1) of each type used

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. The PLCs shall be a CompactLogix system as manufactured by Rockwell Automation/Allen-Bradley with a 5069-L3X processor, without exception.

B. Substitutions

1. There shall be no substitutions allowed.

2.1 PRODUCTS

A. POWER SUPPLIES

1. Regulated dc power supplies shall be provided in each PLC enclosure for analog inputs, analog outputs, and digital outputs, digital inputs. Power supplies shall be suitable for an input voltage variation of ±10 percent, and the supply output shall be fused or protected against short-circuiting. Output voltage regulation shall be as required by the instrumentation equipment supplied under other Division 40 – Instrumentation sections.

2. The loop power supply shall be isolated as shall sources from analog cards to isolate from processor and digital rack power supply.

3. The power source for all digital inputs from field devices shall be separately fused for each digital input module. Unless otherwise noted, all field devices will be provided with dry contacts that close to provide an input to the PLC.

B. APPURTENANCES

1. The PLC Rack and I/O hardware shall be provided as complete systems, as shown on the block diagram drawings. The PLCs shall include all necessary hardware and software for a complete working system. All special rack or panel mounted power supplies, special interconnecting and programming cables, special grounding hardware, or isolation devices shall be furnished for proper operation of the equipment. Signal converters, signal boosters, amplifiers, special power supplies, special cable, special grounding, intrinsically safe relays and current repeaters, surge suppression devices, and isolation devices shall be furnished and installed for proper operation of the equipment.

C. INPUT/OUTPUT HARDWARE

1. Input/output hardware shall be arranged as indicated on the Drawings. Programmable logic controller systems shall support the following types of input/output modules.

   a. 24-Volt DC digital input and output.

   b. 4-20mA DC analog input.

2. All digital input/output hardware shall include isolation against surges of at least 1,500 volts. All output hardware connected to inductive loads shall be supplied with surge suppression devices and recommended by the PLC manufacturer to prevent damage to output hardware. Input/Output modules will be acceptable if they meet the following requirements:

   a. All input/output modules shall utilize easily removable plug-in or hinged field wiring terminals to allow removal of modules without disconnecting individual wires.

   b. Outputs for motor driven equipment will typically be powered from the driven equipment. Digital outputs for miscellaneous equipment shall be powered either from the controlled

equipment or the PLC enclosure as indicated on the Drawings or as coordinated with the controlled equipment supplier.

c. Outputs that control process equipment specified under other sections or provided under other contracts shall be fully isolated or shall operate either interposing relays or relay-type digital output modules in the PLC cabinet.

d. Digital input modules shall sense voltages between 20- and 28-Volts DC and shall have LED indicators for each point to display the status of the field contact. Each input module shall be suitable for being connected to a separate voltage source and return. Return voltage may be common to the entire input module. Digital input modules shall have multiple inputs. Digital input modules shall be Allen Bradley 1756-IB16 without exception.

e. Digital output modules shall control voltages from 20- and 28-volts dc and shall be rated at least 1 ampere. Outputs shall be individually fused and shall have LED indicators to display output status. Outputs shall withstand a surge of at least 80 amperes for one cycle and shall have an off-state leakage current not to exceed 2.0 mA. Digital output modules shall have multiple outputs. Digital output modules shall be Allen Bradley 1756-OB8 without exception.

f. Analog input modules shall accept linear 4-20 mA DC signals from field transmitters. Analog to digital conversion accuracy shall be at least 12-bit (0 4095 count) resolution. Analog input modules shall have multiple inputs. Each input shall be fully isolated from the other inputs and shall be current sourcing. Analog input modules shall be Allen Bradley 1756-IF8I without exception.

2.2 GENERAL REQUIREMENTS

A. All programmable logic controller systems shall be products of the same manufacturer and of the same series or product line. Processors, local and remote input/output hardware, communications modules, and specialty modules such as coprocessors and communications modules shall be interchangeable among all I/O panels and systems. PLC modules and hardware by other manufacturers will be acceptable only if the PLC manufacturer does not offer suitable modules and hardware for the same functions.

B. CONTRACTOR shall provide adequate memory for the amount of I/O, control algorithms, and communications in the initial system.

C. Each PLC input/output enclosure shall be provided with at least 20 percent spare inputs and outputs of each type. Spare I/O shall be installed, wired, and interfaced properly to the terminal strip. The spare I/O shall be in addition to any I/O installed and reserved for future process signals as may be indicated on the I/O list. In addition, each PLC input/output enclosure shall be capable of accommodating 20 percent of additional input/output capacity of each type as originally assembled, without the need for additional expansion racks, communication adapters, cables, or PLC power supplies.

D. Each PLC processor and associated I/O shall have a future expandability as shown on the drawings.

E. The PLCs shall be distributed and arranged as indicated on the Drawings.

F. PLCs will be installed in environments as specified in Section 40 61 11 - Instrumentation and Control System.

G. All PLC input/output signals for field connections shall be terminated through panel enclosure terminal strips. Direct connection of field wiring to the I/O module terminals is not acceptable.

H. Interposing relays shall be incorporated on all I/O circuits, where required by the application of isolate foreign power sources, where the continuous output rating of the PLC relay digital or output module is not sufficient to power the connected device or equipment, or where otherwise required by the CONTRACTOR'S equipment. Interposing relays shall be provided for any digital output module output signal that leaves the PLC enclosure. Interposing relays shall be mounted in the PLC enclosure containing the output module that activates the relays. Relays shall be furnished as specified in Section 40 67 11 – Panels, Consoles, and Appurtenances.

I. Programmable logic controllers and input/output hardware shall be housed in shop assembled panels as indicated on the Drawings and as described in Section 40 67 11 – Panels, Consoles, and Appurtenances.

2.3 COMMUNICATIONS

A. Each programmable controller system shall be furnished complete with communication hardware modules for local input/output hardware, remote input/output hardware, or for host computers.

B. All PLC Rack mounted Ethernet hardware shall be Allen-Bradley 1756-EN2T, no exceptions.

C. Communication hardware shall be compatible with the cable, data highway, fiber optic, or radio communication media. Ethernet components and cable are specified in Section 40 66 11 – Network Systems and Section 40 66 33 – Metallic and Fiber Optic Communications Cable and Connectors.

D. Each programmable logic controller shall be individually addressable so that only the selected controller responds when queried. IP addressing shall be used. Designation of a controller's network address may be either a software or hardware function.

E. CONTRACTOR shall provide all necessary communications hardware. Hardware shall be included for, but not be limited to, remote I/O, data highway, host computer, fiber optics, Ethernet and radio.

1. PLC to Remote Communications Hardware. Remote I/O equipment shall not be designed, only direct wiring to the PLC shall be allowed.

2. PLC to Host Communications Hardware. Each PLC shall communicate to the host computer over a data highway communications network. CONTRACTOR shall include all rack mounted, enclosure mounted, or desktop mounted communications modules required for a complete working system.

F. COMMUNICATIONS MEDIA

1. CONTRACTOR shall provide all necessary cabling for the PLC. Communications cables shall meet the requirements of the manufacturers of the PLCs and communications modules. PLC communications media shall be as specified under Section 40 66 11 – Network Systems.

G. MEDIA CONVERTORS

1. Converters shall be supplied as required to provide conversion between fiber optic cable and copper cable. CONTRACTOR shall coordinate the media converter and termination equipment with the fiber optic and network protocols.

PART 3 – EXECUTION

3.0 INSTALLATION REQUIREMENTS

A. PLCs installation requirements are specified in Section 40 61 11 – Instrumentation and Control System except as described herein.

B. Field check, testing, and training shall be as specified in the Section 40 61 11 – Instrumentation and Control System in coordination with Section 01 60 60 - Facility Startup.

3.1 CONFIGURATION

A. Configuration services are specified in the Section 40 61 11 – Instrumentation and Control System.

– End of Section –

SECTION 40 66 11

NETWORK SYSTEMS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The Networks Systems section covers the furnishing of all hardware and software for network systems for the Instrumentation and Control System. Principal components of the network systems shall be as indicated on the block diagram Drawings and as described below. The CONTRACTOR and OWNERS System Integrator shall be responsible for the network communications between the programmable logic controller (PLC) in the Pump Station building and the OWNER'S SCADA System at the Water Treatment Facility (WTF). The CONTRACTOR shall provide fiberoptic cable between the Pump Station and the WTF. OWNER shall terminate and provide equipment for extending telephone and internet services to the Pump Station.

1. Network Functional Description. The network system shall provide communications between the operator workstations, servers, and PLCs.

2. CONTRACTOR shall furnish all necessary equipment, interconnecting cables, accessories, and appurtenances for proper network operation and to meet the functional requirements indicated on the Drawings and specified herein. Configuration of all hardware shall be provided by the CONTRACTOR and OWNERS System Integrator.

B. Equipment and services provided under the Networks section shall be subject to the general requirements specified herein. Supplementing this section, network data, special requirements, and options may be indicated on the Drawings.

C. Division 01 General Requirements shall apply to all equipment and materials provided under this section. If requirements in this specification differ from those in Division 01, the requirements specified herein shall take precedence.

D. Supplementing this section, the Drawings indicate locations and arrangement of hardware and enclosures, provide mounting details, and may show other information regarding the connection and interaction with other equipment.

E. Governing Standards for network systems shall be as specified in Section 40 61 11 – Instrumentation and Control System.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractors Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Products Requirements
Section 01 60 60 – Facility Startup
Section 27 10 00 – Building Communications Cabling Systems
Section 40 61 11 – Instrumentation and Control System
Section 40 66 11 – Network Systems
Section 40 67 11 – Panels, Consoles, and Appurtenances

1.2 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractors Submittals.

B. Network design submittal:

1. Shall be provided with the First Stage Submittals detailed in Section 40 61 11 – Instrumentation and Control System.

2. A complete network topology diagram, detailing all hardware, cabling and the interconnections between all connected equipment. Interconnections to existing installed equipment and OWNER-Supplied equipment shall be included in the diagram.

C. Network operations and maintenance submittal:

1. Shall be provided with the Third Stage Submittals detailed in Section 40 61 11 – Instrumentation and Control System.

2. All Network Design documentation shall be provided in the Operation & Maintenance manuals.

1.3 SPARE PARTS

A. Spare parts shall be provided as specified below:

SPARE PARTS	**QUANTITY**
Switches	One (1) of each type.
Converters	One (1) of each type.
Panel Mounted Fiber Patch Panel	One (1) of each type

1.4 DELIVERY, SHIPMENT, PROTECTION, AND STORAGE

A. Equipment provided under this section shall be shipped, protected, and stored as specified in Section 40 61 11 – Instrumentation and Control System.

B. Identification of packaging shall be as described in Section 40 61 11 – Instrumentation and Control System.

COORDINATION WITH OWNER

C. The CONTRACTOR and OWNERS System Integrator shall coordinate all demolitions, installations and rework on the existing networks with OWNER. No work shall be performed without the written consent of the OWNER. The CONTRACTOR shall submit a written request to perform work on the existing network, including date, time, scope of work, length of time, and any OWNER's support that may be required.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. As listed in the subsequent sections.

2.1 GENERAL

A. The following paragraphs provide minimum Ethernet network device stipulations.

B. Special power supplies, special cable, special grounding, and isolation devices shall be furnished for proper performance of the equipment.

C. To the extent possible, components used for similar types of functions and services shall be the same brand and model line. Similar components of different network hardware shall be the products of the same manufacturer to facilitate maintenance and stocking of repair parts. Whenever possible, identical units shall be furnished.

D. A programming or system-configuring device, or software required for programming, shall be provided for systems that contain any equipment that requires such a device or software for routine maintenance and troubleshooting.

1. The programming device shall be complete, newly purchased for this project, and shall be in like-new condition when turned over to OWNER at completion of startup.

2. Programming software shall be licensed to OWNER.

2.2 ETHERNET NETWORK HARDWARE

A. Ethernet network hardware shall be provided as specified and/or as shown on the Drawings. All specified functionality of provided Ethernet network equipment shall adhere to the IEEE 802 standards.

B. Ethernet Hubs will not be accepted for network systems.

C. Ethernet switches shall be provided to connect multiple network segments together, selectively forwarding traffic between the segments.

1. Industrial (Panel-Mounted) Ethernet Switches: Each switch mounted in process areas shall include the following functionality:

a. Ports: Switch shall support the quantity of 10/100BaseTX ports and 100BaseFX fiber ports to meet the functionality indicated on the Drawings, with a minimum of 20 percent spare auto-negotiating 10/100Base-T, RJ-45 ports, and two (2) multimode fiber uplink ports. A minimum of four (4) UTP ports shall be provided.

b. Each switch connection shall automatically sense the network speed of the devices to which it is connected.

c. Capable of ring-based media redundancy with 30 ms recovery time.

d. Path Redundancy: IEEE 802.1w Rapid Spanning Tree Protocol.

e. Prioritization: IEEE 802.1p QoS Support.

f. Network Segregation: Port VLAN.

g. Management: SNMPv3 and Browser-based management shall be supported.

h. IGMP snooping supported.

i. LED indication of the link activity for each port.

j. Environmental: Suitable for installation in industrial environments. Operating Temperature Range: 0 to 60 degrees C. Optional minus 40 to 60 degrees C rating availability.

k. Redundant 24 VDC power supply inputs.

l. Conformal coating option for use in hazardous environments.

m. Mounting: DIN-rail mounted suitable for panel installation.

n. All necessary memory upgrades, software feature sets, and cables needed for proper operation of these switches shall be furnished with each switch.

o. Switches shall be Rockwell Automation/Allen-Bradley STRATIX 5400, without exception.

D. Ethernet wiring connectors shall be RJ-45 male modular plug connectors.

1. Standard connectors shall be polycarbonate, clear connectors. Connectors shall conform to RJ-45 and ISO 8877 standards. Contacts shall be gold plated with a 0.5A current rating and a minus 25 degrees to 60 degrees C temperature rating. Connectors shall accept unshielded Cat-5e or Cat-6, AWG 24, solid conductor cable.

E. The CONTRACTOR shall supply fiber optic media converters for all systems requiring conversion from copper media to fiber optic media. All converters shall be mounted in the network panels. The CONTRACTOR and OWNERS System Integrator shall coordinate the media converter and termination requirements with the fiber optic cable and network protocols.

1. Fiber optic to copper media converters for all computer networks shall convert twisted pair 10/100BaseT cable transmissions to 10/100BaseFX fiber optic cable transmissions.

2. Converters shall provide auto-sensing detection of network speed and full duplex or half duplex signaling. Converters shall have diagnostic LEDs for network speed and network traffic.

3. Converter copper port shall be 100BaseTX (RJ-45). Converter fiber port shall be compatible with connectors provided with fiber cable jumpers and compatible with fiber cable type and light wavelength.

4. Transmission Speed shall be 100Mbps on both ports. The converter shall be powered from 120 volts AC, or shall be provided with a plug-in transformer to provide the required voltage to the device.

5. Converters shall be as manufactured by Transition Networks, D-Link, Black Box, or approved equal.

F. Panel mounted fiber optic patch panels shall be Single mode.

1. Fiber optic patch panels in panels shall mount on DIN rail.

PART 3 – EXECUTION

3.0 NETWORK INSTALLATION REQUIREMENTS

A. Additional network installation requirements are specified in Section 40 61 11 – Instrumentation and Control System. Networks shall be installed and tested in accordance with the following requirements.

3.1 NETWORK CONFIGURATION

A. The CONTRACTOR and OWNERS System Integrator shall fully configure all network devices.

3.2 NETWORK TESTING

A. After each network has been installed, a technical representative of CONTRCTOR and OWNERS System Integrator shall test the network and shall provide a written report for each test. Specific testing requirements are described in the individual network specification sections.

B. A technical representative of CONTRACTOR and OWNERS System Integrator shall participate in the checkout of network systems. Systems check requirements shall be as specified in Section 40 61 11 – Instrumentation and Control System.

C. Unless specified otherwise, all test equipment for the calibration and checking of system components shall be provided by CONTRACTOR for the duration of the testing work and this test equipment will remain the property of CONTRACTOR.

1. Ethernet Network Minimum Test Requirements. The following minimum tests are to be performed by the CONTRACTOR:

    a. Verify Link Integrity Status LED is lit on both sides of each link.

    b. Verify proper operation and failover of each redundant component and redundant link.

    c. Verify alarming of each link failure.

    d. Verify bandwidth Usage.

2. Ethernet Network Test Reports. Upon completion and testing of the installed Ethernet network, the CONTRACTOR shall submit test reports to OWNER in printed form. Test reports are to show all test results performed by the CONTRACTOR for each port and piece of equipment. Date of calibration of the test equipment is also to be provided.

3.3 NETWORK TROUBLESHOOTING

A. It is the CONTRACTOR'S responsibility to provide trouble-free and reliable networks.

B. The CONTRACTOR shall employ any means necessary to ensure operational networks.

C. The CONTRACTOR shall obtain any needed test equipment, including but not limited to time-domain reflectometers, protocol analyzers and network sniffers, to troubleshoot any problems.

D. The CONTRACTOR shall utilize the services of a trained and certified Network Engineer that is regularly involved in troubleshooting network problems, in the event that operational or reliability problems exist.

E. Acceptable certifications include Cisco CCNP, Cisco CCIE, or Network Professional Association Certified Network Professional (CNP).

– End of Section –

SECTION 40 66 33

METALLIC AND FIBER OPTIC COMMUNICATION CABLE CONNECTIONS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The Network Cable section covers the furnishing and installation of cable systems to provide communications for the Pump Station System as indicated on the Drawings.

B. Accessories and appurtenances shall be provided as specified herein to provide a complete and properly operating system.

C. Equipment and services provided under this section shall be subject to the General Control System Requirements specified in Section 40 61 11 – Instrumentation and Control System Section and Section 40 66 11 – Network Systems. Supplementing this section, network data, special requirements, and options are indicated on the Drawings.

D. The CONTRACTOR shall provide Fiber and Cable at the Pump Station Building to bring in outside plant communications, plant communications and provide network patch cables for connection to equipment within the Pump Station building.

E. The CONTRACTOR shall provide necessary coordination and support to the OWNERS System Integrator for all RIVER PUMP STATION equipment system software integration for the SCADA, including SCADA computer, PLC, and HMI programming.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Products Requirements
Section 01 60 60 – Facility Startup
Section 27 10 00 – Building Communications Cabling Systems
Section 40 61 11 – Instrumentation and Control System
Section 40 66 11 – Network Systems
Section 40 67 11 – Panels, Consoles, and Appurtenances

1.2 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Drawings and Data Submittals shall be made as detailed in the Section 40 61 11 – Instrumentation and Control System section for first stage submittals.

1. Each sheet of descriptive literature submitted shall be clearly marked to identify the material or equipment.

2. Product data shall include the following in the submittal:

a. Cut sheets and catalog literature for proposed Ethernet cable, fiber optic cable, and fiber optic cable accessories (pigtails, connectors, etc.).

b. Manufacturer specifications and data that clearly shows that the fiber optic cable meets all requirements specified herein.

c. Sample of the proposed cable.

d. Physical dimension drawings of all fiber optic accessories.

e. Proposed fiber identification sequence and labeling.

f. Provide off-line maintenance aids and on-line diagnostics to check the performance of the communication links and interfaces of devices on the data highway.

g. Provide a Recommended Spare Parts List (RSPL).

h. Provide a list of recommended special tools for fiber installation testing or maintenance.

C. Submittals shall be made as detailed in the Section 40 61 11 – Instrumentation and Control System section for second stage submittals.

1. Cable test plan in coordination with Section 01 60 60 – Facility Startup, for approval by OWNER.

2. Notification of testing to OWNER minimum of fourteen (14) days prior to start of the testing.

D. Submittals shall be made as detailed in the Section 40 61 11 – Instrumentation and Control System section for third stage submittals.

1. Operation and Maintenance Manuals shall have the following items included in addition to those items specified in other sections:

a. Description of all components.

b. Methods of connection.

c. Connection diagram.

d. OTDR (Optical Time Domain Reflectometer) trace plots for all fibers.

1.3 SHIPMENT, PROTECTION, AND STORAGE

A. Equipment provided under this section shall be shipped, protected, and stored in accordance with the requirements of Section 40 61 11 – Instrumentation and Control System.

1.4 QUALIFICATIONS

A. Due to the specialized nature of installing, splicing, terminating, and testing optical fiber cable, the CONTRACTOR shall utilize personnel who are experienced in such practices.

B. The installing CONTRACTOR shall have performed similar installation and testing work on at least three (3) projects of similar size and complexity.

C. The personnel assigned to the installation and testing shall also have experience on at least three (3) projects of similar size and complexity.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. As listed in subsequent sections.

B. SUBSTITUTIONS:

1. Substitutions shall comply with specified requirements and be approved by OWNER.

2.1 MATERIALS AND EQUIPMENT GENERAL

A. All Ethernet and fiber optic cable, fiber optic hardware and accessories shall be designed, assembled and connected in accordance with the requirements of these Specifications and the Drawings.

2.2 ETHERNET UNSHIELDED TWISTED PAIR (UTP) CABLE

A. ACCEPTABLE MANUFACTURERS

1. Cat-6 cable shall be Belden 7883A or approved equal.

B. Ethernet cables and connectors shall be provided for a complete and working system, and/or as shown on the Drawings.

C. Cable for Ethernet wiring between devices in the same panel shall be UTP Cat-6 cable.

D. JACKET COLOR CODING:

1. Jacket color coding for cables shall be as follows:

a. Standard Cat-6: Yellow.

b. Crossover Cables: Yellow.

E. CAT-6 CABLE

1. Cat-6 Cable shall meet the following characteristics:

a. #24 AWG.

b. 4 pair solid strand FEP Teflon insulation.

c. 100 Ohm impedance.

d. 1-250 MHz frequency range.

e. Min attenuation 19.9dB.

f. Min NEXT 44.3dB/100MHz.

g. Min PS-NEXT 42.3dB/100MHz.

h. Min ELFEXT 27.8dB/100MHz.

i. Min PS-ELFEXT 24.8dB/100MHz.

j. Min return loss 20.1dB/100 MHz.

k. Max delay skew 45 ns.

l. Max propagation delay 540 ns.

F. Plenum rated cable shall have FEP insulation jacketing and FEP insulation for conductors. Non plenum rated cable shall have PVC insulation jacketing and polyethylene insulation for conductors.

G. Pre-wired and terminated patch cables with RJ-45 connectors and lever protecting boot shall be furnished for all connections to computers, network equipment, and controller equipment except where physical conditions (i.e., length over 12 feet or conduit size) require unterminated wire to be installed.

H. Patch cables shall be Cat-6 and shall meet the requirements Cat-6 cable specified in this section.

I. All Ethernet cables shall be wired using the T568-C family of standards.

J. Shielded Cat-6 cable shall be provided for connections between panels. Cable shall be routed for installation in tray and conduit.

2.3 FIBER OPTIC CABLE

A. ACCEPTABLE MANUFACTURERS

1. Fiber optic cable shall be as manufactured by Corning Cable Systems, Belden, Commscope, TE Connectivity, or approved equal.

    a. The fiber optic cable must meet all the requirements of the following paragraphs.

B. The fiber optic cable must meet the following requirements of the National Electrical Code (NEC) Section 770.

1. Riser Applications – Applicable Flame Test UL 1666.

2. Finished cables shall conform to the applicable performance requirements of Table 8-6 and 8-7 in the Insulated Cable Engineers Association, Inc. (ICEA) Standard for Fiber Optic Premises Distribution Cable (ICEA S-83-596).

3. Every fiber in the cable must be usable and meet required specifications.

4. All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification.

5. Each optical fiber shall consist of a doped silica core surrounded by a concentric glass cladding. The fiber shall be a matched clad design.

6. All optical fibers shall be proof tested by the fiber manufacturer at a minimum load of 100 kpsi.

7. All optical fibers shall be 100 percent attenuation tested. The attenuation shall be measured at 850 nm, and 1300 nm for multimode fibers. The attenuation shall be measured at 1310 nm and 1550 nm for single-mode fibers. The manufacturer shall store these values for a minimum of five (5) years. These values shall be available upon request.

8. The storage temperature range for the cable on the original shipping reel shall be minus 40 degrees C to plus 70 degrees C. The operating temperature range shall be minus 40 degrees C to plus 70 degrees C. Testing shall be in accordance with FOTP-3.

9. The attenuation specification shall be a maximum attenuation for each fiber at 23 ± 5OC.

10. The attenuation of the cabled fiber shall be uniformly distributed throughout its length such that there are no discontinuities greater

than 0.2 dB at 850 nm/1300 nm (multimode) in any, one-kilometer length of fiber.

11. Required Fiber Grade: Maximum Fiber Attenuation at 850 nm shall be 3.5 dB/km.

12. Optical fibers shall be placed inside a loose buffer tube. The nominal outer diameter of the buffer tube shall be 3.0 mm.

13. The cable shall contain the number of fibers indicated on the drawings (6, 12, or 24) inside of the buffer tube.

14. Each fiber shall be distinguishable from others by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

15. The fibers shall be colored with ultraviolet (UV) curable inks.

16. Buffer tubes containing fibers shall also be color coded with distinct and recognizable colors in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

17. In buffer tubes containing multiple fibers, the colors shall be stable during temperature cycling and not subject to fading or smearing onto each other.

    a. Colors shall not cause fibers to stick together.

18. The buffer tubes shall be resistant to kinking.

19. The cable jacket color shall be black.

20. Fibers may be included in the cable core to lend symmetry to the cable cross-section where needed. Fibers shall be placed so that they do not interrupt the consecutive positions of the buffer tubes. In dual layer cables, any fillers shall be placed in the inner layer. Fillers shall be nominally 3.0 nm in outer diameter.

21. The jacket shall be continuous, free from pinholes, splits, blisters, or other imperfections. The jacket shall have a consistent, uniform thickness; jackets extruded under high pressure are not acceptable. The jacket shall be smooth, as consistent with the best commercial practice. The jacket shall provide the cable with a tough, flexible, protective coating, able to withstand the stresses expected in normal installation and service.

22. The outer cable jacket shall be marked with the manufacturer's name or UL file number, date of manufacture, fiber type, flame rating, UL symbol, and sequential length markings every two (2) feet, e.g.,:

a. "62.5/125 MICRON – TYPE OFNR – (UL) 00001 Feet"). The print color shall be white.

23. All outdoor fiber cable shall be gel filled. All indoor fiber shall be gel-free.

24. Flammability – All cables shall comply with the requirements of the 1996 NEC Article 770. All cables shall pass UL 1666.

C. Multimode fiber shall be 62.5/125µm core diameter.

D. 62.5 µm core diameter multimode fiber optic cable shall meet the following requirements:

1. The multimode fiber utilized in the cable specified herein shall meet EIA/TIA- 492AAAA-1989, "Detail Specification for 62.5 m Core Diameter/125 m Cladding Diameter Class Ia Multimode, Graded Index Optical Waveguide Fibers."

2. Core diameter: 62.5 + 3.0 micrometers.

3. Cladding diameter: 125.0 + 2.0 micrometers.

4. Core-to-Cladding Offset: < or = 3.0 micrometers.

5. Cladding non-circularity: < or = 2.0%. Defined as: [1-(min. cladding dia. + max. cladding dia.)] X 100.

6. Core non-circularity: < or = 6.0%. Defined as: [1-(min. core dia. + max. core dia.)] X 100.

7. Coating Diameter: 245 + 10 micrometers.

8. Graded index.

9. Numerical Aperture: 0.275 + 0.015.

10. Attenuation Uniformity: There shall be no point discontinuities greater than 0.2 dB at either 850 nm or 1300 nm.

11. Minimum Bandwidth Requirement shall be 160/500 MHz-km at 850/1300 nm.

E. Single Mode Fiber shall be OS2 9/125 µm type cable.

F. All optical permanent fibers shall be terminated with connectors, as approved by OWNER. All fiber patch cables shall be terminated with connectors that are approved by OWNER.

1. Epoxy connectors shall be provided to terminate each fiber in the cable. Connector style, as approved by OWNER, shall be coordinated

with the patch panels and field devices that will interface directly with the cable.

2. Connectors shall be compatible with the supplied cable. Connector loss shall be no greater than 0.3 dB. Loss measurement shall be performed at the time of splicing and documentation shall be furnished for each termination. Connectors shall be Corning Cable Systems Connectors or approved equal.

G. Fiber optic jumper cables shall be furnished and installed for equipment interfacing and between termination cabinets. The jumpers shall meet the following requirements:

1. The jumpers shall be 62.5/ 125 microns, 50/ 125 microns, multimode for operation at 1300 nm. They shall be tight-buffered and be protected by Kevlar-type strength material.

2. The jumpers shall be supplied with connectors on each end. Connector types, as approved by OWNER, shall be matched to the equipment provided. Jumpers shall be sized to provide a single connection between the fiber optic hardware being connected.

PART 3 – EXECUTION

3.0 INSTALLATION

A. The CONTRACTOR shall be responsible for the coordination of the installation of all cable furnished hereunder. The CONTRACTOR shall be responsible for the termination of all cable furnished hereunder.

B. If the cable becomes damaged during installation, the CONTRACTOR shall stop work and notify OWNER immediately. OWNER will decide whether to replace the entire reel of cable or to install a splice at the damaged section. If OWNER decides to replace the entire reel of cable, the CONTRACTOR shall begin the installation at the last designated splice point. The damaged cable between these points shall be removed, coiled, tagged, and given to OWNER. Installation of new cable to replace damaged cable shall not be a basis of extra payment or contract completion time. In addition to installation of the new cable, the CONTRACTOR shall reimburse OWNER for the entire cost of the replacement reel of cable. This cost will be withheld from the contract price. If OWNER decides to install a splice at the damaged point, and the cable is damaged a second time, the entire reel of damaged cable (and all subsequent damaged reels) shall be replaced with new reels at the CONTRACTOR'S expense.

C. Straight through cables shall be wired using the T568-B pin assignment standard for both connectors as shown in the table below (connector pin numbers are left to right with the clip down). Crossover cables shall be wired using the T568-A pin assignment standard for one connector and the T568B standard for the opposite end as shown in the table below:

Connector Pin	568A Wiring Conductor	568B Wiring Conductor
1	White/Green	White/Orange
2	Green	Orange
3	White/Orange	White/Green
4	Orange	Green
5	Blue	Blue
6	White/Blue	White/Blue
7	White/Brown	White/Brown
8	Brown	Brown

D. The fiber optic cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification. Fiber optic cable installation shall meet the following requirements:

1. All fiber optic cable shall be installed, terminated, and tested by the CONTRACTOR or his fiber subcontractor as specified above.
2. In pulling the cable, strain-release, or other tension limiting devices shall be used to limit the pull tension to less than 600 lbs.
3. Minimum bend radius restrictions shall be satisfied both during and after cable installation.
4. Horizontal, unsupported cable runs shall be supported at continuous distances of five (5) feet or less.
5. All conduit and cabinet entrances shall be sealed with RTV or other re-enterable sealant material to prevent ingress of water, dust, or other foreign materials.
6. Cable routing within occupied office areas shall conform to Federal, State, and local electrical and fire codes.
7. Any non-terminating (field) splices shall be documented as to the physical location and cable meter mark (prior to stripping). Field splices shall be OTDR-tested and documented prior to final cable acceptance testing.
8. Fiber optic cables shall be installed in accordance with NECA 301-2004, Installing and Testing Fiber Optic Cables.

3.1 CABLE TESTING

A. After the network cabling has been installed, each network cable shall be tested.

B. Unless specified otherwise, all test equipment for the calibration and checking of system components shall be provided by CONTRACTOR for the duration of the testing work and this test equipment will remain the property of CONTRACTOR.

1. The CONTRACTOR shall utilize the previously specified test equipment, and additional tools as needed to validate the Ethernet cable installation.

2. All test equipment shall bear current calibration certification from a certified calibration laboratory, as appropriate.

3. Each cable shall be tested for open pairs, shorted pairs, crossed pairs, reversed pairs, and split pairs.

4. A check off sheet shall be utilized, shall be signed by the technician testing the cables, and shall be submitted for approval.

5. Any identified faults shall be corrected at no additional cost.

C. Acceptance testing of the data highway (fiber and electronic equipment) shall be conducted as a part of integrated system field testing, as specified elsewhere. Prior to such tests, however, the fiber optic cable shall be tested as specified herein.

1. The CONTRACTOR, or his fiber subcontractor, shall conduct fiber optic cable testing as specified below.

2. All testing following field installation shall be witnessed by OWNER. The CONTRACTOR shall bear the cost for field witnessed testing in accordance with the General Equipment Stipulations.

3. A test plan shall be submitted prior to the proposed test dates.

4. The test plan and procedures shall be mutually agreed to prior to conducting the tests.

5. Each optical fiber of each fiber optic cable shall be OTDR (Optical Time Domain Reflectometer) tested on the reel at the factory, on the reel upon arrival at the jobsite, and after installation and termination.

6. For each fiber, an OTDR (Optical Time Domain Reflectometer) trace soft/hardcopy is required to be provided to OWNER.

7. OTDR traces shall be provided for each test (at the factory, on the reel at the job- site, and after installation).

8. A 100-foot launch cable shall be spliced to each fiber for each fiber OTDR test, to ensure accurate results. This end-to-end trace shall be performed from BOTH ends of the fiber. Also, for each fiber, an end-to-end power attenuation (insertion loss) test shall be performed.

9. The attenuation test shall use a stabilized optical source and an optical power meter calibrated to the appropriate operating wavelength (1300 nm).

10. For each installed fiber, the power attenuation shall not exceed the following, tested from connector to connector at the respective patch panels:

    a. (0.0035)L + (0.25)N + 3.0 dB

    b. Where L = The length of the fiber optic cable in meters, and N = the number of splices in the fiber.

11. Any fiber optic cables containing one (1) or more fibers not meeting this performance will not be accepted by OWNER and shall be repaired or replaced at no additional cost.

12. Each fiber optic jumper cable shall be tested and must exhibit an end-to-end attenuation of less than 2.0 dB at 1300 nm. Any jumper exceeding this level shall be replaced at no additional cost to OWNER. Any damaged cable still on the reel shall be returned to the manufacturer for replacement at no additional cost to OWNER.

13. All fiber cable testing shall be documented on pre-approved test forms. Three (3) copies of all documentation (including OTDR traces) shall be submitted to OWNER upon successful completion of the testing.

– End of Section –

SECTION 40 67 11

PANELS, CONSOLES, AND APPURTENANCES

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The Panels, Consoles and Appurtenances section covers the furnishing of panels, consoles, and appurtenances as indicated on the Drawings.

B. Equipment furnished and installed under this section shall be fabricated and assembled in full conformity with the Drawings, specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by OWNER.

C. Division 01 General Requirements shall apply to all equipment and materials provided under this section. If requirements in this specification differ from those in the Division 01, the requirements specified herein shall take precedence.

D. Seismic design requirements for products specified herein shall be as indicated in the in the Structural notes per reference section.

E. General dimensions and arrangements and partial bill of materials are indicated on the Drawings. System Supplier shall be responsible for coordinating the console and enclosure sizes and arrangements to accommodate the equipment provided.

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 00 – Products Requirements
Section 01 60 60 – Facility Startup
Section 26 05 11 – General Electrical Requirements
Section 26 05 19 – Conductors and Cables
Section 26 05 26 – Grounding
Section 26 05 83 – Electrical Equipment Installation
Section 27 10 00 – Building Telecommunications Cabling System
Section 40 61 11 – Instrumentation and Control System
Section 40 66 11 – Network Systems
Section 40 66 33 – Metallic and Fiber Optic Communication Cable and Connectors

1.2 CONTRACTOR SUBMITTALS

A. Submit in accordance with Section 01 33 00 – Contractor Submittals.

B. Drawings and Data submittals shall be made as detail in the Section 40 61 11 - Instrumentation and Control System section for first stage, second and third stage submittals.

C. Submit confirmation of compliance with the requirements for equipment installed in a facility with Seismic Class, Design Category and Risk Category per structural drawing notes.

1.3 DELIVERY, STORAGE, AND SHIPPING

A. Delivery, storage, and shipping shall be as per Section 40 61 11 – Instrumentation and Control System section.

PART 2 – PRODUCTS

2.0 ACCEPTABLE MANUFACTURERS

A. As listed in subsequent sections.

B. Substitutions: Substitutions shall comply with specified requirements and be approved by OWNER.

2.1 PANEL DESIGN AND FABRICATION FEATURES

A. Acceptable Manufacturers: Enclosures shall be manufactured by nVent/Hoffman or owner approved alternative.

B. All Control Panels shall be UL508A certified.

C. All panels furnished shall conform to the stipulations of NEMA ICS-6-1993. Unless indicated otherwise on the Drawings, the following paragraphs describe general fabrication specifications for the PLC cabinets, instrument panels, consoles, enclosures, and subpanels.

1. The power entrance to each panel shall be provided with a surge protection device. Refer to the Section 40 61 11 Instrumentation and Controls section for surge suppression requirements.

2. Power distribution wiring on the line side of panel fuses shall be minimum #12 AWG Copper. Secondary power distribution wiring shall be minimum #14 AWG Copper. Wiring for AC power distribution, DC power distribution, intrinsically safe, and control circuits shall have different colors and shall agree with the color-coding legend on System Supplier's panel wiring diagrams. With the

exception of electronic circuits, all interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 600 Volts, with a moisture resistant and flame-retardant covering rated for not less than 90 degrees C.

3. All internal panel wiring shall be type SIS or THHN stranded copper wiring rated not less than 600 Volts. Electronic analog circuits shall be twisted, shielded pairs rated not less than 300 Volts. Analog circuits shall be separated from AC power circuits. Intrinsically safe circuits shall be physically separated from other circuits in accordance with applicable codes. Wires within the panel shall conform to the minimum size as shown in the table below.

TYPE	MINIMUM WIRE SIZE	COLOR
AC Control	#16 AWG	Grey
DC Control (24VDC)	#16 AWG	Blue
DC Control (125VDC)	#16 AWG	Yellow
Analog Circuits	#18 AWG Twisted Pair	White

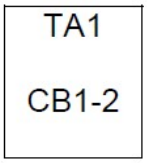
4. All wiring termination ends must have a ferrule crimp attachment to allow tighter torque regulation of the termination and to prevent unintentional whiskers from sticking out. All terminations must be tightened to the torque rating according to UL508A Standards.

5. All wiring shall be grouped or cabled and firmly supported inside the panel. Each individual wire in power, control, and instrumentation circuits shall be provided with identification markers at each point of termination. The wire markers shall be positioned to be readily visible for inspection and the identification numbers shall match the identification on the supplier's panel wiring drawings.

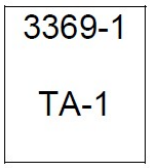
6. Wiring shall be bundled in groups and bound with nylon cable ties or routed in Panduit or similar nonmetallic slotted ducts. Ducts shall be readily accessible within the panel, with removable covers, and with space equal to at least 40 percent of the depth of the duct remaining available for future use after completion of installation and field wiring. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables.

7. Wire labels must be provided at each end of the wire termination. The wire label must show both wire destination abbreviations on each termination. For example: For a wire that runs between terminal

TA-1 and terminal CB1-2, a wire label would be placed at the connection at TA-1 and at CB1-2 and should read as follows (the order is not important):



8. Each wire termination requires two identical labels. These labels will allow a person to know where the wire termination points are at each end of the wire. The wire labels should be clearly visible. Cable terminations will be marked similarly. The label for Cable #3369, conductor #1 to terminal TA-1 should read as follows:



9. All wire labels must be wipe resistant, polyolefin material that can withstand ambient temperatures from minus 50 degrees C to 130 degrees C.

10. Terminal blocks for external connections shall be suitable for #12 AWG wire, shall be rated 30 Amperes at not less than 300 Volts and shall be screw clamp type. Terminal blocks shall be fabricated complete with marking strip, covers, and pressure connectors. Terminals shall be labeled to agree with identification shown on the supplier's submittal drawings. A terminal shall be provided for each conductor of external circuits, plus one (1) ground for each shielded cable. Not more than two (2) wires shall be terminated on a single terminal. Not less than 8 inches of clearance shall be provided between the terminal strips and the base of vertical panels for conduit and wiring space. Not less than 25 percent spare terminals shall be provided. Each control loop or system shall be individually fused, and all fuses or circuit breakers shall be clearly labeled and located for easy maintenance.

11. Power supply to the panels shall be from electrical sources shown on the Drawings, which may be backed by redundant utility feeds, engine generators, or externally mounted uninterruptible power supplies (UPSs) specified in other sections.

12. All devices shall be provided with permanent identification tags. The tag numbers shall agree with the I/O list and the tag names in other

sections and with the supplier's equipment drawings. All field-mounted transmitters and devices shall have stamped stainless steel identification tags. Panel, subpanel, and rack-mounted devices shall have laminated phenolic identification tags securely fastened to the device. Hand-lettered labels or tape labels will not be permitted.

13. Nameplates shall be provided on the face of the panel or on the individual device. Panel nameplates shall have legends and approximate dimensions as indicated on the Drawings and shall be made of laminated phenolic material having engraved letters approximately 3/16-inch-high extending through the black face into the white layer.

14. Nameplates shall be secured firmly to the panel. Panel face nameplates do not replace the requirement for device identification tags as specified under the Device Tag Numbering System paragraph. Terminals shall be sized for ferrule crimp type, terminations.

15. Indicating lights shall be colored as shown in the following table unless indicated otherwise on the Drawings, in other specification sections, or in the instrument device schedule.

COLOR	**MEANING**
Red	Associated equipment or device is “running,” “open,” or is in an “unsafe” state or position.
Green	Associated equipment or device is “stopped,” “closed,” or is in a “safe” state or position.
Yellow or Amber	Associated equipment or device has “failed” or a process alarm condition is present or imminent
White	All other conditions not defined above.

16. Interior and exterior surfaces of all carbon-steel panels shall be thoroughly cleaned and painted with rust inhibitive (universal) primer. The panel interior shall be painted white with the manufacturer's standard coating. All pits and blemishes in the exterior surface shall be filled. Exterior surfaces shall be painted with one or more finish coats of the manufacturer's standard coating in ANSI 61 standard gray color. Finish coats shall have a dry film thickness of at least 4 mils. One (1) quart of touch-up paint shall be furnished with the panels.

2.2 WALL-MOUNTED CABINETS

A. Cabinets, which contain the system components indicated on the Drawings, shall be suitable for wall mounting and shall meet the NEMA enclosure rating as indicated on the Drawings or the referring equipment specification section. The enclosures shall be fabricated from USS 16 gage or heavier, carbon steel, stainless steel, or fiberglass. Cabinets shall be equipped with full size gasketed doors with hinges and a chromium-plated or stainless steel three-point latch. A screened vent shall be provided in the enclosures.

1. PLC Cabinet: nVent Hoffman, 72 inches x 36 inches x 12 inches or approved equal.

B. All wall-mounted cabinets shall meet the requirements of the panel fabrication paragraph of this section.

C. Panels mounted outdoor shall be NEMA 4X stainless steel.

PART 3 – EXECUTION

3.0 GENERAL INSTALLATION REQUIREMENTS

A. Installation requirements are specified in Section 40 61 11 Instrumentation and Control System. In addition, equipment furnished under this section shall conform to the following manufacturing stipulations.

B. All wiring shall be grouped or cabled and firmly supported inside the panel. Wiring shall be bundled in groups and routed in Panduit or similar nonmetallic slotted ducts. Ducts shall be readily accessible within the panel with removable covers and shall have a space of at least 40 percent of the depth of the duct available for future use after installation is complete and all field wiring installed.

1. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables. AC and DC wires must be placed inside separate wireways.

C. Where signal or loop wiring must be routed to more than one (1) panel or device, the required circuit routing shall be as indicated on the one-line diagrams. The panel fabricator shall provide such additional circuits as may be indicated on the electrical schematic Drawings.

– End of Section –

SECTION 40 71 63

FLOW METERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. General:

1. This section covers the furnishing and installation of the flow meters and accessories required for flow control and monitoring as indicated on the design drawings.

2. Flowmeters:

PIPE SIZE	QUANTITY	LOCATION	FLOW RANGE, GPM
30"	1	Flow Meter Vault	500 – 15,000

1.1 DESIGN CRITERIA

A. General:

1. Flow meter to be an ultrasonic clamp-on flow measurement system designed for non-intrusive external to pipe measurement of water. The system shall utilize a transit time ultrasonic principle of measurement mounted on the customer pipe from which the volume flow rate can be derived. The two-sensor set version shall maintain specified accuracy when mounted as close as 2xDN pipe diameters before or after specified obstructions. The ultrasonic flow meter will be suitable for flow velocities from 0 - 33 fps.

2. Primary elements shall derive any required power from the transmitter, unless otherwise indicated.

3. The instrument shall be installed to measure, monitor, and display the specified process at the ranges and service conditions indicated on the design drawings. The instrument shall be installed in the location indicated on the design drawings.

4. The flow meter shall be factory calibrated to the standard meter range.

1.2 CONTRACTOR SUBMITTALS

1. General Submit in accordance with section 01 30 00 – Contractor Submittals.

B. Shop Drawings:

1. Complete Shop Drawings for the sensors, transmitters, cables, and mounting assemblies.

C. Catalog Literature:

1. Manufacturer's literature on all components including sensors, transmitter, cables, and mounting assemblies. Installation instructions shall also be provided.

D. Product Data:

1. Dimensional Drawings.
2. Materials of Construction.
3. Measurement accuracy.
4. Range and range ability.
5. Enclosure Rating.
6. Classification Rating.
7. Power Requirements, voltage and wattage.
8. Output options.
9. ISA data sheet ISA-TR20.00.01.
10. Documentation of calibration results and final settings.
11. Manufacturer's installation and operation manual.

1.3 QUALITY ASSURANCE

A. Manufacture instruments facilities certified to the quality standards of ISO Standard 9001 - Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. General:

1. Store all instruments in a dedicated structure with space conditioning to meet the recommended storage requirements provided by the Manufacturer.
2. Any instruments that are not stored in strict conformance with the Manufacturer's recommendation shall be replaced.

PART 2 – PRODUCTS

2.0 MANUFACTURER

A. Endress+Hauser - Proline Prosonic Flow W 400

2.1 MANUFACTURED UNITS

A. General:

1. Flow meters shall measure and display the instantaneous flow rate with an accuracy of ±2% in gallons per minute (GPM). In addition, meters shall display the total volume delivered measured in millions of gallons.
2. Flow meters and displays shall be suitable for exposed outdoor installation.
3. Flow meter is intended to clamp on 30" diameter steel pipe.
4. Flow meter to be ordered to accommodate final pipe wall thickness and material.
5. Minimum pressure rating shall be 200 psi.
6. Provide flow straightening vanes if necessary to achieve required measurement accuracy.
7. The flow measuring system shall consist of a clamp-on sensor pair(s), sensor holders, sensor cables, transmitter, transducer coupling pads, mounting clamps/straps, installation aids.
    a. The flow measuring system with two sensor sets shall have an option for measuring with a minimum of 2xDN pipe diameters upstream or downstream of specified obstructions (Flow Disturbance Compensation, FlowDC) and remain within the published measuring accuracy.
    b. The flow measuring system shall have an easy, safe, and menu-guided ultrasonic sensor mounting procedure to ensure precise measuring results.
    c. The flow measuring system shall support remote configuration.
    d. Ultrasonic coupling gel shall not be required due to transducer coupling pads.
8. The sensors shall be selected based on the pipe diameter specified and meet the appropriate process temperature range.

a. The sensors shall be rated NEMA 6P suitable for submergence.

b. The sensors shall be suitable for composite, metal, plastic, lined or unlined pipes.

c. The sensors shall utilize an integral spring mechanism to maintain correct contact pressure with the mating pipe surface during operation.

d. The sensors shall locate mechanically and lock within the sensor holder to preclude incorrect sensor orientation during installation or accidental dislocation due to vibration during operational service.

e. The sensor positioning on the pipe shall be prescribed by the transmitter via the HMI display and communications protocol.

9. The transmitter shall be a three-stage microprocessor controller mounted remotely as specified in the instrument schedule. The transmitter shall operate on 120VAC via a dedicated power supply. The transmitter housing shall be aluminum or polycarbonate, carry a NEMA 4X rating, and shall be constructed to prevent moisture ingress.

a. The transmitter shall allow local or remote programming that can be operated via an optical display or WLAN connection without opening the compartment.

b. The transmitter display shall indicate simultaneous flow rate and total flow with three Totalizers (e.g. forward, reverse and net total) and user-selectable engineering units, readout of diagnostic remedy messages, and support at least 19 standard languages.

c. The transmitter shall safeguard against entering of invalid data for the meter size and all programming parameters shall be access-code protected and retained in the embedded HistoROM.

d. The transmitter primary output shall be 4-20mA HART and have up to two 0-10 kHz pulse/frequency/switch outputs and one digital status input.

e. The transmitter output(s) shall be integral to the ultrasonic flowmeter transmitter electronics; using an external third-party signal converter is unacceptable.

f. The transmitter output selected must be supported by Add-on Instructions (AOI), faceplates, device drivers, instructions, and pre-engineered code.

g. The transmitter shall internally retain all setup parameters, calibration parameters and accumulated measurements in non-volatile memory in the event of power failure.

h. The transmitter shall be protected against voltage spikes from the power source with internal transient protection.

i. The transmitter and sensor must support an onboard, ISO traceable means of attested in-situ verification utilizing redundant references to validate measurement quality over the lifespan.

j. The transmitter shall provide access to service and monitoring parameters designed to identify transient or permanent process influences.

k. The transmitter shall provide lock-out from vandalism or programming changes of K-factor and zero point.

l. The transmitter shall support commissioning and maintenance options via a service interface for operation via an internal web server, accessible via a standard RJ-45 cable.

m. The transmitter shall include a wireless local area network (WLAN) option built into the device display with an operating range of up to 16 feet. The WLAN shall permit unique SSID programming, four encryption levels and activation/deactivation of the function at the OWNER's preference.

2.2 SOURCE QUALITY CONTROL

A. Each flow measuring system shall be verified at a facility traceable to the National Institute of Standards and Technology (NIST) accredited to ISO 17025.

B. The flow measuring system maximum measured error under factory reference conditions shall be ± 0.5% of reading at any flow velocity greater than 1 ft/sec to the stated maximum.

C. When installed in the field, measurement error becomes a function of additional sources of uncertainty; the additional error should typically not exceed ± 1.5% of reading giving an overall error of ± 2%.

D. The technique of sensor and transmitter verification must be by a traceable method per NIST or ISO.

E. Provide complete documentation covering the traceability of all calibration instruments.

F. Provide ISA data sheet ISA-TR20.00.01. Use the latest revision of form 20F2321. Complete the form with all known data and dash out the inapplicable fields. Incomplete data sheets submitted will be result in a rejected submittal.

2.3 ACCESSORIES

A. Stainless Steel tag – labeled to match the Contract Documents.

2.4 SAFETY

A. All electrical equipment shall meet the requirements of ANSI/NFPA 70, NATIONAL ELECTRIC CODE, latest edition.

B. All devices shall be certified for use in hazardous areas such as: CSA C/US non-incendive for Class I, Division 2

C. All devices shall be suitable for use as non-incendive devices when used with appropriate non-incendive associated equipment.

D. Electrical equipment housing shall conform to NEMA 4X classification.

E. Non-intrinsically safe electrical equipment shall be approved by a Nationally Recognized Testing Laboratory (NRTL) such as FM, UL, ETL, CSA, etc. for the specified electrical area classification.

PART 3 – EXECUTION

3.0 INSTALLATION REQUIREMENTS

A. General:

1. The installation of equipment furnished hereunder shall be by the CONTRACTOR or their assigned subcontractors.

2. Field Wiring. Field wiring materials and installation shall be in accordance with Specification Division 26 – Electrical requirements.

3. Instrument Installation. The flow meter transmitter panel shall be mounted so that it can be easily read and serviced and so that all appurtenant devices can be easily operated.

4. Field Calibration of Instruments. After the flow meter has been installed, a technical representative of flow meter supplier shall

review the installation, verify calibration of the flow meter, and shall provide a written report confirming correct installation, and documenting the calibration results and final settings. The adjustments of calibrated instruments shall be sealed or marked, insofar as possible, to discourage tampering.

5. Individual device testing shall include verification of flow transmitters and operation and wiring connections through to the panel CP-1 terminations.

6. The CONTRACTOR shall verify that the PLC and SCADA computer is receiving correct inputs, to simulate status indication and alarms by artificially manipulating the devices.

7. Install as shown on installation details and mechanical Drawings.

8. Install as recommended by the manufacturer's installation and operation manual.

9. Specific attention should be given to the following technical requirements:

    a. Observe undisturbed straight run diameters before and after the point of measurement greater than or equal to 2DN. Product must be ordered with Flow Disturbance Compensation which allows for 2DN inlet and 2DN outlet after certain disturbances. The contractor shall select the Flow Disturbance Compensation option during procurement of the flowmeter.

    b. Ultrasonic sensors mounted on horizontal piping should be oriented at ± 30 degrees from the top (0°) or bottom (180°) position on the pipe circumference to ensure measuring accuracy.

– End of Section –

SECTION 40 73 13

PRESSURE GAUGES AND TRANSMITTERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. The CONTRACTOR shall provide pressure gauges, transmitters, and appurtenances, complete and operable, in accordance with the contract documents.

1.1 SUBMITTALS

A. Submit in accordance with section 01 30 00 – Contractor Submittals.

B. Submit manufacturer's literature for each type and size of gauge and snubber.

PART 2 – PRODUCTS

2.0 PRESSURE GAUGES AND TRANSMITTERS

A. General: Pressure gauges shall be provided on discharge connections to pumps and as indicated in the contract documents.

B. Gauge Construction: Gauges shall be industrial quality type with Type 316 Stainless Steel movement and Stainless Steel or alloy case. Unless otherwise indicated, gauges shall be liquid filled, 4-inch dial, 1/4-inch threaded connection, a Type 316 Stainless Steel snubber adapter, and a shut-off valve. Gauges shall be calibrated to read in applicable units, with an accuracy of plus and minus 1 percent, to 150 percent of the operating pressure of the pipe or vessel to which they are connected. All gauges shall be vibration and shock resistant.

C. Gauge Manufacturers, or Equal:

1. Marsh Instrument Company;
2. Ashcroft Industrial Instruments (Dresser);
3. Foxboro/Jordan, Inc.;
4. Marshalltown Instruments, Inc.;
5. U.S. Gauge Div. of Ametek.
6. Rosemount

D. Snubber Manufacturers, or Equal:

1. Cajon Company
2. Weksler Instruments, Corp.
3. Rosemount

PART 3 – EXECUTION

3.0 INSTALLATION

A. Gauges shall be installed with the face in the vertical position, at the locations indicated and in strict accordance with the manufacturer's printed instructions. Care shall be taken to minimize the effect of water hammer or vibrations on the gauges. In extreme cases, the gauges may have to be mounted independently, with flexible connectors. Isolation ball valves shall be installed prior to the pressure gauges/transmitters connection to the measured line, to allow for isolation and removal of the pressure gauge/transmitter.

– End of Section –

SECTION 40 75 53

TURBIDITY ANALYZERS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. Instrument for continuous, online monitoring of turbidity in water that includes predictive diagnostics capability to monitor instrument status using the USEPA Approved Hach Method 10258 compliance method.

1.1 MEASUREMENT PROCEDURES

A. The sensor is used with an SC controller to measure low range turbidity in water. These sensors collect scattered light at an angle of 90° in a 360° radius around the axis of the incident light beam.

B. Methods of turbidity measurements that do not include a laser light source and a 360° x 90° detection system are not acceptable.

C. Instruments that do not have predictive diagnostic capabilities are not acceptable.

1.2 SYSTEM DESCRIPTION

A. Performance requirements for USEPA Approved Hach Method 10258 Sensor:

1. Measuring Range:

a. 0 to 1000 NTU

B. Other Specifications:

1. Detection limit:

a. 0.002 NTU / FNU / TE/F / FTU

2. Accuracy:

a. ±2% of reading ±0.01 NTU from 0 to 40 NTU based on formazin primary standard at 25°C

b. ±10% of reading from 40 to 1000 NTU based on formazin primary standard at 25°C

3. Repeatability:

a. ±1% of reading or 0.002 NTU, whichever is greater based on formazin primary standard at 25°C

4. Resolution:
    a. 0.0001 NTU / FNU / TE/F / FTU / EBC
5. Response Time:
    a. T90 <45s at 100 mL/min
6. Sample Flow:
    a. 100 to 1000 mL/min; optimal flow rate 200 to 500mL/min
7. Sample Pressure:
    a. Max. 6 bar (87 psi) compared to air at sample temperature range of 0 to 40 °C (32 to 104 °F)
    b. Max. 3 bar (43 psi) compared to air at temperature range of 40 °C to 60°C (104 °F to 140 °F)
8. Sample Temperature:
    a. 2 to 60 °C (36 to 140 °F)

1.3 CERTIFICATIONS

A. US FDA accession number: 1420493-001 EPA version, 1420492-001 ISO version. Complies with IEC/EN 60825-1 and to 21 CFR 1040.10 in accordance with Laser Notice No. 50)

1.4 SUBMITTALS

A. Section:
    1. Submit in accordance with section 01 30 00 – Contractor Submittals.
B. Shop Drawings:
    1. Complete shop drawings for the sensors, transmitters, cables, and mounting assemblies.
C. Catalog Literature:
    1. Manufacturer's literature on all components including sensors, transmitter, cables, and mounting assemblies.
D. Product Data:
    1. Dimensional Drawings
    2. Materials of Construction
    3. Measurement accuracy
    4. Range and range ability

5. Enclosure Rating
6. Classification Rating
7. Power:
    a. Voltage
    b. Wattage
8. Output options
9. Manufacturer's installation and operation manual
10. Certification of performance of the instrument
11. Manufacturer's Service Agreement

1.5 QUALITY ASSURANCE

A. Manufacturer instruments facilities certified to the quality standards of ISO 7027 - Determination of turbidity – model for quality assurance in design/development, production, installation, and servicing.

1.6 ENCLOSURE RATING

A. Electronic compartment IP55; all other functional units IP65 with process head/ACM attached.

PART 2 – PRODUCTS

2.0 MANUFACTURER

A. Hach – TU5300sc Low Range Laser Turbidimeter and SC4500 Controller

2.1 SENSOR

A. The low range online laser turbidimeter consists of a Class 1 650nm (EPA) or 850 nm (ISO) laser light source and 360° x 90° detection system with predictive diagnostics designed to continuously monitor turbidity in a sample stream. Automatic cleaning and flow measurement options are available.

2.2 EQUIPMENT

A. Online turbidimeter:

1. Utilizes a laser-based 360° x 90° optical system that measures turbidity from multiple different angles.
2. Continuous particle removal using a vortex created by the fluid path.

3. Utilizes an identical laser-based optical system that matches the laboratory turbidimeter described in 2.2.C. for direct comparison between laboratory and online measurements.
4. Includes capability to actively monitor all internal components and present diagnostics on the overall health of the turbidimeter and time to next required maintenance.
5. When connected to a predictive diagnostics capable controller the overall status of instrument performance is displayed as a percentage value via a measurement indicator.
6. Built in-help screens included.

B. Controller:

1. Provide an SC controller for turbidimeter operation.

C. Calibration Standards:

1. Manufacturer must make available certified calibration standards that can be used in online instruments for highest calibration accuracy.

2.3 COMPONENTS

A. Analytical Instrument to include:

1. Turbidimeter
2. Mounting bracket
3. Desiccant cartridge
4. User manual
5. Controller

B. Dimensions: Refer to turbidimeter drawings

C. Weight: 5 lbs (2.3 kg)

2.4 INSTRUMENTATION EQUIPMENT

A. The following optional items are to be added to instrument at time of order:

1. System Check Module

2.5 INSTRUMENT ACCESSORIES

A. The following optional items are to be added to instrument at time of order at OWNERs' discretion:

1. Flow sensor
2. Bubble trap
3. Turbidimeter maintenance kit
4. Glass calibration/verification rod

PART 3 – EXECUTION

3.0 EXAMINATION

A. Examine the complete set of plans, the process fluids, pressures, and temperatures and furnish instruments that are compatible with installed process condition.

B. Examine the installation location for the instrument and verify that the instrument will work properly when installed.

3.1 PREPARATION

A. Mounting:

1. As shown on the design drawings

B. Inlet and outlet connection sizes:

1. As shown on the design drawings

3.2 INSTALLATION

A. As shown on installation details and mechanical Drawings.

B. As recommended by the manufacturer's installation and operation manual.

3.3 TRANSPORTING

A. Care shall be taken when handling and transporting to prevent damage to the equipment.

3.4 MANUFACTURER'S SERVICE AND START-UP

A. CONTRACTOR shall include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.

B. CONTRACTOR shall include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of

equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.

C. Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.

– End of Section –

DIVISION 43 – PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT

SECTION 43 23 31

VERTICAL TURBINE PUMPS

PART 1 – GENERAL

1.0 DESCRIPTION

A. This section covers the furnishing and installation of vertical turbine pumps for the municipal water supply pump station. The CONTRACTOR shall provide pumps and appurtenances, complete and operable, in accordance with the Contract Documents. Pumps included in this section are as follows:

DESCRIPTION	QUANTITY
Large Vertical Turbine Pumps (PMP-5 through PMP-8)	4 total
Small Vertical Turbine Pumps (PMP-3, PMP-4)	2 total

1.1 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 01 43 00 – Contractor Quality Assurance
Section 01 60 60 – Facility Startup
Section 09 90 00 – Painting and Coatings
Section 26 24 23 – Low Voltage Motor Control Center

1.2 CONTRACTOR SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.
2. Standard manufacturer's product literature and/or catalogue cuts of the pumping equipment.
3. Copy of pump manufacturer's ISO 9001:2008 Certificate.
4. Company information of authorized representative listing engineering support staff and service facilities.
5. Initial factory pump performance curves including rate of flow vs. total head, rate of flow vs. efficiency, rate of flow vs. input power, and rate of flow vs. NPSHR. Curves shall be based on factory vertical open sump testing per ANSI/HI of an existing and tested pump impeller model. Curves must indicate full compliance with pump performance requirements. Provide multi-speed performance curves for large pumps (PMP-5 through PMP-8)

6. Engineering calculations showing computations for total head and pump absorbed power at pump design point and maximum power.
7. Shop general dimension drawings detailing overall pump dimensions, weights and pump interface details.
8. Pump mechanical drawings including cross sectional and isometric drawings, listing materials of construction of pump components.
9. Coating system data including MSDS sheets.
10. Factory Pump Performance Test Plan detailing test configuration, procedure, and compliance with HI 2.6-2000 AWWA E101.
11. A dynamic analysis report generated from finite element analysis software verifying that the assembled pump unit produces no dangerous resonant lateral or torsional frequencies in accordance with ANSI/HI 9.6.4. Complete report must include computer program used, schematic diagram of the model depicting nodes and elements, input data of node coordinates, element types, material properties, element characteristics, and specified displacements. Report results must include a list of all significant natural frequencies and an interpretation of results.
12. Complete electric motor data including complete dimensions, weights, enclosure construction, performance information, noise levels at 3, 10, and 50 feet from the pump motor and NEMA nameplate data. The motor submittal for pumps PMP-5 through 8, which are operated from a variable frequency drive shall also include data required in Section 26 24 23 – Low Voltage Motor Control Center.
13. Copies of Pump Factory Test Reports, as specified herein.
14. Impeller Dynamic Balance Reports listing balancing location, balancing equipment used, and balancing results showing compliance with specifications.
15. Casting Examination Reports listing casting location, examination personnel, and ASTM test results showing compliance with specifications.
16. Submittals shall include pump performance test plans and report.

1.3 DELIVERY, STORAGE, AND HANDLING

A. General:

1. All pumps and accessories shall be handled, protected, and stored as recommended by the manufacturer.

B. Shipping:

1. All pumps and accessories shall be protected with packaging to resist moisture, dust, handling, or other potentially harmful elements during shipping. Packaging shall include a unique number that includes the specification number as a reference.

2. Any pumps and accessories damaged during shipping shall be replaced at the CONTRACTOR's expense.

3. Each pump shall be assembled at the manufacturer's plant prior to shipping to assure proper fitting and alignment of all parts. Factory assembled parts and components shall not be dismantled for shipment unless permission is received in writing from the Engineer.

C. Storage:

1. Storage requirements shall comply with the manufacturer's written instructions for weather protection, temperature, humidity, and ventilation.

2. Any pumps and accessories damaged during storage shall be replaced at the CONTRACTOR's expense.

1.4 SPARE PARTS

A. A list of recommended spare parts and prices shall be provided to the OWNER's Representative with the Contractor submittal.

1.5 QUALITY ASSURANCE/QUALITY CONTROL

A. General:

1. The pump manufacturer shall be made responsible for coordination of design, factory assembly, and testing of the Pumps; however, the CONTRACTOR shall be responsible to the OWNER for compliance of the Pumps with the Contract Documents.

2. Vibration testing shall be performed in accordance with the recommendations of ANSI/HI 9.3.4 – American National Standard for Rotodynamic Pumps for Vibration Measurements and Allowable Values. Pumps shall be balanced to achieve vibration limits within the tolerances stated in Section 3.1.

PART 2 – PRODUCTS

2.0 MANUFACTURERS

A. General:

1. The pump and drive equipment to be furnished under this contract shall be new and made by a single Manufacturer regularly engaged in such work, who has furnished like equipment and specialties for at least five (5) similar installations which have been in continuous successful operation for no less than five (5) years. Evidence of this experience, which shall be satisfactory to the OWNER's Representative and data on the equipment and its operation in those plants, shall be made available to the OWNER's Representative on request so that they may determine whether the equipment and specialties offered meet the requirements of these specifications. Where major items of equipment are similar in type and description, they shall be the product of a single Manufacturer. Pump bowls, propellers and motors shall also be the product of a single Manufacturer.

2. A factory authorized service facility shall have trained service technicians and be able to show evidence of parts inventory for routine maintenance items such as bearings, gaskets, shafts, and sleeves.

3. Acceptable pump manufacturers, or approved equal, include:

   a. Trillium Flow Technologies

   b. Goulds/Xylem

   c. Cascade Pump Company

2.1 LARGE PUMP CONDITIONS (PMP-5 - PMP-8)

A. Performance Requirements:

Design Flow Capacity, gpm	3,100
Design Flow TDH, ft.	250
Design Flow Pump Speed, rpm	1770
Design Flow Minimum Bowl Efficiency, %	84
Operating Range, rpm	885-1770
Nominal Motor Speed, rpm (direct drive)	1,800
Motor Size, hp	250

B. Operating Conditions:

1. The pumps shall be suitable for long-term operation under the following conditions:

Pump Discharge Centerline Elevation, ft	361.58
Minimum Sump Water Surface Elevation, ft	338.3
Pump Sump Slab Elevation, ft	332.0
Fluid Temperature, deg F	45 to 70
Fluid	Fresh Water
Specific Gravity	1.0

2.2 SMALL PUMP CONDITIONS (PMP-3 & 4)

A. Performance Requirements:

Design Flow Capacity, gpm	1,500
Design Flow TDH, ft.	250
Design Flow Pump Speed, rpm	1770
Design Flow Minimum Bowl Efficiency, %	84
Pump Operating Range, rpm	885-1770
Nominal Motor Speed, rpm	1,800
Motor Size, hp	125

B. Operating Conditions:

Pump Discharge Centerline Elevation, ft	361.5
Minimum Sump Water Surface Elevation, ft	338.3
Pump Sump Slab Elevation, ft	332.0
Fluid Temperature, deg F	45 to 70
Fluid	Fresh Water
Specific Gravity	1.0

2.3 PUMP CONSTRUCTION

A. Vertical line shaft pump(s) shall be of segmented (jointed) construction. One-piece pumps shall not be accepted. Pumps shall be three-stage, vertical turbine, product lubricated. Pumps shall fit within the dimensions shown on the Project drawings. Pumps shall be constructed to be able to withstand full capacity reverse flow for 10 seconds minimum.

B. Pump Bowl:

1. Pump bowls shall be manufactured of cast iron, flanged at both ends allowing ease of assembly/ disassembly. The flanges shall have register fits and be closely machined to ensure shaft and propeller

alignments. The use of dowels shall not be accepted. Cast wall shall have a minimum thickness of 1-1/4 inches. Bowls shall contain support for impeller shaft bearings and have vanes to guide the pumped flow. Bowl bearings shall be mounted in a removable bearing housing. The bowl blades shall be designed and manufactured to minimize head loss and optimize pump efficiency.

C. Impellers:

1. Impeller shall be manufactured of cast 316L Stainless Steel. Impeller hub shall be bored and keyed for secure locking to the pump shaft as well as for easy removal. Entire impeller shall be statically and dynamically balanced at maximum operating speed per ANSI/HI 2000. Bronze impellers will not be accepted.

D. Castings:

1. Cast bowls and impellers shall be free of surface imperfections. Minor surface imperfections shall be filled or ground down as necessary to preserve correct contour and outline of impeller and to restore surface imperfections to the same degree of finish as surrounding surfaces. Correct surface pits, depressions, projections, or overlaps showing greater than 1/16-inch variation from the general contour for that section. All pump castings shall be examined by nondestructive means. Examination personnel shall be qualified/certified in accordance with applicable ASTM requirements. The examination procedure and qualification of the examiner shall be submitted for approval. Examination tests shall be made at the foundry and a certified report shall be submitted for approval. Nondestructive examinations shall be of the following:

a. Ultrasonic - Inspection shall conform to the applicable provisions of ASTM A 609/A 609M.

b. Magnetic Particle - Inspection shall conform to the applicable provisions of ASTM E 709.

c. Liquid Penetrant - Inspection shall conform to the applicable provisions of ASTM E 165.

E. Suction Bell:

1. Suction bell shall be constructed of cast iron and shall be flanged to the pump bowl. Suction bell shall have a flared inlet designed to reduce entrance losses and shall have a sufficient number of vanes to guide the entrance flow to the impeller and to support the weight of the impeller and pump shaft when dismantling the pump. Forged

or fabricated suction bells shall not be accepted. Shaft bearings in suction bell shall not be accepted.

F. Flow-Straightening Anti-Vortex Conditioning Basket:

1. Suction bells shall include a flow-straightening anti-vortex basket. Provide basket design approved by a nationally recognized Hydraulics Testing Laboratory. Provide a certified drawing for all baskets for review with pump submittal. Pump manufacturer to coordinate the method of securing the basket to the pump intake bell. Basket minimum design criteria:

   a. Minimum basket clearance from intake floor: 4 inches

   b. Minimum basket height: Equal to intake bell outside diameter (D) divided by three (D/3).

   c. Vane spacing: Not to exceed 15 degrees.

   d. Bottom grating depth to spacing aspect ratio: 1:1 and minimum of 75% open area.

   e. Maximum Headloss Coefficient K: 0.70

   f. Material: Type 316L Stainless Steel

G. Column Assembly and Discharge Head:

1. Pump column and discharge head shall be constructed of ASTM A36 low carbon steel. Walls shall have a minimum thickness of 3/8 inches. No pump segment shall be greater than 8 feet in length. If intermediate bearings are required, column flange shall be machined to allow for the installation and auto-alignment of intermediate removable shaft support spider. Large Pumps shall have a 12-inch discharge and Small Pumps shall have a 10-inch discharge as indicated in the project drawings. Pump discharge flanges shall conform to AWWA (American Water Works Association) C207.

H. Flanged Joints:

1. All Pump flanged joints shall be air- and water-tight, without the use of preformed gaskets. Flanges shall be register fit and closely machined to ensure shaft and propeller alignments, and shall have external stiffeners, if needed. Dowels shall not be permitted. Bolts and nuts used for flanged joints shall be hexagonal head fasteners of 300 series Stainless Steel.

I. Pump Line-Shaft:

1. All pump shafting shall be constructed of high tensile pump shaft quality 416 Stainless Steel. The shaft shall be of sufficient diameter capable of transmitting required horsepower and torque throughout entire operating range of pumps and sized to be free of undo vibrations. Shaft design shall be based on criteria set forth in ASME B106.1M for two different design cases. The first uses a factor of safety of 5 based on ultimate tensile strength of shaft material and maximum horsepower based on pump requirements. The second uses 75 percent of the yield strength of shaft material and maximum motor torque based on pump operating requirements. Where extended shaft lengths may be required, shaft couplings shall be keyed and sleeved couplings. Threaded couplings are not permitted.

J. Radial Bearings:

1. Bearings shall be Styrene Butadiene Rubber (SBR) water lubricated bushings. Bearings shall be located within the pump diffuser and stuffing box, discharge elbow, and intermediate locations as required. Tailcone bearings are not permitted. Grease or oil bearings are not allowed. Intermediate bearings shall be provided as required and shall be supported by removable bearing retainers.

K. Stuffing Box:

1. Stuffing box and packing gland shall be constructed from carbon steel with 304 Stainless Steel gland bolts. Stuffing box shall be removable. Packing shall be Teflon impregnated and lantern ring shall be bronze.

L. Thrust Bearings:

1. Thrust bearings shall be provided to carry the entire weight of the rotating element of the pump, the hydraulic thrust imposed by the impeller, and radial load if any. Thrust bearing shall be enclosed in an oil bath, with a sight glass to verify oil level. Greased bearings are not permitted. Thrust bearings shall be rated for a minimum B10 life of 20,000 hours.

M. Support Baseplate (Sole Plate):

1. Pump shall include a single piece mounting baseplate. The baseplate shall be constructed of A36 carbon steel, and of adequate thickness to prevent excessive vibration and deflection. Baseplate stress analysis shall be provided.

N. Lifting Lugs:

1. Pump segments shall be furnished with lifting lugs to facilitate pump handling, for assembly, installation, removal, and pump maintenance.

O. Welding:

1. All welds shall be continuous with full penetration inside and outside. Pressure containing fabrications shall be welded only by those who are qualified on ASME Section IX.

P. Surface Preparation and Protective Coating:

1. Pump bowl assembly to be coated with fusion bonded epoxy, Scotchkote 134. Pump column shall be coated and lined with Carbonguard 891 epoxy. Pump bearing and retainer shall be coated with Carboguard 891 epoxy. Pump discharge head shall be coated and lined with Carboguard 891 epoxy coating. Pump soleplate shall be coated with Carboline 635 VOC primer with Carboline 3359 top coat – top side only.

2.4 ELECTRIC MOTOR DRIVER

A. General:

1. Each pump shall be driven by a squirrel cage induction TEFC electric motor. Each motor shall be rated 460V/3PH/60Hz, Inverter Duty, NEMA B design, Class F insulation, 1.15 S.F., for direct-drive pumping applications. Motors shall have a minimum efficiency of 95.8 percent for the 250 hp motors and 95.4 percent for the 125 hp motor.

2. The motors for pumps PMP-3 through PMP-8 shall be rated for Inverter Duty for use with Allen Bradley variable frequency drives and reduced voltage starters. These motors shall comply with the requirements of NEMA MG1 Part 31. The CONTRACTOR shall provide the required submittal data required specifically for the variable frequency driven motors. Provide motor winding and bearing resistance temperature detectors (RTDs) for temperature monitoring. All equipment shall be derated as recommended by the drive and motor manufacturers for reduced speed operation with an adjustable frequency controller in addition to any derating requirements in Section 26 24 23 – Low Voltage Motor Control Center. Motors shall have adequate cooling at the lowest expected speed of operation at the expected load condition. Any line terminators, filtering devices, harmonic filters, line reactors, shaft grounding, insulated bearings, or other devices required for proper operation of the motor and variable frequency drive combination shall be provided and installed by the CONTRACTOR at no extra cost to the OWNER.

2.5 GUARDS AND NAMEPLATES

A. General:

1. The pump shall be identified by means of a separate name-plate permanently affixed in a conspicuous location. The plate shall bear the manufacturer's name, model designation, serial number, and other pertinent information such as design capacity, design speed, etc. The plate shall be made of corrosion-resisting metal with raised or depressed lettering and contrasting background.

2. Safety guards and/or covers shall be provided wherever necessary to protect the operators from accidental contact with moving parts. Guards and covers shall be of sheet steel, expanded metal, or another acceptable material and removable for disassembly of the pump.

2.6 PUMP TESTING

A. General:

1. Factory Pump Performance Testing: Factory pump performance testing shall be performed at the manufacturer’s site prior to pump shipment. Testing shall be Open Sump Testing (Vertical Configuration in an Open Sump) in accordance with testing standards ANSI/HI 2.6-2000, ANSI/ASME PTC 18.1, and HI Test Standard 1U.

2. Testing shall be performed in accordance with HI 2.6-2000. Whenever possible a minimum of seven test points shall be tested and recorded including one above and below the specified operating range of the pump.

3. Head measurements shall be taken using a multiple tap with a loop manifold configuration as per HI 2.6-2000.

4. A Pump Performance Test Plan shall be supplied for approval before testing, detailing the test configuration and testing procedure, verifying adherence to specifications.

5. A complete Pump Performance Test Report shall be supplied and Certified Pump Performance Curves shall be generated showing pump flow vs. total head, and pump flow vs. pump efficiency, stamped by a registered professional engineer.

    a. Complete tests at 50%, 60%, 70%, 80%, 90%, and full speeds for each pump, and include in pump performance test report.

PART 3 – EXECUTION

3.0 INSTALLATION

A. General:

1. Pumps shall be installed as detailed on the design drawings.
2. Pumps shall be installed plumb such that the base plate shall be within a tolerance of 0.005 inches per foot of base plate width.
3. The CONTRACTOR shall coordinate the installation of the pumps with the pump Manufacturer. All construction and installation shall conform with the drawings and specifications and the pump Manufacturer's written recommendations.
4. A two (2) hour, full speed, wet run test shall be performed on each pump. Thirty (30) minute wet test runs shall be performed on each pump at speed increments from 50% to 90% at 10% speed increments. The field tests shall demonstrate correct mechanical operation after pump start-up and witnessed by a qualified representative of the pump manufacturer.
5. Dynamic vibration testing and balancing shall be performed by a qualified technician at each speed increment. Balancing shall demonstrate that pumps run within a vibration tolerance of 0.2 inches per second and 7.0 mils peak to peak. A report shall be submitted with the results of testing and balancing, and shall correlate and document the results with the vibration transmitter associated with each pump.
6. Testing shall be done before checkout of the system operation in accordance with Section 01 60 00 – Facility Startup.
7. Pump Control System (PCS) integration testing will require coordination with the OWNER. The CONTRACTOR shall assist the OWNER’s integrator to verify that the PCS is receiving correct inputs, to simulate operating sequences, and to assist with startup and commissioning testing.

3.1 SERVICES OF MANUFACTURER

A. Inspection, Startup, and Field Adjustment:

1. A Service Representative of the Manufacturer shall be present at the site for a minimum of three (3) workdays to oversee and inspect the installation and initial startup of the pumps. The manufacturer’s

representative shall provide certification that the pumps were installed as per the Manufacturer's recommendations and that the pumps are functioning properly. Testing shall include measuring the shaft alignment immediately adjacent to the stuffing box to demonstrate that it is within the manufacturers recommended tolerances. Testing shall also include measuring vibration with an accelerometer and balancing as required such that the pump assembly is within the manufacturers recommended limits of vibration.

B. Instruction of Owner's Personnel:

1. A Training Representative of the Manufacturer shall be present at the Site for a minimum of one (1) workday to instruct the OWNER's operations personnel in the proper operation and routine maintenance of the pumps. The scheduling of the training session shall be coordinated with the OWNER in advance to ensure that the appropriate personnel are available.

C. Workday:

1. For the purposes of this section, a workday is defined as an 8-hour period at the site, excluding travel time.

– End of Section –

SECTION 43 25 13

SUMP PUMPS

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the furnishing and installation of submersible non-clog pumps. The CONTRACTOR shall provide submersible non-clog pumps and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The Supplier shall examine the Site conditions, intended application, and operation of the pump system and recommend the pump which will best satisfy the indicated requirements.

1.1 SUBMITTALS

A. General:

1. Submittals shall be made as specified in Section 01 33 00 – Contractor Submittals.

2. Submittal information shall include dimensional drawings, Installation, Operation, and Maintenance Manuals.

   a. Layout drawings shall be drawings of the valve showing all envelope dimensions including material callout.

3. Submittal shall include the pump base, guide rails, auto-coupling mechanism, and accessories.

4. Submittal shall include field testing procedures.

PART 2 – PRODUCTS

2.0 WET WELL SUMP DEWATERING PUMP

A. Identification:

PUMP NAME	**SUMP DEWATERING PUMP**
Equipment number	PMP-9
Quantity	1
Location	Wet Well Sump

B. Operating Conditions:

1. The WORK of this Section shall be suitable for long term operation under the following conditions:

Duty	Continuous
Drive	Constant Speed
Ambient environment	Submerged
Ambient temperature, degrees F	40 to 120
Ambient relative humidity, percent	40 to 100
Fluid service	Water
Fluid temperature, degrees F	60 to 120
Fluid pH range	6 to 8
Fluid specific gravity	1.0
Project site elevation, (m.s.l)	50
Minimum available NPSH, ft	3

C. Performance Requirements:

Maximum shutoff head, ft	100
Design flow capacity, gpm	110
Design flow pump head, TDH, ft	36
Design flow minimum pump efficiency, percent	60
Maximum pump speed, rpm	1800
Minimum motor size, hp	2.0

D. Pump Dimensions:

Size of discharge flange, inches	1-1/2" – 3"
Flange rating, ANSI, psi	150 lb
Pump Removal and Discharge Disconnect	Cables and Two Guides

2.1 PUMP REQUIREMENTS

A. General:

1. Pump shall be capable of continuous operation at full load with a water level of 24-inches above the invert of the wet pit, without cavitation or overheating of the motor.

2. Pump, with its cable and appurtenances, shall be able to withstand continuous submergence to a minimum depth of 65 feet, whether running or off, without leakage.

3. Each pump shall be able to operate for short periods at zero static suction head without causing any damage to any part of the unit.

4. Pump shall include a dedicated base with auto-coupling mechanism. Guide rails are to be provided with a height sufficient to remove the pump without entering the wet well. Pump supplier to provide accessories to connect the guide rails to the concrete wall.

B. Pump Construction: Construction of submersible non-clog pumps shall conform to the following requirements:

Connections	Machined metal-to-metal quick disconnect type, for withdrawal of unit from above without disconnecting pipe. When lowered into place, the pump shall automatically connect and lock into the discharge pipe, allowing for zero leakage at all anticipated pump heads.
Pump Design	Single stage, centrifugal type, close-coupled to sealed or submersible electric motor, for operation in dry or wet pit, without external cooling.
Impeller	Maximum 3-port non-clog type with replaceable wear rings on impeller and in casing, to handle raw unscreened sewage, solids, and fibrous materials.
Bearings	Permanently-lubricated, heavy-duty axial and radial ball or roller bearings top and bottom, with a minimum L-10 life of 50,000 hours, at continuous, maximum load and speed, supported by detailed calculations, to be submitted with the Shop Drawings.
Seals	Dual mechanical tandem, one stationary and one revolving shaft seals with individual springs, tungsten carbide or silicon carbide ring, each not requiring any maintenance, and capable of withstanding 1.5 times pump shutoff head. The seals shall be oil lubricated, with moisture detector probes, alarm, and test circuits.
Oil Chamber	To supply oil for lubrication and cooling of the shaft seals.

Support	Cast duckfoot bend or discharge elbow with machined face, anchored to sump floor.
Cables	Include necessary cables for power connection, moisture detection, and overload protection, sheathed, coded, and suitable for submersible pumps, and of sufficient length for direct connection to the terminal boxes indicated. Cables shall be connected to the pumps and tested at the factory.
Lifting Devices	Type 316 Stainless Steel guide rails with brackets and Stainless Steel lifting system of sufficient operating length, or with a Stainless Steel guide cable system with hooks and tension device, all rated at least 5 times the weight of the pump and motor.

C. Materials:

Pump, volute, oil casing, sliding bracket, motor frame	Cast iron
Impeller	Cast iron, statically and dynamically balanced
Pump shaft	Type 420 Stainless Steel, or 1045 carbon steel with Type 420 Stainless Steel sleeve
Exposed bolts, nuts, washers	Type 316 Stainless Steel
Mechanical seals	Independently operating landem tungsten- carbide or silicon carbide and carbon rings with Stainless Steel springs
Wear rings	Type 304 or 416 Stainless Steel and nitrite rubber with steel insert, with a Brinell hardness of 300 on impeller and 350 on case

2.2 MOTOR

A. Approval: The pumping system, including the motor and wiring, shall be approved by a nationally approved testing agency for explosion-proof service. The system shall be rated Class I, Division 1, Group C and D service

as determined by the National Electric Code and approved by a nationally recognized testing agency (UL or FM) at the time of bidding of the project.

B. Insulation: The pump motors shall be designed for continuous duty in hazardous locations. The stator and stator leads shall be moisture-resistant, triple varnished and insulated according to Class F, capable of withstanding a temperature rise of up to 155 degrees C. The allowable temperature rise of the motor at full load condition shall not exceed 80 degrees C.

C. Stator: The motor stator shall be mounted in an air-filled, watertight casing and shall not be fixed in place by externally-mounted screws which may cause leakage in the motor.

D. Motor Rating: Motors shall have service factors of 1.10 or greater. For motors driven by variable frequency drives, motor horsepower shall be the greater of:

1. Non-overloading conditions throughout the pump curve.
2. 1.15 times the horsepower required by the pump at maximum indicated flow.

E. Junction Box: The motor shall have a junction box capable of being sealed completely from the stator casing to prevent leakage through the junction box into the stator housing should a motor cable be damaged or have some other means to prevent leakage into the junction box under any condition.

F. Cable Entry: The cable entry water seal design shall be such that it precludes specific torque requirements to ensure a watertight and submersible seal. It shall permit no entry of water into any high voltage area even if the cable is severed below the water level.

G. Cooling System: Each pump shall be provided with an adequately designed cooling system using a water jacket and thermal radiator integrally cast with the stator casing. Cooling medium channels and ports shall be non-clogging by virtue of their dimensions. Water jackets are not required for motors which are designed to operate continuously at full load with ambient air cooling.

H. Motor Protection: Integral thermal sensors in the motors, one for each phase, shall be provided to monitor stator temperatures. These sensors shall be used in conjunction with and supplemented by external motor over-current protection located at the control panel. High motor temperature condition shall stop the motor until it is reset to start up.

2.3 PUMP CONTROLS

A. All electrical equipment shall conform to the requirements of the Drawings and electrical specifications. The motor control for the pump shall be contained in a single vendor control panel (VCP) of the appropriate size for the motor controllers, equipped with a surge protection device, disconnecting device consisting of thermal magnetic circuit breakers (CBs) or motor circuit protectors (MCPs), and starters (one for each pump), control power transformers (CPTs) with fuses, and control devices. The disconnect(s) shall be operable and lockable from the outside of the control panel with the door closed and meet the NEC and OSHA requirements for a panel disconnect. Thermal overload protection may be incorporated in the starter or provided by separate thermal overload devices. The operator shall be able to switch the pump on and off via the wall-mounted control panel. A low-level float switch shall be provided to stop the pump once it meets its NPSHr water elevation.

2.4 FACTORY TESTING AND SHIPMENT

A. The following procedures shall be included with the factory test prior to shipment:

1. Verification of the pump characteristic curves by testing at 1/4, 1/2, 3/4, and full flow and recording the measured head and motor current for each flow.
2. Verification of cavitation-free service and absence of motor overheating during conditions simulating the actual operating conditions after installation, whether submerged, semi-submerged, or dry.
3. Pump seals shall be designed for complete water tightness at 65 feet submergence for 30 minutes and data on factory testing and quality control shall be submitted with the Shop Drawings.
4. All parts shall be properly lubricated and protected so that no damage or deterioration will occur even during a prolonged delay from the time of shipment until installation is completed and the pumps are ready for operation.
5. Finished ferrous surfaces not painted shall be properly protected to prevent rust and corrosion.
6. The finished surfaces of exposed flanges shall be protected by strong wooden blind flanges.

7. Each pump shall be properly crated to protect against damage during shipment.

2.5 MANUFACTURERS, OR EQUAL

A. Flygt Corporation

B. KSB Pumps

C. Homa Pump

D. Grundfos

PART 3 – EXECUTION

3.0 INSTALLATION

A. The CONTRACTOR shall ensure that anchor bolts are set only after the discharge piping has been properly installed, to ensure exact fit with piping components.

3.1 TRANSPORTING

A. Care shall be taken when handling and transporting to prevent damage to the equipment.

– END OF SECTION –

DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

SECTION 46 21 50

BRUSH-CLEANED RETRIEVABLE WEDGEWIRE SCREEN SYSTEM

PART 1 – GENERAL

1.0 SECTION INCLUDES

A. This section covers the design, fabrication, delivery, installation, startup, operational training, and furnishing of a brush cleaned, retrievable, cylindrical screen system with all controls and accessories necessary to provide a complete and operational system.

1.1 GENERAL

A. The screen system shall be furnished completely, consisting of two (2) complete screen, track, main and local control systems, and one (1) track for future installation of a screen:

1. Retrievable screen with rotating wedgewire screen cylinder, submersible electric drive unit, external and internal brushes, and rolling manifold with internal suction pipe;
2. Retrieval track with framework, docking inlet, electrically actuated slide gate, electric-powered hoist, wire rope, and rigging tackle; and
3. System controls with water level sensors, local control panels, and screen system main control panel. The main control panel shall have adequate space for the future installation of controls for a third screen.

B. The track for future installation of a retrievable screen of the same capacity as the installed screens shall include the framework, docking inlet, and manual slide gate.

C. The system shall be designed to enable an operator to lower the screen into the operational position over the docking inlet and raise and lock the screen into the inspection/maintenance/storage position at the top of the retrieval track.

1.2 RELATED SECTIONS

Section 01 33 00 – Contractor Submittals
Section 03 30 00 – Cast-in-Place Concrete
Section 26 05 11 – General Electrical Requirements
Section 35 22 36 – Sluice Gates
Section 40 67 11 – Panels, Consoles, and Appurtenances

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM)

1. A36 Standard Specification for Carbon Structural Steel.
2. A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Product
3. A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. A193 Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
5. A276 Standard Specifications for Stainless Steel Bars and Shapes.
6. A320 Specifications for Stainless Steel Nuts and Bolts for Low Temperature Service.
7. A473 Standard Specification for Stainless Steel Forgings.
8. D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.

B. American Welding Society

1. D1.1 Structural Welding Code – Steel.
2. D1.6 Structural Welding Code – Stainless Steel.

C. National Electrical Code (NEC)

D. National Electrical Manufacturer's Association (NEMA)

E. Underwriters Laboratories (UL)

1.4 SUBMITTALS

A. Complete description of system operation including the screen cleaning system, retrieval system, and electrical systems with general arrangement and installation drawings.

B. Detailed shop drawings of all system components including the screen, electric drive unit, retrieval track, winch/hoist, electrical schematics and wiring diagrams, control schematics and programming, control cabinets, and layout drawings of all components.

C. Design calculations for screen, retrieval track, lifting mechanism, and anchorage and bracing. Calculations signed and stamped by Civil or Structural Engineer licensed in the State of Oregon.

D. Commercial products data for components furnished.

E. Manufacturer's installation procedures and instructions.

F. Description of routine maintenance requirements.

G. List of recommended Spare Parts.

H. Manufacturer's welding qualifications and welder certifications using Stainless Steel and carbon steel as appropriate per AWS D1.1 and D1.6.

I. Manufacturer's Certificate of Proper Installation.

J. Operation and Maintenance Manual.

K. Field Test and Training Plan.

L. Manufacturer's Certificate of Warranty.

1.5 ENVIRONMENTAL REQUIREMENTS

A. The system shall operate with ambient air temperatures ranging from 10°F to 115°F with extended periods of high humidity and full sun exposure. Submerged components will operate water temperatures ranging from 40°F to 75°F.

PART 2 – PRODUCTS

2.0 MANUFACTURER

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Intake Screens, Inc., www.isi-screens.com ,(916) 665-2727
2. Or approved equal.

B. The single manufacturer supplying this equipment must be able to furnish proof of five (5) similar installations and five (5) years of manufacturing equipment of similar technology.

2.1 DESIGN REQUIREMENTS

A. Minimum Flow through each screen: 13.0 cubic feet per second (cfs).

B. Maximum Design Approach Velocity: 0.40 feet per second (fps).

C. Maximum Slot Size: 1.75 millimeters (mm).

D. Minimum Open Area: 50 percent.

E. Diameter of Cylinders: 36 inches in diameter.

F. Minimum Overall Screen Length: 48 inches.

G. Strength: The screen cylinders shall be designed to withstand at least 10 feet of head differential measured at the screen centerline.

2.2 COMPONENTS

A. Screen – Drum shaped intake screen shall have single screen cylinder with bi-directional rotation for cleaning operation. Screen shall include the following:

1. All main screen fabrications to be made of type 304 Stainless Steel.
2. All hardware to be 18-8 Stainless Steel.
3. Screen cylinder to be fabricated from wedgewire with wires measuring 1.75 mm wide and configured with 1.75 mm slot openings.
4. 6-12 nylon brushes shall clean both the exterior and interior surfaces of the screen cylinder. The exterior of the screen shall be cleaned via screen cylinder rotation against a stationary brush. The interior shall be brush cleaned to remove and inhibit bio-fouling material.
5. Rolling manifold and internal suction pipe weldment shall support the screen cylinder, drive unit, and brush systems and mount to the retrieval track. Internal suction pipe configured to promote even approach velocity across the surface of the wedgewire cylinder.
6. Drive unit for rotating the screen cylinder comprised of a submersible electric motor, gear reducer, and drive hub. All interfaces of dissimilar metals shall be electrically isolated and drive unit to be factory sealed for corrosion resistance. Submersible motor to be 480-VAC, 3-phase, 60 Hz and rated for 2.0 hp maximum. Drive unit shall be rated for continuous duty at 40-foot submergence, 15 minutes unsubmerged, and provided with moisture and temperature switches.
7. Rotation sensors at screen cylinder to provide verification when the wedgewire screen cylinder is rotating.
8. Docking switch at manifold to provide verification when the screen has reached the operational position over the inlet.

B. Retrieval System – Each screen shall be designed to travel along a retrieval track to enable the screen to be removed from the water for inspection, maintenance, or storage. Retrieval System shall include the following:

1. All retrieval track fabrications to be made of type 304 Stainless Steel.
2. All hardware to be 18-8 Stainless Steel.

3. Wall thimble to be cast into the concrete wet well wall and provide bolting for retrieval track and isolation gate. The dimensions of the interior face of the wall thimble shall be suitable for installation of a sluice gate and shall include drilled and tapped gate mounting holes.
4. Retrieval tracks and framework with support attachments and anchoring provisions to intake wall and thimble.
5. Docking inlet with sealing surface to rolling manifold to connect to inlet opening.
6. Bar rack to exclude large debris from entering docking inlet area when screen is raised.
7. Electric winch/hoist shall mount to top of retrieval track and include wire rope with rigging. Retrieval system shall employ a slack roller with a limit switch to stop the downward travel of the screen. A top limit switch shall stop the upward travel of the screen, with a mechanical hard-stop back up. The winch/hoist shall include a brake to hold the screen in a partially raised position. The winch/hoist shall include motor overload or similar protection to prevent excessive force from being applied to the retrieval system in the event of debris or other obstruction in the track.
8. Securing pin or latch that does not rely on the winch/hoist for support shall secure the screen to the track in the raised position.
9. Linked umbilical cable management system shall provide guidance and strain relief for power and signal cables during screen travel.
10. Retrieval system to be factory wired as much as practical.
11. Electrical junction box/local control panel mounted to the track frame to serve as the field wiring termination point.

C. Control System – Control system consisting of a Main Control Panel and Local Control Panel(s) for system monitoring, automatic and manual cleaning operation, and manual winch/hoist operation.

1. Main Control Panel (MCP) with programmable logic controller (PLC) and touchscreen Human Machine Interface (HMI) for both automatic and manual screen cleaning operation and system monitoring.
    a. MCP shall be furnished by the Manufacturer and include at least the following:
        i. Input Power: 460 Volts, 3-phase, 60 Hz

ii. Main circuit breaker with external disconnecting handle capable of being locked in the open position

iii. Control transformer with line and load fuses

iv. Surge arrestor

v. Motor starters: NEMA rated, magnetic starters

vi. Enclosure: NEMA 4X rated enclosure that shall be wall-mounted and fabricated from Stainless Steel with a three-point latch door handle.

vii. Programmable Logic Controller: Siemens Simatic S7-1200, or submitted and approved substitution

viii. HMI (Human Machine Interface) / Touchscreen: Siemens 9" TP900 Comfort

ix. Water Level Sensors: SENSEMORE LMP 307, or approved alternative

x. Cylinder Rotation Sensors: magnetic reed switch or approved alternative

xi. Constructed per UL508 standards and labeled as such

xii. Dry Contacts for Status Indication:

1) System Faults: screen rotation motor temperature, motor overload, and seal leak

2) System Warning: screen rotation

3) Screen Auto (for each screen)

4) System Ready

5) Screen Cleaning Cycle in Progress

xiii. Digital Outputs for Status Indication:

1) Water Level (inside and outside pump wet well)

xiv. External Inputs:

1) Clean Now command

b. Mode Selection – HAND/OFF/AUTO: Three-position maintained type switch for mode selection.

i. HAND Mode – Manual Operation Mode from LCP

ii. OFF Mode – Non-operational Mode

iii. AUTO Mode – Automatic Operation Mode from MCP

c. Cleaning Operation:

i. Cleaning Cycle: a screen cleaning cycle is defined as rotation of the wedgewire screen cylinder against the internal and external brushes in a forward and then reverse direction. The cleaning cycle frequency, rotation duration and differential pressure settings shall be operator adjustable.

1) Frequency is defined as the number of cleaning cycles per 24-hour period.

2) Duration is the amount of time the cylinders are in rotation, first in forward and then reverse direction.

3) Factory programming shall be set at a frequency of 3 cleaning cycles per day each with a duration of 60-seconds in a forward direction, a 3-second stop, and 60-seconds in the reverse direction.

ii. Automatic Cleaning Cycle: a cleaning cycle will begin when triggered by one of the following conditions; triggers may be enabled or disabled:

1) Cleaning cycle frequency interval reached.

2) Differential pressure exceeds 6-inches.

3) Clean Now" command. A set of dry contacts provided in the control panel that can be used to remotely initiate a cleaning cycle when the system is in Auto mode.

d. Manual Cleaning Cycle: Manually initiated at HMI / Touch Screen.

e. Screens shall be cleaned sequentially, not simultaneously.

2. Local Control Panel (LCP) to be positioned adjacent to each retrieval track and serve as cable termination point and operator interface for manual cylinder rotation and winch/hoist operation for the respective screen system. The respective screen system can only be manually operated from the LCP when HAND Mode is selected at the MCP.

a. LCP shall be furnished by the Manufacturer and include at least the following:

i. Enclosure: NEMA 4X rated enclosure that shall be free-standing or track-mounted and fabricated from Stainless Steel.

ii. Controls and status lights shall be located behind a lockable outer cover.

iii. Constructed per UL508 standards and labeled as such.

iv. Emergency stop functionality

v. Status indication for:

1) HAND Mode indicator light

2) Screen Docked indicator light

3) Cable Slack indicator light

b. Cylinder Rotation – FWD/OFF/REV: Three-position selector switch with spring-return to center type operator to engage simultaneous rotation of the screen cylinder in the designated forward or reverse direction.

c. Manual Winch/Hoist Operation – UP/OFF/DOWN: Three-position selector switch with spring-return to center type operator to engage winch operation in the designated up or down direction.

2.3 MATERIALS

A. Structural Steel: ASTM A36. CONTRACTOR may substitute ASTM A992 or ASTM A572 Grade 50 for ASTM A36.

B. Stainless Steel:

1. Plates, sheets and strips: ASTM A240, Type 304.

2. Bars and shapes: ASTM A276, Type 304.

C. Stainless Steel Bolts and Hex Cap Screws:

1. ASTM A193 and ASTM F593, Type 304.

PART 3 – EXECUTION

3.0 FABRICATION AND WORKMANSHIP

A. Metalwork shall be free from warp, twists, dents, buckle, and other defects.

B. Installation shall be neat, plumb, square, straight and in alignment. Provisions shall be made for expansion throughout to avoid damage. Surfaces shall be cleaned and left free from stains, marks, burrs, or other defects.

C. All Stainless Steel shall be pickled prior to shipping. Pickling shall produce a modest etch and shall remove all embedded iron and heat tint. All Stainless Steel surfaces shall be adequately protected during fabrication, shipping, handling, and installation to prevent contamination from iron or carbon steel objects or surfaces.

D. Comply with AISC Specification for all steel fabrication.

E. Comply with AWS D1.6 and D1.1 for welding qualifications and procedures.

F. Lubricants shall be non-toxic, fish friendly and NSF 61 certified.

3.1 DELIVERY STORAGE, HANDLING

A. Insofar as is practical, the equipment specified herein shall be factory assembled. The parts and assemblies that are, of necessity, shipped unassembled shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final assembly in the field.

B. CONTRACTOR shall provide all necessary insurance for shipped goods. CONTRACTOR shall unpack materials, confirm delivery of all items on packing list, and perform and verifications as further described in Contract documents as applicable.

3.2 INSTALLATION

A. CONTRACTOR's installation shall be in accordance with the with Manufacturer's recommendations.

3.3 MANUFACTURER'S SERVICES

A. Manufacturer's representative to be present for an installation inspection, field test, and personnel training of the complete system for a total of four (4) 8-hour days on-site during two separate trips, one for installation inspection and a second trip for field testing and personnel training. The installation inspection shall occur prior to removal of the cofferdam. Costs requiring the Manufacturer's representative to be on site any additional length of time for safety training or additional inspections, testing, and/or training due to improper installation or delays shall be borne by the CONTRACTOR.

1. Installation Inspection: Manufacturer's representative shall issue a Certificate of Proper Installation (COPI) upon inspection and acceptance of CONTRACTOR installed equipment.
2. Field Test: Manufacturer's representative shall conduct operational field testing of equipment following issuance of COPI. Field test shall demonstrate proper operation and settings of all screen cleaning systems, retrieval systems, and control systems.
3. Personnel Training: Manufacturer's representative shall conduct training of OWNER'S personnel following an operational Field Test. Training to include identification of major components, system operation, preventative maintenance recommendations, and troubleshooting.

3.4 WARRANTY

A. All equipment supplied under this section shall be warranted by the Manufacturer for a period of two (2) years from issuance of the Manufacturer's Certificate of Warranty which will be submitted following an operation field test or six (6) months following delivery of the complete system; whichever occurs first.

3.5 SPARE PARTS

A. Manufacturer shall provide the following spare parts:
   1. One (1) screen rotation motor.
   2. Two (2) sets of internal and external screen cleaning brushes.
   3. One (1) set of screen position limit switches (docking switch and top limit switch) and slack roller sensor.
   4. One (1) water level sensor.

– End of Section –

APPENDIX A – GEOTECHNICAL INVESTIGATION REPORT

GeoProfessional Innovation®

December 23, 2024
File: MO21192A

Mr. Bill Cutting, P.E.
Kleinschmidt Group, Inc.
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Redmond, WA 98052
425.556.1288
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RE: **Geotechnical Engineering Evaluation**
City of Umatilla Pump Station Improvements
Umatilla, Oregon

Greetings, Bill:

GeoProfessional Innovation Corporation (GPI) has performed the authorized geotechnical engineering evaluation for the planned improvements to the existing City of Umatilla (City) pump station located along the Columbia River, north and east of Umatilla, Oregon. Our geotechnical engineering evaluation's purpose was to explore the subsurface conditions within the planned improvement area and provide geotechnical opinions and recommendations to assist project planning, design, and construction. We accomplished our geotechnical services referencing our authorized proposal dated May 30, 2024, as well as our discussions and interactions with you and your team after the project was initiated.

In this report we provide geotechnical recommendations for earthwork activities, as well as foundation design and construction based on the subsurface conditions encountered and observed. The geotechnical recommendations presented herein must be read and implemented in their entirety; portions or individual sections of our report cannot be relied upon without the supporting text in other pertinent sections. We recommend GPI be retained by the City of Umatilla or Kleinschmidt Group (Kleinschmidt) to provide observation and testing services to document construction is accomplished referencing the project plans, specifications, and the recommendations in this report.

We appreciate the opportunity to continue our professional relationship with Kleinschmidt and we look forward to assisting you with this project throughout its progression. Please contact us if you have any questions or comments so that we may address them in a proactive and timely fashion to help facilitate project design.

Sincerely,
GPI

Joshua T. Kannenberg, P.G.
Project Geologist

Andrew J. Abrams, P.E.
Senior Engineer



AJA/mg

Geotechnical Engineering Evaluation

City of Umatilla Pump Station Improvements
Umatilla, Oregon

PREPARED FOR:

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December 23, 2024

TABLE OF CONTENTS

INTRODUCTION 1
SCOPE OF SERVICE 1
PROJECT UNDERSTANDING 1
FIELD EXPLORATION 2
LABORATORY TESTING 2
SUBSURFACE CONDITIONS 2
GEOTECHNICAL OPINIONS AND RECOMMENDATIONS 3
Geologic Setting 3
Slope Instability Potential 3
Seismicity and Liquefaction Potential 3
Liquefaction Evaluation 4
Earthwork 5
Site Stripping 5
Undocumented Fill Removal 5
Excavation Characteristics 5
Bedrock Excavation 6
Establishing Subgrades 7
Structural Fill 7
Site Soil Reuse 8
Required Compaction 8
Coarse Soil Compaction 9
Utility Trench Construction 9
Geotextiles 9
Earthwork Seasonality/Wet Weather Considerations 10
Geotechnical Documentation 10
Foundation Design and Construction 11
Shallow Foundation Design Criteria 11
Soil Corrosivity 12
Concrete Slab-On-Grade Floors 12
Moisture Protection 12
Exterior Slab Considerations 13
Static Lateral Earth Pressures 13
Ground Anchor Design/Construction 14
Site Drainage 15
Foundation Drainage 15
GEOTECHNCAL CONTINUITY 16
EVALUATION LIMITATIONS 16

REPORT TABLES AND FIGURES

Table 1. Rock RQD Summary 3
Table 2. Site Class B Seismic Response Criteria (ASCE 7-16)[1] 4
Table 3. Site Class C Seismic Response Criteria (ASCE 7-16)[1] 4
Table 4. Soil Fill Specifications and Allowable Use 8
Table 5. Geotextile Specifications 10
Table 6. Static Equivalent Fluid Pressures (EFP) 13
Figure 1. Static Pressures on Below-Grade Walls 14
Figure 2. Rock Anchor Pull-out Cone Geometry 15

REPORT PLATES AND APPENDICES

Plate 1:	Exploration Map
Appendix A:	Unified Soil Classification System (USCS) and Exploration Logs
Appendix B:	Laboratory Test Results

Geotechnical Engineering Evaluation

City of Umatilla Pump Station Improvements
Umatilla, Oregon

INTRODUCTION

GeoProfessional Innovation Corporation (GPI) performed this geotechnical engineering evaluation to assess subsurface conditions within the planned improvement area at the existing City of Umatilla (City) pump station along the Columbia River, north and east of Umatilla, Oregon. This report was prepared referencing our proposal dated May 30, 2024. The planned improvement area is shown on Plate 1, *Exploration Map*, attached to this report. The following text outlines our scope of services project, understanding, exploration findings, geotechnical opinions, and recommendations specific to the planned pump station improvements.

SCOPE OF SERVICE

1. Coordinated exploration with Kleinschmidt Group, Inc. (Kleinschmidt) and the Oregon Utility Notification Center prior to exploration.

2. Explored the subsurface conditions within the planned improvement area via 2 exploratory borings extending 21.5 to 22.5 feet below existing site grades.

3. Accomplished laboratory testing referencing *ASTM International* (ASTM) procedures to classify soil and rock material encountered during our exploration and to estimate material parameters.

4. Performed engineering analyses to provide geotechnical recommendations to aid project design and construction.

5. Prepared and provided this electronic deliverable containing our exploration and laboratory test data, as well as our geotechnical opinions and recommendations.

PROJECT UNDERSTANDING

The existing City water pump station, pump intake, and portions of the existing water pipe line need to be replaced with new facilities. No detailed design information or configurations are established at this time.

Kleinschmidt reports the new improvements will be similar, albeit updated versions of the existing facilities. The new pump station will be a single-story structure with an approximate 500-square-foot footprint, likely comprising steel or reinforced masonry framing supported on typical shallow spread footings and a concrete slab-on grade floor. Structural loads are not yet established, but are expected to be less than 25 kips per column and 2 kips per linear foot along perimeter walls. The new intake structure is not yet designed, but will likely comprise a concrete structure, constructed below the existing Columbia River normal water level to facilitate drawing water through a screen structure and into the pump station for treatment and distribution. New foundations, walls or other structural elements which extend below the Columbia River water level will require rock anchors to resist uplift and/or lateral loads due to buoyancy on the order of 25 kips per isolated column and 2 kips per linear foot along walls. Minor grade changes (less than 3 feet) are required for the planned construction; cast-in-place concrete retaining walls will be designed by Kleinschmidt to accommodate these grade changes. No additional asphalt paved roadways are planned. Subsurface utilities will be extended to the new pump station from existing utility alignments.

FIELD EXPLORATION

GPI accomplished exploration on September 3 and 4, 2024 by observing 2 exploratory borings extending 21.5 to 22.5 feet below the existing ground surface. Borings were advanced with a track-mounted CME 850 drill rig equipped with hollow-stem augers, diamond core drilling equipment, and standard penetration test (SPT) sampling equipment. During exploration, our geotechnical engineer visually classified, described, and logged the geologic conditions encountered referencing the *Unified Soil Classification System* (USCS). SPT data was collected within the soil profile above bedrock at approximate 2.5- to 5-foot depth intervals. Disturbed soil samples were collected at various depths and locations for laboratory testing. Rock coring was accomplished to penetrate bedrock encountered in each boring location. Rock quality designation (RQD) and percent recovery data were collected from each core run. Borings were backfilled with site soil and received a bentonite plug immediately after exploration.

LABORATORY TESTING

We performed laboratory testing in reference to ASTM standards on select soil samples obtained during exploration. Laboratory testing included:

- Grain size distribution (ASTM C136)
- Moisture content (ASTM D2216)
- Modified Proctor (ASTM D1557)
- Soil pH, resistivity, and sulfates

Laboratory test results were used to estimate soil engineering parameters. These results are included in Appendix B.

SUBSURFACE CONDITIONS

Much of the existing ground surface within the planned improvement area maintains a 0.5-foot-thick layer of topsoil described as brown Silty Sand (SM) that was loose to medium dense, moist, with moderate vegetation and organics. No topsoil containing vegetation and organics was present within the existing site access road alignment. Rather, this area was covered with a 3-inch layer of crushed gravel fill. Beneath these surficial layers, alluvial sand mantles shallow basalt bedrock within the planned improvement area. The primary subsurface units encountered in our exploration are described in the following bullets:

- **Alluvium**: Silty Sand (SM). Brown, loose, and moist. Alluvial silty sand was encountered beneath topsoil or gravel fill in both exploration locations, extending 9.0 to 10.0 feet below the ground surface, where basalt bedrock was encountered.

- **Bedrock**: Basalt (RX). Dark gray with reddish brown staining, moderately weathered highly fractured. Basalt bedrock was encountered beneath alluvial sand in each boring. Basalt bedrock refused our hollow-stem augering equipment within 1.0 foot of encountering it in each boring. Coring equipment was used to penetrate basalt bedrock 12.5 feet in each boring.

Groundwater was not encountered in either boring location to the depths explored. We expect consistent groundwater levels at the site are coincident with the water level in the nearby Columbia River. However, isolated perched groundwater tables may be encountered at various depths, depending on variations in precipitation, irrigation and infiltration. Specifically, groundwater may collect at the interface between soil and underlying bedrock at certain times.

GEOTECHNICAL OPINIONS AND RECOMMENDATIONS

The following sections provide our geotechnical recommendations to aid design and construction for the planned City pump station improvements. These recommendations are based on our exploration observations and current project understanding.

Geologic Setting

The project site is located on the south bank of the Columbia River. Surface geology within the project area comprises near alluvial (i.e., water-deposited) sediment comprising variable mixtures of sand, silt, and gravel. Alluvial silty sand can be relied upon for use in various construction applications, but it requires diligent moisture conditioning. Due to its relatively loose condition exhibited in our borings, we anticipate alluvial sand can exhibit collapse potential upon wetting as the native soil structure is disturbed. Beneath alluvial sand, we encountered basalt bedrock.

Basalt bedrock encountered at the site is mapped as part of the Columbia River Basalt group, common throughout eastern Washington. The Columbia River Basalt formation was emplaced approximately 14 million years ago (MYA) through local feeder dikes which are commonly observed in regional rock cuts throughout the vicinity. Basalt bedrock is generally very hard and massive to columnar. Zones of variable weathering and fracturing are common, which can soften or loosen significant zones at varying depths throughout the rock mass. We provide a summary of RQD and percent recovery from rock core samples obtained in each boring in Table 1.

Table 1. Rock RQD Summary

Boring	Depth Interval (ft)	RQD (%)	Recovery (%)	Notes
B-21192A-1	9.0-11.5	13	87	
	11.5-16.5	25	100	
	16.5-21.5	52	100	
B-21192A-2	10.0-12.0	0	67	
	12.0-16.0	10	33	3-inch clay lens at 16 feet
	16.0-17.0	0	100	
	17.0-20.0	22	100	
	20.0-22.5	22	88	

Based on our experience with basalt bedrock deposits in the area, we anticipate fracturing and weathering will vary significantly with depth throughout the rock profile. Zones of very slightly fractured, massive basalt can be intermingled with highly fractured, highly weathered basalt. In our experience, voids in the rock mass of Columbia River Basalt deposits are not common within the Umatilla area.

Slope Instability Potential

During our visits to the site, we did not identify surface conditions indicative of slope failures within the planned pump station improvement area. Therefore, our opinion is that slope instability risks at the site will be directly related to any planned grading or construction activity that create new slopes or impacts existing slopes via new loads or revised drainage patterns.

Seismicity and Liquefaction Potential

Significant seismic activity has not been recorded in the project area in geologically recent time. The presence of faults, fault rupture, or other such features were not observed during our field reconnaissance. Seismic

activity resulting in significant ground movement or damage to structures has not been recorded in the northeastern Oregon region within geologically recent time. The only fault systems mapped within 10 miles of the project site include the Central Ferry fault and Hite Fault System, both located within 10 miles south and east of the transmission line alignment.[1] Our research on the United States Geological Survey (USGS), Washington Department of Natural Resources (WDNR), and Pacific Northwest Seismic Network (PNSN) websites indicate the Central Ferry and Hite fault systems have not exhibited significant seismic events greater than magnitude 4.0 within the last 100 years.

Where foundations will bear directly on basalt bedrock, structural design should use a Seismic Site Class "B" referencing the ASCE 7-16 Chapter 20 criteria. Where foundations will bear on silty sand alluvium, structural design should use a Seismic Site Class "C" per the same reference. We recommend seismic design reference the parameters provided in Tables 2 and 3, based on the seismic site class and project location.

Table 2. Site Class B Seismic Response Criteria (ASCE 7-16)[1]

Period (seconds)	Acceleration Coefficients (g)[2] for Site Class B	Site Factor for Site Class B	MCE_R Spectral Acceleration Parameters for Site Class B (g)[3]	Design Spectral Acceleration Parameters for Site Class B (g)
0.0 (Peak)	PGA = 0.178	F_{PGA} = 0.9	$PGA_M = 0.16 (PGA*F_{PGA})$	-
0.2(Short)	S_S = 0.396	F_a = 0.9	$S_{MS} = 0.357 (F_a*S_S)$	$S_{DS} = 0.238 (⅔ S_{MS})$
1.0	S_1 = 0.151	F_v = 0.8	$S_{M1} = 0.121 (F_v*S_1)$	$S_{D1} = 0.081 (⅔ S_{M1})$

1. Values for location Latitude 45.927574° and Longitude -119.234422°
2. Acceleration coefficients based on 2% probability of exceedance in 50 years.
3. Values for an ASCE Risk Category III

Table 3. Site Class C Seismic Response Criteria (ASCE 7-16)[1]

Period (seconds)	Acceleration Coefficients (g)[2] for Site Class B	Site Factor for Site Class C	MCE_R Spectral Acceleration Parameters for Site Class C (g)[3]	Design Spectral Acceleration Parameters for Site Class C (g)
0.0 (Peak)	PGA = 0.178	F_{PGA} = 1.222	$PGA_M = 0.217 (PGA*F_{PGA})$	-
0.2(Short)	S_S = 0.396	F_a = 1.3	$S_{MS} = 0.515 (F_a*S_S)$	$S_{DS} = 0.343 (⅔ S_{MS})$
1.0	S_1 = 0.151	F_v = 1.5	$S_{M1} = 0.343 (F_v*S_1)$	$S_{D1} = 0.151 (⅔ S_{M1})$

1. Values for location Latitude 45.927574° and Longitude -119.234422°
2. Acceleration coefficients based on 2% probability of exceedance in 50 years.
3. Values for an ASCE Risk Category III

Liquefaction Evaluation

We used our exploration data comprising soil stratigraphy, laboratory test results, SPT blowcounts, and groundwater observations from borings to evaluate liquefaction potential within the soil profile beneath the planned pump station location. The soil's resistance to liquefaction is based on density, effective overburden pressure, groundwater conditions, fines content, as well as the seismic forces driving the soil towards liquefaction.

Considering the site conditions and regional seismicity, our opinion is the risk of liquefaction at the site is low. This is primarily due to the absence of a consistent static groundwater table within the sand alluvium, and relatively shallow bedrock at the site. Though the liquefaction risk is low, the loose sand alluvium may settle due to volume change during a significant seismic event. Depending on the magnitude of the seismic event,

1 Reference: https://geologyportal.dnr.wa.gov/

we estimate seismically-induced settlement may range from 0.7 to 1.4 inches beneath planned improvements constructed over loose sand alluvium. Where improvements bear directly on bedrock, or on compacted *Structural Fill* placed over bedrock, seismically-induced settlement risks are significantly reduced.

Earthwork

Site Stripping

Topsoil was encountered in each exploratory test pit except TP-22176A-4, extending 0.5 feet below the ground surface. Strip topsoil including vegetation and organics from the planned improvement alignment. Topsoil containing vegetation and organics is not suitable for reuse as trench backfill or any other structural fill application. We recommend Kleinschmidt, J-U-B, and the City delineate a topsoil disposal location near the project alignment to reduce export costs. Alternatively, stripped topsoil can be used to dress the finished ground surface along utility alignments outside of roadways or other improvements.

Undocumented Fill Removal

GPI did not encounter undocumented fill in our exploration locations. However, we anticipate localized undocumented or uncontrolled fill deposits may be encountered at various locations along the alignment. Specifically, Kleinschmidt reports a "pre-blasted" trench alignment exists along the southern extents of the planned alignment. The exact trench alignment is not known by Kleinschmidt or GPI. Reportedly, the trench was a result of over blasting for installation of their fiber utilities. The blasted material was not removed, fractured rock remains in the trench and is proposed to be removed and disposed as part of the project. Further, where the existing water line traverses down the steep slope at the northern end of the alignment, the pipe is supported on a fill embankment that appears to be 5 to 10 feet above the adjacent existing ground surface. GPI's exploration did not penetrate this fill embankment, due to concern of damaging or disrupting the existing water line. This fill embankment appears to be supporting the existing water line without significant settlement or other performance problems. Therefore, it is plausible to assume that the embankment was constructed with some compactive effort.

We recommend the selected contractor work with the City, Kleinschmidt, and GPI during construction to identify and remove loose or otherwise unsuitable soil from beneath planned improvements. Where such fill is removed, it must be replaced with *Structural Fill* referencing this report's recommendations prior to subgrade preparations or placing additional fill or concrete. Excavated site soil may be reused as structural fill, provided it satisfies this report's *Structural Fill* requirements.

Excavation Characteristics

The planned improvements will require excavations ranging from 5 to 10 feet below the existing ground surface. Our exploration encountered silty sand soil atop bedrock ranging from 9.0 to 10.0 feet below the ground surface. We anticipate the soil above bedrock may be excavated using conventional excavation techniques and equipment. Excavators should be equipped with mechanical thumbs to manipulate boulders or large debris. Carefully plan and implement temporary soil excavations to be sloped, shored, or braced in accordance with the *Oregon Occupational Safety and Health Act* (Oregon OSHA) regulations and local code. Our exploration suggests site soil above bedrock is type "C" soil when it remains dry. Therefore, provisions should be made to allow temporary soil excavations to be sloped back to at least 1.5H:1V (horizontal to vertical) during dry conditions. However, temporary construction slopes can vary depending on soil type and consistency as well as moisture conditions, and must be evaluated on a case-by-case basis during construction by the contractor.

Construction vibrations can cause excavations to slough or cave. We do not recommend stockpiling materials adjacent to or within 10 feet of excavations, which may cause a surcharge and contribute to excavation

instability. Ultimately, the contractor is solely responsible for site safety and excavation configurations factoring in water infiltration, construction access, adjacent loading, and other factors that contribute to excavation stability.

Plan excavations with water collection points and utilize conventional sumps and pumps to remove nuisance water from irrigation or precipitation. If site soil excavations are not immediately backfilled, they may degrade when exposed to water and require over-excavation and replacement with *Granular Backfill*. We recommend construction activities, pipe installation, and excavation backfilling be performed as rapidly as possible following excavation to reduce the potential for damage to the pipeline and subgrades to degrade under construction traffic or wet weather conditions.

Bedrock Excavation

Our exploration encountered basalt bedrock in both borings at 9.0 to 10.0 feet below the ground surface. We expect bedrock excavation will be required to achieve planned subgrades and invert depths within the planned improvement area. Heavily weathered or fractured bedrock that exhibits cementation or cohesion is classified as Type B soil, which can be sloped at 1H:1V in temporary excavations. We anticipate heavily weathered bedrock is that which can be excavated with a typical, large excavator (John Deere 300G or larger) equipped with rock excavation teeth.

Competent basalt bedrock exposed in excavations is characterized as "stable rock" referencing OSHA requirements, which may be excavated near vertical for temporary applications. Excavating competent bedrock beyond 1 to 2 feet will be difficult and will require large and possibly specialized excavating equipment with ripper shanks, rock teeth, and/or hydraulic breakers. Alternatively, blasting may be required to facilitate bedrock excavation to the panned transmission line invert depths.

If blasting is required, retain a licensed blasting contractor to develop and implement a blasting plan that meets state and local codes as well as the project design requirements. At a minimum, the blasting plan should include procedures for protecting adjacent structures and properties, including established vibration limits, vibration monitoring requirements, and maintaining safety for the public and workers near the blast site.

Non-explosive demolition agents (i.e., "chemical blasting") are an alternative to traditional explosive techniques. Such methods have been used on various regional projects to aid bedrock excavation, with mixed results. Non-explosive demolition agents are expansive chemical slurries that are poured into holes drilled into the rock mass. As it cures, the slurry expands, applying pressure to the rock mass, which can fracture it in a similar fashion as traditional explosives. However, non-explosive demolition agents can also be dangerous, and must only be implemented by contractors who are very familiar with their application and performance. If the selected contractor wishes to utilize non-explosive demolition agents for rock excavation, we recommend consulting an expert in these techniques and discussing the project with a non-explosive demolition agent manufacturer to evaluate applicable performance specifications for incorporation into project documents.

The following considerations can be incorporated into the project specifications or used as a general guide to facilitate bedrock excavation requirements. Earthwork and general contractors should consider the following with respect to accomplishing rock excavation.

1. Bedrock excavation shall be performed with late-model excavation equipment; configurations equipped with short-tip-radius rock buckets; rated at not less than 150 hp net flywheel power with a bucket-curling force of no less than 35,000 lbf and stick-crowd force of not less than 23,000 lbf.

2. A minimum 9,500-ft-lb hydraulic breaker is expected to breakout competent bedrock in confined spaces when not fractured or weathered. The contractor shall maintain contingencies for mobilizing such equipment.

3. Other rock excavation methods, including predrilling, blasting, chemical agents, and others, may be considered to achieve the required excavation depths. However, the requirements and potential impacts of each method must be carefully evaluated by J-U-B, the City, and any prospective contractor.

4. For reuse as *Structural Fill*, bedrock excavation must reduce the excavated material to a maximum 0.7-foot particle size.

As part of any bedrock excavation process, it is critical that the overall bedrock removal limits be clearly outlined to contractors such that appropriate methods are utilized to prevent fracturing at or below subgrade elevations and that rock removal extend laterally to the prescribed limits.

Establishing Subgrades

Following site stripping and excavating to achieve planned construction surfaces, and prior to placing structural fill or concrete for planned improvements, prepare subgrades as follows:

- Sand Alluvium Subgrades**:** where sand alluvium is exposed at the subgrade surface below foundations and slab support aggregate sections, moisture condition and compact the exposed subgrade per the *Structural Fill* report section herein. Prepared subgrades must be dense, unyielding, and free of loose soil, debris, ice, and standing water.

- Bedrock Subgrades: where bedrock is exposed at the subgrade surface beneath planned improvements, the subgrade surface must comprise a neat and level rock surface. Gravel and loose rock particles at the surface may be compacted to a dense, interlocking condition prior to fill or concrete placement, provided the loose material above the bedrock surface is less than 0.3 feet thick. Where variations in the rock surface elevation require placement of fill to create a level surface for foundation or slab support, place *Granular Backfill* atop bedrock subgrades and compact it per the *Structural Fill* requirements in this report. Subgrades must remain compacted and free of loose soil, debris, ice, and standing water prior to placing concrete or additional *Structural Fill*.

After preparing subgrades, it is the earthwork subcontractor's sole responsibility to protect subgrades from degradation, freezing, saturation, or other disturbance. Our opinion is careful construction and earthwork procedures will be critical to achieving adequate subgrade preparation and reducing over-excavation. Specifically, these procedures could include, but are not limited to, carefully staging equipment and/or stockpiles, routing construction equipment away from subgrades, and implementing aggressive site drainage procedures to help reduce saturating subgrades during wet weather conditions.

Structural Fill

All fill for this project must be placed and compacted as structural fill. Imported fill materials will be required throughout construction. Site soil and excavated rock material (excluding topsoil containing vegetation and organics) may be reused as *General Structural Fill* for various applications, provided it is processed to meet the requirements in this report. Recommended material requirements for on-site material and imported fill products are provided in Table 4 referencing the latest *Oregon Department of Transportation* (ODOT) *Standard Specifications for Construction* (Standards).

Table 4. Soil Fill Specifications and Allowable Use

Soil Fill Product	Allowable Use	Material Specifications
General Structural Fill	• General site grading	• Soil must be classified as GP, GM, GW, SP, SC, SM, SW, or ML according to the USCS. • Soil may not contain particles larger than 0.5 feet in median diameter. • Soil must contain less than 3 percent (by weight) of organics, vegetation, wood, metal, plastic, or other deleterious substances. • Site soil meets these requirements but may require processing to remove isolated organics and debris.
Granular Backfill	• Temporary haul roads • *General Structural Fill* applications • Foundation backfill	• Soil meeting requirements stated in *Section 330.14 – Selected Granular Backfill* in the ODOT Standards.
Pipe Bedding	• Utility pipe bedding	• Soil meeting requirements stated in *Section 405-12 & 13 – Bedding & Pipe Zone Material of ODOT Standards.*
Crushed Aggregate	• Foundation support • Pavement support sections • *Granular Backfill* applications	• Soil meeting requirements stated *in Section 2630.10 – Dense Graded Aggregates* of ODOT Standards • 1.0- to 0.75-inch nominal aggregate sizes per Table 2630-1 in the ODOT Standards
Unsatisfactory Soil	• NONE	• Soil classified as CL, CH, ML, MH, OH, OL, or PT may not be used for structural fill at the project site. • Any soil containing more than 3 percent (by weight) of organics, vegetation, wood, metal, plastic, or other deleterious substances. • Variable moisture content does not render a soil unsatisfactory. Soil must be moisture conditioned to facilitate the required compaction.

Site Soil Reuse

Soil excavated from the site (excluding soil containing debris, vegetation, and organics) may be reused as *General Structural Fill* for site grading. Bedrock excavated from the site may be reused as *Granular Backfill* provided it is processed to meet the requirements in Table 1. We expect both site soil and imported structural fill products will be below optimum moisture content and will require wetting to near optimum moisture content prior to effective reuse. Earthwork contractors must understand and plan for the time required to process soil to meet the report requirements.

Difficulty achieving required compaction may impact construction costs, schedules, and other project aspects. Allowing time and space (i.e., lay-down area) to process excavated site soil and facilitate proper moisture conditioning is critical if the contractor plans to reuse site soil as structural fill and when establishing subgrades. Proper moisture conditioning and sorting can help reduce excessive compaction efforts.

Required Compaction

All soil subgrades and structural fill beneath foundations, slabs and other structural improvements must be compacted to at least 95 percent of the soil's maximum dry density referencing ASTM D1557 (Modified

Proctor). Place structural fill only over approved subgrades. Never place structural fill over frozen, saturated, or soft subgrades, or subgrades not reviewed and approved by the project geotechnical engineer retained for construction. Fill placed outside the improvement areas can be placed as non-structural fill providing there are no structures (sidewalk, curbs, utilities, signs, etc.) or other improvements planned directly above the fill in future development phases.

Structural fill products must be moisture conditioned to near optimum moisture content and placed in maximum 1-foot-thick, loose lifts. This lift thickness requires compaction equipment with a static weight at least 5 tons. If smaller or lighter compaction equipment is used, reduce the lift thickness to meet the compaction requirements presented herein.

Coarse Soil Compaction

Any material with greater than 30 percent retained above the ¾-inch sieve is too coarse for Proctor density testing. Coarse granular structural fill products are often known locally as "pit-run" or "shot rock". However, such coarse material may be used as *General* and *Granular Structural Fill*. Compact coarse fill using a "method specification" developed during construction, based on the material characteristics and the contractor's means and methods. A method specification exists in *Section 330.4.c "Non-Moisture Density Testable Material"* of the latest edition of the *ODOT Standards*. It is common that method specifications are developed during construction, specific to the materials and conditions encountered. At a minimum, GPI recommends coarse granular fill be placed in maximum 1.5-foot-thick lifts and compacted with 5 complete passes of a 10-ton, vibratory or grid roller. Vibratory rollers must have a dynamic force of at least 30,000 pounds per impact per vibration, and at least 1,000 vibrations per minute. Coarse fill must be compacted to a dense, interlocking, and unyielding surface. GPI must review the soil and aggregate material planned for fill use and monitor compaction effort full time during construction.

Utility Trench Construction

Pipe bedding for utility construction must conform to the requirements in Table 1 in this report. Loose soil must be removed from the base of utility trenches prior to placing pipe bedding. We recommend utility pipes be placed on at least 0.3 feet of bedding placed over undisturbed soil or otherwise supported according to the pipe manufacturer's specifications and ODOT requirements.

Thoroughly place and compact bedding below pipe haunches or the zone between the pipe invert and the spring line. Then place pipe bedding and compact it from the pipe invert to 1 foot above the top of the pipe with tamping bars and/or plate compactors to render the backfill to a firm and unyielding condition. To accomplish bedding compaction, the distance between the side of the pipe at the spring line and the trench wall should be at least 1 foot. The remainder of the utility trench should be backfilled in accordance with this report's *Required Compaction* section.

Geotextiles

Geotextiles and geogrids are not required for any specific project aspect. However, geotextiles can aid constructability and performance for parking lots, access roads, drainage systems, and other project aspects and can help remediate soft soil conditions and maintain site access roads during wet weather construction. Where utilized, geotextiles shall meet the minimum requirements in ODOT Standards *Section 2320 – Table 2320*-4, and the minimum properties shown in Table 5.

Table 5. Geotextile Specifications

Geotextile Type	Potential Use	Minimum Material Specifications
Non-Woven Geotextile	• Separation between aggregate and subgrade surfaces	• Reference ODOT Standards *Section 2320.20 Table 2320-4 – Subgrade Separation Geotextile Criteria – Type III* • Grab tensile strength: 113 pounds (ASTM D4632) • Puncture resistance: 223 pounds (ASTM D6241) • Apparent opening size: US Sieve #30 (ASTM D4751) • Permittivity: 0.05 seconds^{-1} (ASTM D4491)
Geogrid Reinforcement	• Persistent soft subgrade conditions	• 93 percent junction efficiency (GRI-GG2-05) • 3.0 kg-cm/degree Aperture Stability (U.S. Army Corp of Engineers Ref. 3.3.1.2000) • Minimum Radial Stiffness of 15,400-lb/ft at 0.5% Strain (ASTM D6637)

Apply geotextiles directly on approved subgrades, taut, free of wrinkles, and overlapped at least 1 foot. Consult the project geotechnical engineering of record retained for construction to review geotextile applications or other subgrade improvement alternatives.

Earthwork Seasonality/Wet Weather Considerations

Once subgrades are achieved, it is the contractor's responsibility to protect the surface from degrading under construction traffic, freezing, and/or wet weather. Concrete placement should never be attempted following a significant precipitation event and the subgrade should never be allowed to freeze prior to concrete or fill placement. The condition of the subgrade and careful construction procedures are critical to the long-term performance of the planned improvements.

Portions of the on-site soil above bedrock may be susceptible to pumping or rutting from heavy loads such as rubber-tired equipment or vehicles any time of the year. If construction commences before soil can dry after precipitation or during wet periods of the year (November through April), earthwork at the subgrade elevation should be completed by low pressure, track-mounted equipment that spreads and reduces vehicle load. Work should not be performed immediately after rainfall or until soil can dry to below optimum moisture content. Time for proper moisture conditioning during dry weather is critical to reducing excessive over-excavations and the need to import granular structural fill.

Geotechnical Documentation

Successful earthwork activities are important to the project's long-term performance. Retaining experienced earthwork subcontractors is the first step in having confidence that earthwork will be performed in reference to this report's requirements. Providing the necessary testing and engineering verification of earthwork activities is the second step. We recommend GPI be retained to verify design-specified subgrade conditions, fill removal, soil bearing units, and compaction are accomplished per our requirements. If another firm is retained to perform these critical design confirmation activities, they shall become the geotechnical engineer-of-record for construction. The criteria below outline the minimum testing and observation frequencies to implement during earthwork and foundation construction.

1. Site Stripping: observed by experienced geotechnical Engineer or GeoProfessional to confirm conditions required by design.

2. Subgrade Preparation: subgrade conditions observed by an experienced geotechnical engineer to confirm conditions required by design. Additionally, and as applicable, 1 compaction test every 5,000 sf, minimum 3 tests per testing event.

3. Mass Grading/Structural Fill Placement: 1 compaction test every 5,000 sf, per fill lift, minimum 3 tests per testing event.

4. Foundation, Slab, and Pavement Bearing Surfaces: bearing surface conditions verified by an experienced geotechnical engineer to confirm conditions as required by design. Additionally, 1 compaction test every 100 linear feet (lf) of continuous foundations and at least 2 tests per column. Minimum 1 compaction test per 2,500 sf for slab/pavement areas, or a minimum of 4 tests per alignment/area.

5. Foundation Stem Wall Backfill: 1 compaction test every 100 lf of wall or minimum 3 tests per wall line (interior and exterior), whichever results in the greater number of tests, per fill lift.

6. Utility Trench Backfill: 1 compaction test every 100 lf of trench and minimum 3 tests per utility alignment, whichever results in the greater number of tests, per each fill lift.

7. Rock Anchor Installation: installation conditions observed by an experienced geotechnical engineer to confirm conditions required by design. Additionally, and as applicable, at least 2 sets of 3 grout compressive strength test specimens per day's installation.

Foundation Design and Construction

The following items delineate GPI's recommended foundation design criteria, which are based on site subsurface conditions, and anticipated structural loads. We recommend Kleinschmidt review and confirm the loads, settlement tolerances and other aspects assumed in our evaluation. We anticipate varying conditions may be encountered at foundation subgrades, depending on location across the site. Depending on final site configurations and planned grades, we expect sand alluvium will be encountered at the foundation subgrade in some areas. In other areas, basalt bedrock will be encountered at foundation subgrades. Each condition will provide different bearing support and performance. The following bullets provide our recommendations for foundations bearing on these 2 different substrates.

Shallow Foundation Design Criteria

1. Allowable bearing pressure (sand alluvium subgrades): 2,500 psf. This requires:
   - Column loads less than 25 kips & wall loads less than 5 kips per linear foot
   - Bearing on compacted native soil, prepared per the *Establishing Subgrades* report section or *General Structural Fill* placed over prepared soil subgrades.

2. Allowable bearing pressure (basalt bedrock subgrades): 8,000 psf. This requires:
   - Bearing on dense, interlocking and unyielding bedrock subgrades prepared per the *Establishing Subgrades* report section or *Granular Backfill* placed over prepared bedrock subgrades.

3. General foundation design criteria (applies to all subgrade conditions):
   - Frost protection embedment depth: 2 feet below finished exterior surface.
   - Drained conditions. See Plate 2, *Foundation Drain Schematic,* and the *Site Drainage* report section for additional details.

- Thickened slab footings should receive additional reinforcing and/or strategic jointing to help reduce the risk of cracks forming along the transition between section thicknesses.

4. Anticipated static vertical settlement:
   - Total settlement:
     - 0.9-inch total & 0.5-inch differential (foundations bearing on recompacted sand alluvium)
     - <0.5-inch total & differential (foundations bearing on bedrock)
   - Where foundations span differing subgrade conditions, total estimated settlement may be realized entirely as differential settlement.

5. Lateral load resistance:
   - Foundation base friction coefficient:
     - 0.3 for foundations cast on compacted sand subgrades
     - 0.5 for foundations cast on bedrock subgrades
     - Reduce friction by 2/3 for precast elements
   - Lateral passive resistance is available on foundation sides at 300 pounds per cubic foot (pcf) equivalent fluid pressure (EFP). This requires:
     - 3/4 inches of lateral movement to mobilize full passive pressure.
     - Drained conditions within stem wall backfill. See Plate 2, *Foundation Drain Schematic,* and the *Site Drainage* report section for additional details.

Soil Corrosivity

Laboratory test results indicate the site soil exhibits a slight to moderate corrosive environment:

- pH = 8.1
- Resistivity = 8,330 ohm-cm
- Sulfates: 9.0 ppm

Structural designers should account for slight corrosion potential in reinforcing steel spacing and clearances. Soil is not expected to induce negative reactions with concrete. Concrete mix designs should demonstrate aggregate does not have the potential for alkali-silica reactivity (ASR).

Concrete Slab-On-Grade Floors

We recommend concrete slab-on-grade floors be supported by a minimum 0.5 foot of *Crushed Aggregate* meeting the requirements shown in Table 1. This assumes soil subgrades will be prepared beneath slabs per the *Earthwork* report section. Slabs must be designed for the anticipated use, traffic, and equipment or storage loading conditions.

Moisture Protection

We do not anticipate floor slabs for planned structures will maintain floor coverings or moisture sensitive equipment. Therefore, we do not anticipate sub-slab vapor barriers will be installed as part of this project.

If floor coverings or moisture sensitive features are planned, install vapor retarders beneath the slabs consisting of thick, puncture-proof polyethylene sheeting. An example of this material is Stego Wrap™, a 15-mil retarder. Vapor retarders may be placed atop the prepared subgrade prior to *Crushed Aggregate* placement; or atop the prepared C*rushed Aggregate* layer prior to slab section construction, depending on the contractor's means and methods, or the design team's preference.

Form stakes, piping, or other sub-slab penetrations must never penetrate the vapor retarder. Carefully design and construct any vapor retarder penetrations to reduce vapor transport through such penetrations. Even if these recommendations are used, water vapor migration through the concrete floor slab is still possible. Floor coverings should be selected accordingly and, when practical, flooring manufacturers should be consulted regarding moisture barriers, their location and product warranties. Manufacturer's recommendations should be strictly followed. Where vapor retarders are utilized, the flooring and concrete slab contractors, as well as the plastic sheeting manufacturer, should be consulted regarding additional slab cure time requirements and/or the potential for slab curling.

Exterior Slab Considerations

Exterior slabs, such as those at dumpster enclosures, building entryways, or other exterior applications are subject to heavy traffic loads and can be impacted by frost heave. Many agencies and regional facility owners elect to employ “limited frost protection” for exterior slabs by replacing frost-susceptible subgrade soil to a depth equal to 65 percent of the locally required frost protection embedment. If the City or J-U-B elect to employ this limited frost protection approach, this would require over-excavating subgrades beneath exterior slabs 1.3 feet below adjacent existing grades, and replacing it with *Crushed Aggregate* per the Table 1 in this report. GPI’s opinion is this limited frost protection approach will provide a robust support section for exterior slabs exposed to heavy traffic; but it is not required to achieve the minimum support typically required for such site features.

Static Lateral Earth Pressures

Structurally design below-grade walls which retain soil, to resist lateral earth pressures realized from retained soil, as well as any surcharge from equipment, or vehicles adjacent to walls. We recommend static lateral earth pressures for below-grade, non-anchored walls be estimated using the following equivalent fluid pressures (EFPs) from Table 6. We provide EFP estimates for on-site soil (SF-1), which we anticipate will be used for backfill within the entire active zone (extending from the heel of the footing). Excavations into intact bedrock will not apply significant lateral load to adjacent walls. Figure 1 below illustrates the static EFP distributions.

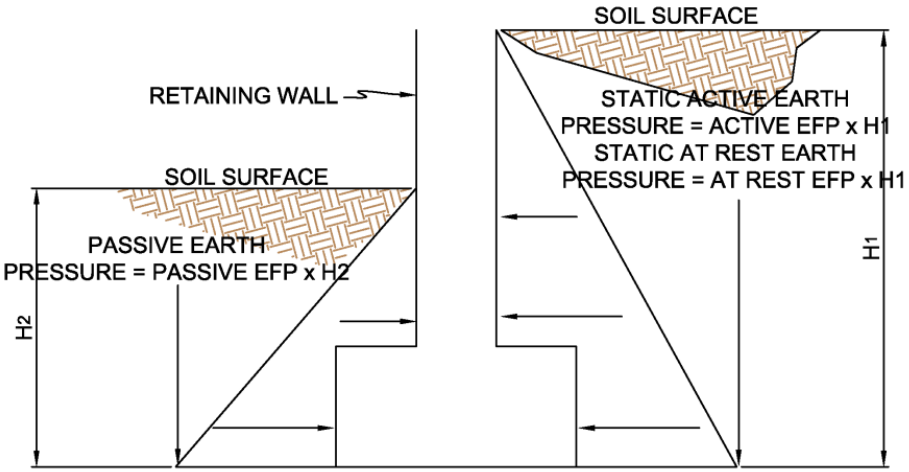
Table 6. Static Equivalent Fluid Pressures (EFP)

On-site soil backfill (Φ=32° γ = 122 pcf)

Rankine Lateral Earth Pressure Case	Equivalent Fluid Pressure (EFP)
At-rest case (no wall movement)	50 pcf
Active case (wall movement away from soil mass)	35 pcf
Passive case (wall movement toward soil mass)	350 pcf[1]

1. Assumes ¾-inch lateral movement to fully mobilize passive resistance

Figure 1. Static Pressures on Below-Grade Walls



These EFP's assume fully drained conditions and no hydrostatic forces acting on the wall. Lateral surcharge pressures due to equipment, stored material, etc. have not been included in the above lateral earth pressure recommendations. A lateral pressure coefficient of 0.5 should be applied to any surface surcharge pressure to estimate the lateral loads applied to walls from surcharges behind and above walls.

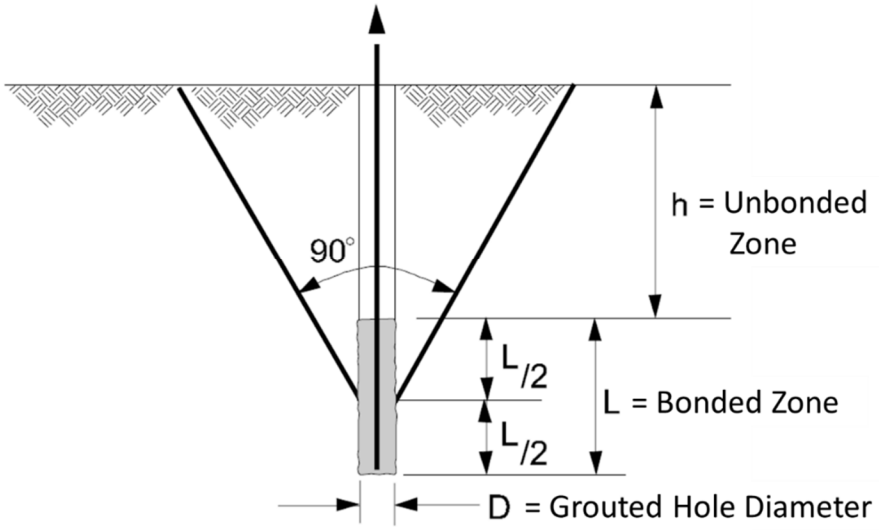
Ground Anchor Design/Construction

Ground anchors will be installed to resist uplift forces caused by buoyancy effects on submerged portions of the structure. We envision these will comprise deformed or threaded steel rods that are drilled and grouted into bedrock below foundations or other strategic locations around the structure. The following sections delineate our geotechnical recommendations to aid Kleinschmidt with designing rock anchors.

- Drilled-in, grouted rock anchors:
  - Kleinschmidt must specify anchor rod diameter, length, and steel grade based on their structural design. At a minimum, we recommend rock anchors comprise deformed or threaded steel bars with a minimum yield strength of 50 kips per square inch (ksi, "Grade 50").
  - Design rock anchors using the following geotechnical criteria:
    - Maximum allowable grout-to-ground bond strength: 10,000 psf.
      i. This incorporates a safety factor of 3.0.
    - Minimum non-shrink grout compressive strength: 4,000 pounds per square inch (psi).
    - Minimum grouted bond zone length: 15 times the hole diameter, but not less than 5 feet bond zone in competent basalt bedrock.
      i. If bond zone extends to ground surface, neglect upper 1 foot of anchor bond resistance.
    - Minimum hole diameter: 3 times the bar diameter or 2 inches, whichever is greater.
    - Maximum hole diameter: 5 times the bar diameter.
    - Minimum center-to-center spacing between anchors: 6 times the hole diameter.
    - Space anchors to preclude interference due to a 90-degree anchor pull out cone, as illustrated in Figure 2. Smaller anchor spacings may reduce individual anchor capacity due to overlapping pullout cone geometry.

Figure 2. Rock Anchor Pull-out Cone Geometry

(From *Ground Anchors and Anchored Systems,* Federal Highway Administration, 1999, FHWA-IF-99-015)



Site Drainage

Runoff from irrigation, precipitation or snowmelt must be routed away from planned improvements to the maximum extent practical and must not be allowed to infiltrate beneath or be diverted towards foundations, or slab subgrades. Where infiltration or ponding occurs, reduced performance should be expected. Convey runoff or water migrating along the ground surface away from planned improvements by an appropriately designed series of catch basins, ditches, swales, or other surface water management procedures.

We recommend the ground surface outside structures be sloped at least 5 percent away for a minimum of 10 feet to rapidly convey surface water or roof runoff away from foundations. Site grades beyond 10 feet from structures should slope at least 2 percent away and toward areas approved by J-U-B for water disposal. *Americans with Disabilities Act* (ADA) hardscapes may not meet the above site grading recommendations adjacent to structures. We recommend ADA-pertinent hardscapes be sloped away from structures to the maximum extent practical. We recommend elastomeric sealant be considered between exterior hardscapes and foundation stem walls to reduce moisture infiltration. Well-designed site drainage and careful final grading will help limit moisture infiltration beneath the building, which will help reduce impacts from frost heave, vapor intrusion to interior spaces, and help improve long-term performance of structures. Provide roof gutters and downspouts, however never connect them to the foundation drains.

Foundation Drainage

Maintaining uniformly drained conditions is important to long-term building performance and to help route water away from footings to reduce settlement risk. Therefore, we recommend installing foundation drains in perimeter foundation alignments as shown on Plate 2, *Foundation Drain Schematic*. We recommend installing foundation drains at the lowest bearing elevation around each structure's perimeter. Foundation drains should never connect to roof drains and should daylight to a disposal area at least 50 horizontal feet away, and 1 vertical foot down-gradient of the planned foundation bearing elevation.

GEOTECHNCAL CONTINUITY

Our experience with similar previous projects suggests providing geotechnical continuity throughout design and construction is critical to project success. We recommend GPI be retained to provide design continuity throughout construction observation and testing to document the report recommendations have been followed. If for some reason we are not retained to provide the recommended construction observation services, we cannot be responsible for soil engineering-related construction errors or omissions. Providing these services during construction will help to identify potential earthwork construction issues, thus allowing the contractor to proactively remedy problems and reduce the potential for errors and omissions.

EVALUATION LIMITATIONS

This geotechnical engineering evaluation has been prepared to assist in planning, design, and construction for the planned pump station improvements located along the south bank of the Columbia River in Umatilla, Oregon. Our scope does not include an engineering evaluation for retaining walls, pavement sections, soil infiltration rates, shoring, underpinning, dewatering systems, landscaping, or soil nutrient analysis. Neither does our scope include civil engineering design, stormwater management, structural design, environmental assessment, hazardous substance evaluation, or performing a 100-foot-deep boring to assess IBC site class. GPI can provide these services at your request under an amended scope.

This report was prepared for the exclusive use of Kleinschmidt, the City of Umatilla, and their design team members, for the specific project referenced herein. GPI cannot be held responsible for unauthorized duplication or reliance upon this report or its contents without written authorization.

Changes to the planned improvements can drastically affect our recommendations. If the improvement plans change from those described herein, we must be notified so that we may make modifications to our recommendations with respect to the modified improvements. Also, variation in subsurface conditions may exist between or beyond our explorations, which can necessitate changes to the geotechnical recommendations in this report. Where variations occur, it is critical GPI be afforded the opportunity to modify our report to reflect the site conditions exposed. This acknowledgment is in lieu of all warranties either express or implied.

The following accompany this report:

Plate 1:	Exploration Map
Plate 2:	Foundation Drain Schematic
Appendix A:	Unified Soil Classification System (USCS) and Exploration Logs
Appendix B:	Laboratory Test Results

LEGEND

Boring locations completed on 9-3-2024 and 9-4-2024

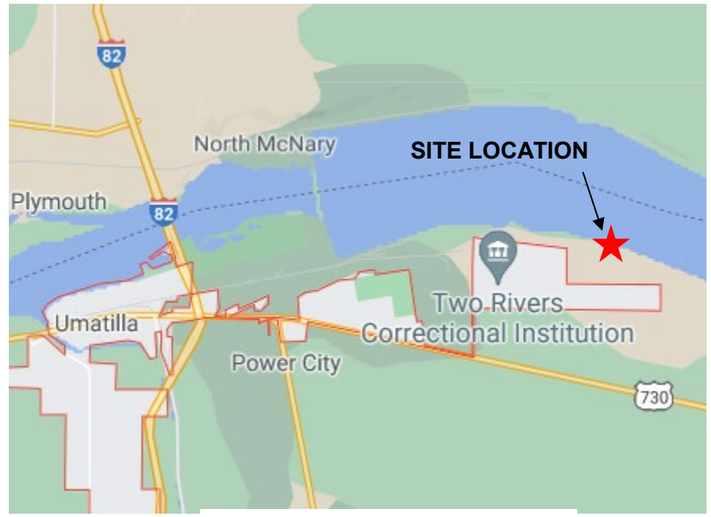
(25) Depth to bedrock below ground surface (feet)

COLUMBIA RIVER

B-21192A-1
(9.0)

B-21192A-2
(10.0)

Existing Pump Station
(45.927559, -119.234155)



Vicinity Map (Not to Scale)

N

EXPLORATION MAP
Umatilla Pump Station
Umatilla, Oregon

GeoProfessional Innovation

PU21192A	PLATE 1

Reference: Base drawing by the City of Umatilla, dated 5/6/2021. No Scale Intended.

Foundation Drain Construction

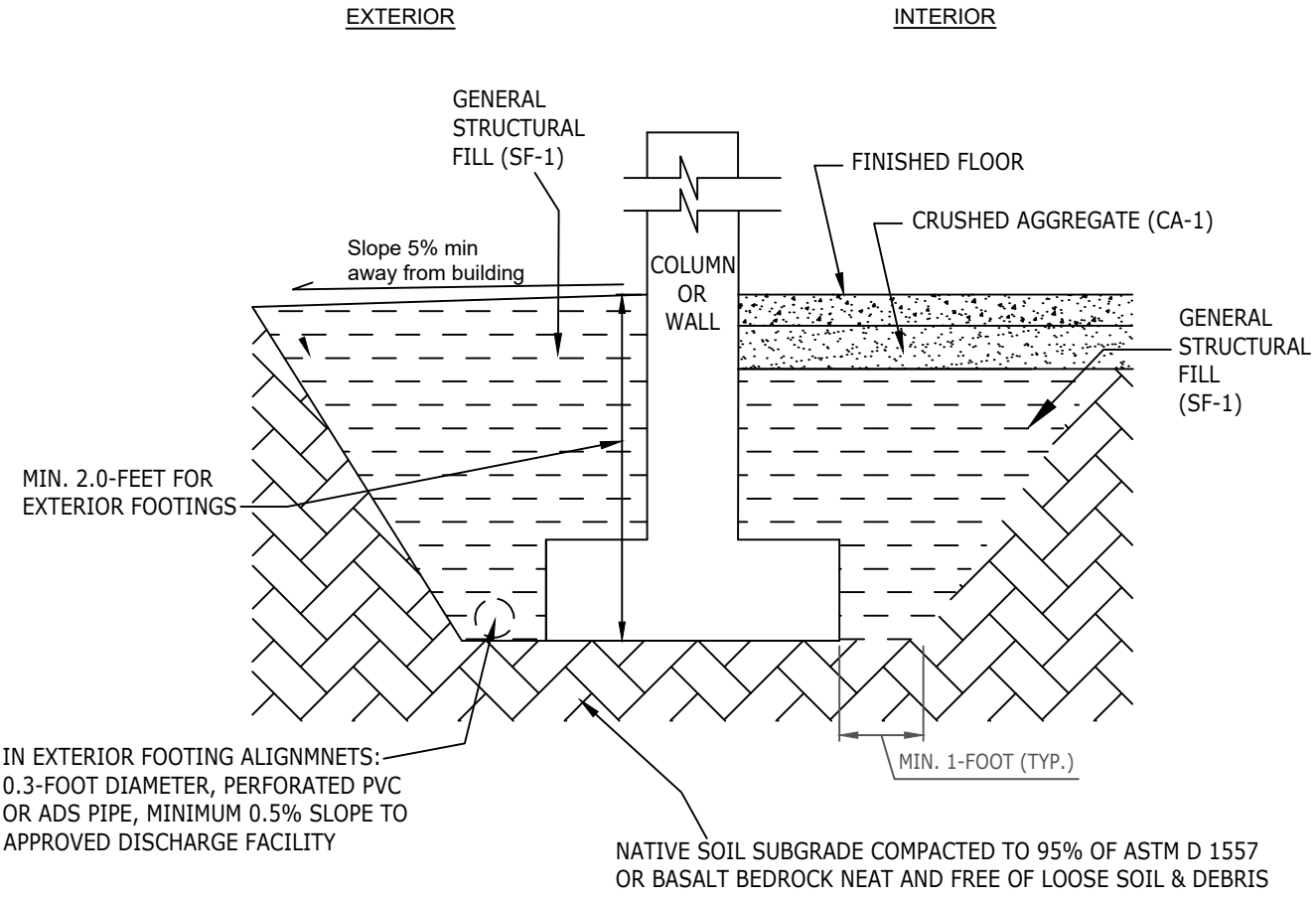
A. Excavate the subgrade to the planned foundation bearing elevation to expose native alluvial soil or bedrock.

B. Prepare and compact the exposed subgrade referencing the *Earthwork* report requirements. GPI to verify subgrades and compaction.

C. In exterior (perimeter) foundation alignments, place 0.3-foot diameter, fabric wrapped, perforated PVC or ADS pipe at lowest possible elevation to maintain gravity drainage, with positive slope towards daylight or approved discharge facility.

D. Backfill stemwalls with *General Structural Fill* (SF-1), placed and compacted referencing the *Structural Fill* report section.

This drawing is intended for shallow foundations supporting isolated columns or walls. Foundation stemwall height will vary. This is not a structural detail.



FOUNDATION DRAIN SCHEMATIC
Proposed Pump Station
Umatilla, Oregon

GeoProfessional Innovation

NOT TO SCALE

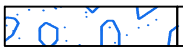
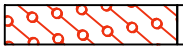
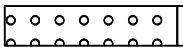
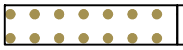
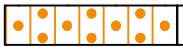
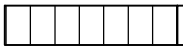
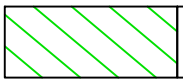
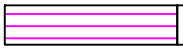
MO21192A	PLATE: 2
DRAWN BY: JBM	CHECKED BY: AJA

THIS FIGURE COMPROMISES A PORTION OF GPI'S REPORT AND THE TEXT OF THE REPORT CONTAINS ESSENTIAL INFORMATION: BEFORE UTILIZING THIS PLAN FOR ANY PURPOSE WHATSOEVER, THE REPORT SHOULD BE READ COMPLETELY. THIS FIGURE IS INTENDED TO HELP VISUALIZE THE INFORMATION PROVIDED BY OTHERS AND NO CHECK OF ACCURACY, CURRENCY, APPROPRIATENESS, ETC., OF INFORMATION PROVIDED BY OTHERS WAS PERFORMED, SINCE SUCH CHECKS WERE NOT PART OF GPI'S SCOPE OF SERVICES.

APPENDIX A

Unified Soil Classification System (USCS) and Exploration Logs

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPHIC SYMBOL	GROUP SYMBOL	TYPICAL NAMES
COARSE GRAINED SOIL	GRAVEL	CLEAN GRAVEL		GW	WELL-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
				GP	POORLY-GRADED GRAVEL, GRAVEL-SAND MIXTURES.
		GRAVEL WITH FINES		GM	SILTY GRAVEL, GRAVEL- SAND-SILT MIXTURES.
				GC	CLAYEY GRAVEL, GRAVEL-SAND-CLAY MIXTURES.
	SAND	CLEAN SAND		SW	WELL-GRADED SAND, GRAVELLY SAND.
				SP	POORLY-GRADED SAND, GRAVELLY SAND.
		SAND WITH FINES		SM	SILTY SAND, SAND-SILT MIXTURES.
				SC	CLAYEY SAND, SAND-CLAY MIXTURES.
FINE GRAINED SOIL	SILT AND CLAY LIQUID LIMIT LESS THAN 50%			ML	INORGANIC SILT, SANDY OR CLAYEY SILT.
				CL	INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, SANDY OR SILTY CLAY.
				CL-ML	INORGANIC MIXED CLAY AND SILT.
				OL	ORGANIC SILT AND CLAY OF LOW PLASTICITY.
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	INORGANIC SILT, MICA- CEOUS SILT, PLASTIC SILT.
				CH	INORGANIC CLAY OF HIGH PLASTICITY, FAT CLAY.
				OH	ORGANIC CLAY OF MEDIUM TO HIGH PLASTICITY.
				PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS.

BORING LOG SYMBOLS

- STANDARD 2 INCH OD SPLIT SPOON SAMPLE
- CALIFORNIA MODIFIED 3 INCH OD SPLIT SPOON SAMPLE
- ROCK CORE
- SHELBY TUBE 3 INCH OD UNDISTURBED SAMPLE

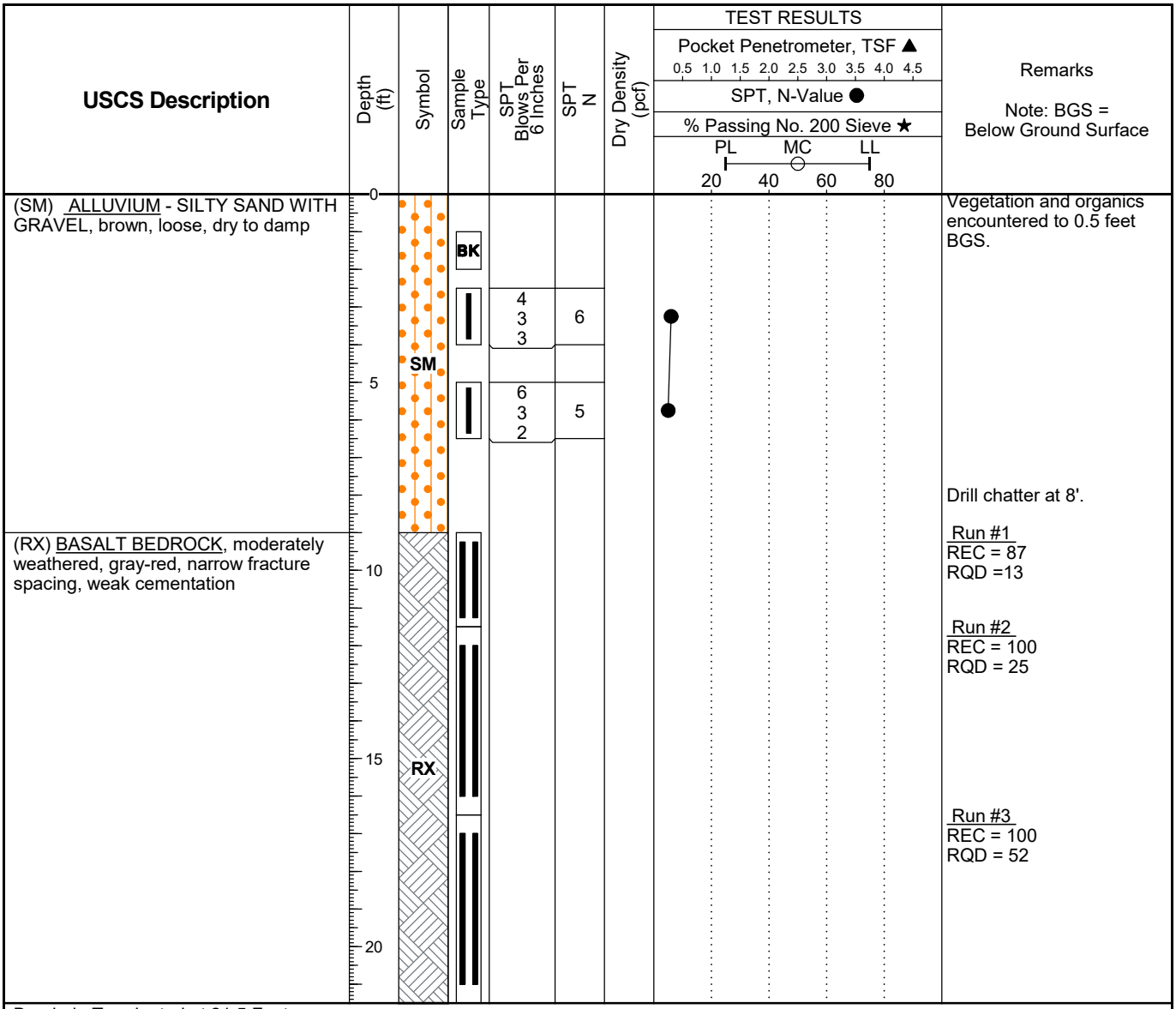
TEST PIT LOG SYMBOLS

- BG — GRAB BAG SAMPLE
- BK — BULK SAMPLE
- RG — RING SAMPLE

GROUNDWATER SYMBOLS

- GROUND WATER AFTER 24 HOURS
- GROUND WATER AT TIME OF DRILLING
- GROUND WATER AT THE END OF DRILLING

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Borehole Terminated at 21.5 Feet.

Client: Kleinschmidt Associates	**Boring Number:** B-21192A-1
Project: PU21192A	**Date Drilled:** 09-03-2024
Drill Rig: CME 850	**Borehole Diameter:** 8"
Depth to Groundwater: N.E.	**Logged By:** KS

GeoProfessional Innovation.

EXPLORATORY BORING LOG

Sheet 1 Of 1

GPI BORING - STRATA.GDT - 9/12/24 17:22 - V:\ENGINEERING\GINT FILES\2024\PU21192A UMATILLA PUMP STATION.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks Note: BGS = Below Ground Surface
(GP) FILL (3.0") - GRAVEL (SM) ALLUVIUM - SILTY SAND WITH GRAVEL, brown, loose, moist	0 5	GP SM	BK BG	6 6 3	9		●	Drill chatter at 9'.
(RX) BASALT BEDROCK, moderately to heavy weathered, gray-red, very hard, narrow fracture spacing, weak cementation	10 15 20	RX						Run #1 REC = 67 RQD = 0 Run #2 REC = 33 RQD = 10 Clay intrusion at 16 feet BGS Run #3 REC = 100 RQD = 0 Run #4 REC = 100 RQD = 21.8 Run #5 REC = 88 RQD = 22
Borehole Terminated at 22.5 Feet.								

Client: Kleinschmidt Associates	**Boring Number:** B-21192A-2
Project: PU21192A	**Date Drilled:** 09-04-2024
Drill Rig: CME 850	**Borehole Diameter:** 8"
Depth to Groundwater: N.E.	**Logged By:** KS

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EXPLORATORY BORING LOG

GPI BORING - STRATA.GDT - 9/12/24 17:22 - V:\ENGINEERING\GINT FILES\2024\PU21192A UMATILLA PUMP STATION.GPJ

APPENDIX B

Laboratory Test Results

GeoProfessional Innovation

Project Name: City of Umatilla Pump Station
Project Number: PU21192A
Client: Kleinschmidt Associates

Laboratory Test Results Summary

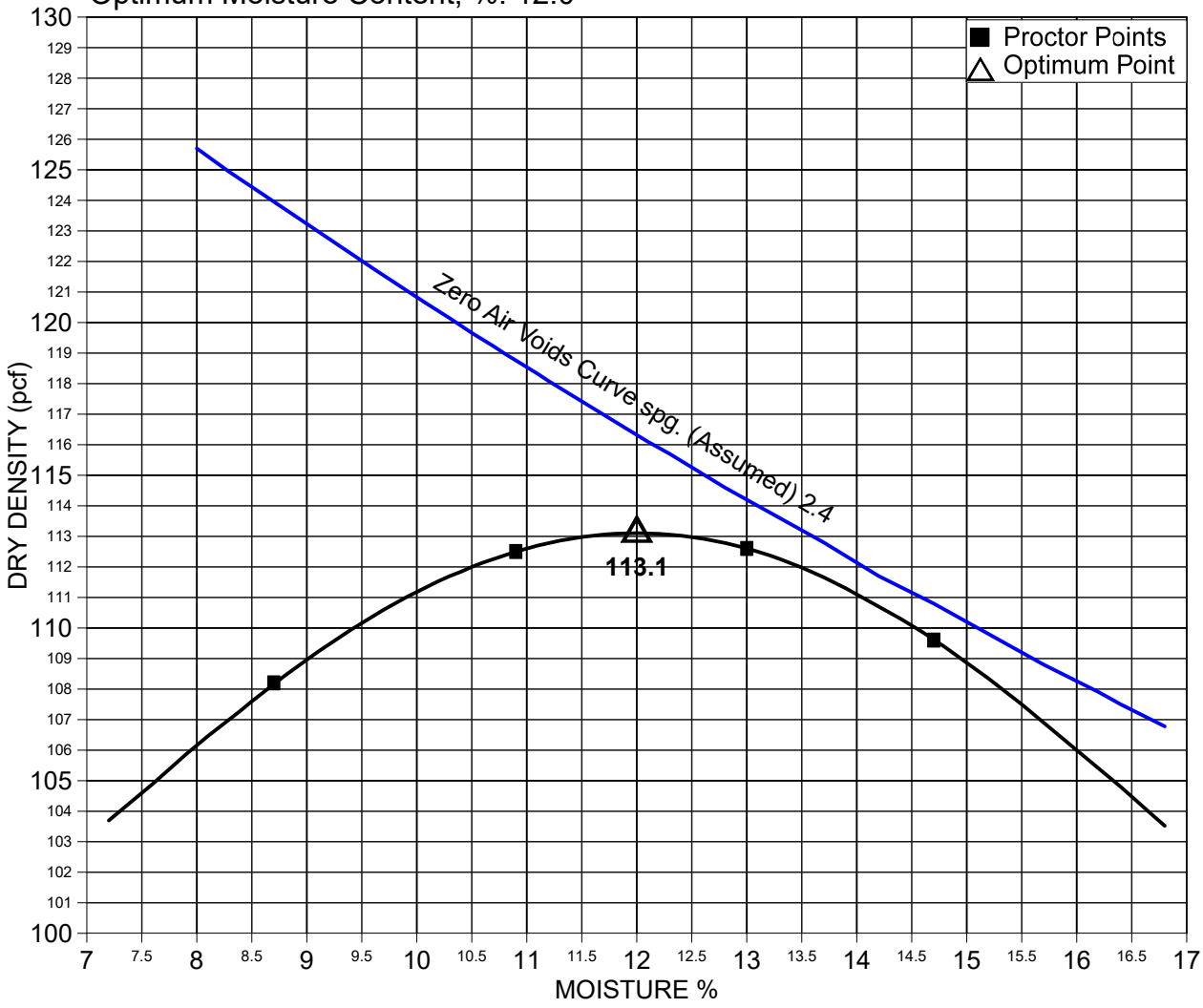
Boring	Depth (feet)	Lab Number	Description (U.S.C.S. Classification)	In situ Moisture, %	Max Dry Density, pcf	Optimum Moisture, %	#200 Sieve Passing, %	pH	Resistivity Ω·cm	Sulfates ppm
B-21192A-1	1.0-2.0	17872	Silty Sand with Gravel (SM)	3.6	113.1	12.0	20	-	-	-
B-21192A-1	2.5-4.0	17873	Silty Sand with Gravel (SM)	3.9	-	-	-	-	-	-
B-21192A-2	4.0-5.5	17874	Silty Sand with Gravel (SM)	3.5	-	-	-	8.1	8,330	9.0

Reviewed By: _____

MOISTURE-DENSITY RELATIONSHIP CURVE
ASTM D 1557
Method A

Project Name: City of Umatilla Pump Station
Project Number: PU21192A
Client: Kleinschmidt Associates
Lab Number: 17872
Sample Location: B-21192A-1 @ 1.0-2.0 feet BGS
Sample Classification: Silty Sand with Gravel (SM)
Date Tested: 9/4/2024 By: KS
Rammer Type: Mechanical

Maximum Dry Density, pcf : 113.1
Optimum Moisture Content, %: 12.0



Reviewed By: _____

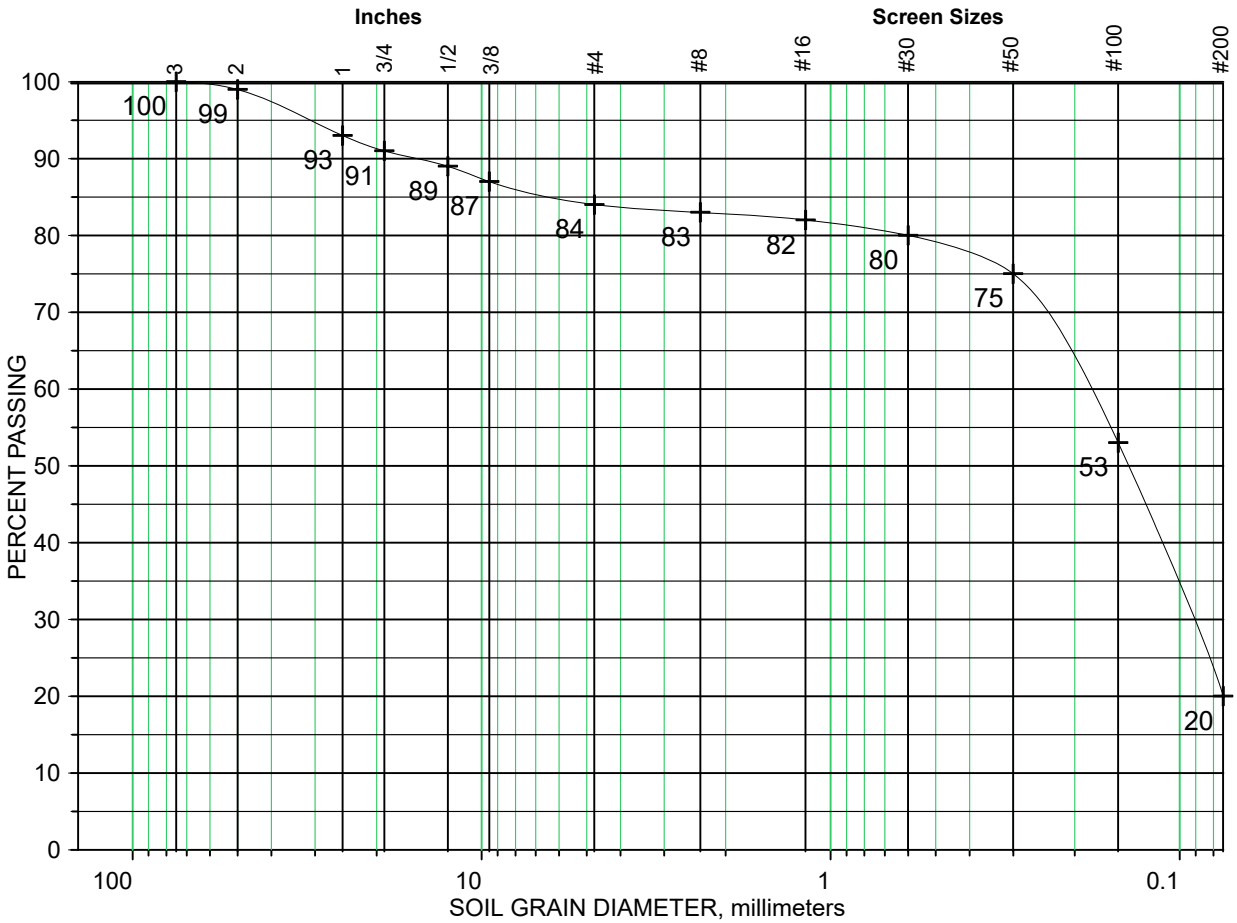
GeoProfessional Innovation.

GRADATION ANALYSIS

ASTM D6913

Project Name: City of Umatilla Pump Station
Project Number: PU21192A
Client: Kleinschmidt Associates
Lab Number: 17872
Sample Location: B-21192A-1 @ 1.0-2.0 feet BGS
Sample Classification: Silty Sand with Gravel (SM)
Date Tested: 9/4/2024 By: KS

Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



Reviewed by: _____

GeoProfessional Innovation.

APPENDIX B – EASEMENT (TO BE PROVIDED LATER)

APPENDIX C – PERMITTING DOCUMENTS

APPENDIX C – PERMITTING DOCUMENTS

	Permitting Documents
0	Permit Conditions Summary
1	US Army, Corps of Engineers 299 Easement
2	US Army, Corps of Engineers Section 404 Permit
3a	State of Oregon Department of State Lands Removal-Fill Permit
3b	State of Oregon Department of State Lands Removal-Fill Permit Renewal
4	State of Oregon Department of Environmental Quality 401 Water Quality Certification
5	State of Oregon Health Authority Construction Approval

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	2	3) 401 WQC on Site: A copy of this 401 WQC must be kept on the job site and readily available for reference by the Applicant and its contractors and subcontractors, as well as by DEQ, USACE, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), and other state and local government inspectors. Rule: OAR 340-012 Justification: All parties must be aware of and comply with the 401 WQC, including on-site contractors.	Construction	City and Contractor
DEQ 401	2	4) Project Changes: DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, if the project changes or project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant is otherwise in violation of the conditions of this certification. Rule: OAR 340-048-0050 Justification: To ensure the project will comply with water quality standards, DEQ must understand all work involved in the construction and operation of the project.	Construction	City and Contractor
DEQ 401	3	8) Erosion and Sediment Control: During construction, erosion control measures must be implemented to prevent or control movement of soil into waters of the state. The Applicant is required to develop and implement an effective erosion and sediment control plan. A project that disturbs more than one acre may be required to obtain a National Pollutant Discharge Elimination System (NPDES) 1200-C construction stormwater general permit. Contact the DEQ Stormwater Program for more information at: https://www.oregon.gov/deq/wq/wqpermits/Pages/Stormwater□Construction.aspx	Pre-Construction	Contractor
DEQ 401	4	9) Deleterious Waste Materials: The Applicant is prohibited from placing biologically harmful materials and construction debris where they could enter waters of the state, including wetlands (wetlands are waters of the state). This includes, but is not limited to: petroleum products; chemicals; cement cured less than 24 hours; welding slag and grindings; concrete saw cutting by-products; sandblasted materials; chipped paint; tires; wire; steel posts; asphalt; and waste concrete. The following specific requirements apply: a. Cure concrete, cement, or grout for at least 24 hours before any contact with flowing waters; b. Use only clean fill, free of waste and polluted substances; c. Employ all practicable controls to prevent discharges of spills of harmful materials to surface or groundwater; d. Maintain at the project construction site, and deploy as necessary, an adequate supply of materials needed to contain deleterious materials during a weather event; e. Remove all foreign materials, refuse, and waste from the project area Rule: OAR 340-041-0007(8), ORS 468B.050, CWA Section 402 Justification: DEQ must ensure that pollution does not enter waterways	Construction	Contractor
DEQ 401	4	10) Spill Prevention: The Applicant must fuel, operate, maintain and store vehicles, and must store construction materials, in areas that will not disturb habitat directly or result in potential discharges. Rule: ORS 468B.025(1)(a) Justification: DEQ must ensure that pollution does not enter waterways	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	4	11) Spill & Incident Reporting: a. In the event that deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge must be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311) within 24 hours. Containment and cleanup must begin immediately and be completed as soon as possible. b. If the project operations cause a water quality problem that results in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, ODFW, NMFS, and US Fish and Wildlife Service (USFW). Rule: ORS 466.645(1); OAR 340-142-0030(1)(b)(B), OAR 340-041 Justification: DEQ must ensure that pollution does not enter waterways and must be protective of beneficial uses, including fish.	Construction	Contractor, City notification required
DEQ 401	5	13) Buffers: The Applicant shall avoid and protect from harm, all wetlands and provide a 50 foot buffer to waters of the state, unless proposed, necessary, and approved as part of the project. If a local jurisdiction has a more stringent buffer requirement, that requirement will take the place of this certification requirement. Rule: OAR 340-041, OAR 340-012 Justification: Riparian, wetland, and shoreline buffers help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.	Construction	Contractor
DEQ 401	5	14) Previously Contaminated Soil and Groundwater: If any contaminated soil or groundwater is encountered, it must be handled and disposed of in accordance with the soil and groundwater management plan for the site, as well as local, state and federal regulations. The Applicant must notify the Environmental Cleanup Section of DEQ at 1-800-452-4011. Rule: OAR 340-041, OAR 340-012, OAR 340-122, OAR 340-040 Justification: DEQ must ensure that pollution does not enter waterways. As sediments are disturbed, pollutants could become redistributed.	Construction	Contractor, City notification required
DEQ 401	6	15) Fish protection/ Oregon Department of Fish and Wildlife timing: The Applicant must perform in-water work only within the ODFW preferred time window as specified in the Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources, or as authorized otherwise under a USACE permit and/or DSL removal/fill permit. Exceptions to the timing window must be recommended by ODFW, NMFS and/or the USFW as appropriate, and approved by DSL when applicable. Rule: OAR 340-041-0011 Justification: DEQ must be protective of all water quality standards, including beneficial uses such as fish.	Construction	Contractor
DEQ 401	6	16) Aquatic life movements: Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity, unless otherwise approved in the approved application. Rule: OAR 340-041-0016; OAR 340-041-0028 Justification: DEQ must be protective of all water quality standards, including beneficial uses such as fish.	Construction	Contractor
DEQ 401	6	17) Isolation of in-water work areas: The Applicant must isolate in-water work areas from the active flowing stream, unless otherwise authorized as part of the approved application, or authorized by DEQ. Rule: OAR 340-041, OAR 340-012, OAR 340-045 Justification: DEQ must ensure that pollution does not enter waterways.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	6	18) Cessation of Work: The Applicant must cease project operations under high-flow conditions that will result in inundation of the project area. Only efforts to avoid or minimize turbidity or other resource damage as a result of inundation of the exposed project area are allowed during high-flow conditions. Rule: OAR 340-041, OAR 340-012 Justification: DEQ must ensure that pollution does not enter waterways.	Construction	Contractor
DEQ 401	6	19) Turbidity: The Applicant must implement BMPs to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below: a. Monitoring: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two-hour intervals each day when in-water work is being conducted. A properly calibrated turbidimeter is required unless another monitoring method is proposed and authorized by DEQ. i. Representative Background Point: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet up-current of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring down current at the compliance point described below. ii. Compliance Point: The Applicant must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet down-current from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.	Construction	City (monitoring) and Contractor (BMPs and work cessation)
DEQ 401	7	19) Turbidity: b. Compliance: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances are allowed as followed: MONITORING WITH A TURBIDIMETER EVERY 2 HOURS TURBIDITY LEVEL Restrictions to Duration of Activity 0 to 4 NTU above background: No Restrictions 5 to 29 NTU above background: Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background. 30 to 49 NTU above background: Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background. 50 NTU or more above background: Stop work immediately and inform DEQ	Construction	City (monitoring) and Contractor (BMPs and work cessation)
DEQ 401	7	19) Turbidity: c. Reporting: i. Record all turbidity monitoring required by subsections (a) and (b) above in daily logs which must include: calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; and location; date; time; and tidal stage (if applicable) for each reading. ii. A narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to regulatory agencies including DEQ, USACE, NMFS, USFWS, and ODFW upon request. iii. Keep records on file for the duration of the permit cycle.	Construction	City (monitoring) and Contractor (storage and access)

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	8	20) Post Construction Stormwater Management: For projects which propose new impervious surfaces or the redevelopment of existing surfaces, the Applicant must submit a post-construction stormwater management plan to DEQ. The plan must be reviewed and approved prior to construction to ensure compliance with water quality standards. The Applicant must implement BMPs as proposed in the stormwater management plan, including construction, operation, and maintenance. If proposed stormwater facilities change due to site conditions, the Applicant must notify DEQ in writing. In lieu of a complete stormwater management plan, the Applicant may submit documentation of acceptance of the stormwater into a DEQ permitted NPDES Phase I Municipal Separate Storm Sewer System (MS4). Rule: ORS 468B.050, OAR 340-045, OAR 340-041 Justification: DEQ must ensure that pollution does not enter waterways.	Pre-Construction	City
DEQ 401	8	21) Stormwater Management & System Maintenance: The Applicant is required to implement effective operation and maintenance practices for the lifetime of the proposed facility. Long-term operation and maintenance of stormwater treatment facilities will be the responsibility of the applicant or the entity listed in the approved post-construction stormwater management plan. Maintenance of stormwater treatment facilities subject to an MS4 permit is regulated by the permit. Rule: OAR 340-041, OAR 340-012, OAR 340-045 Justification: DEQ must ensure that pollution does not enter waterways.	Post-Construction	City
DEQ 401	2 and 3	6) Access: The Applicant and its contractors must allow DEQ access to the project site with or without prior notice, including staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including: a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC; b. To inspect best management practices (BMPs), monitoring or equipment or methods; and c. To collect samples or monitor any discharge of pollutants. Rule: OAR 340-012 Justification: DEQ must inspect facilities for compliance with all state rules and laws.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	3 and 4	In addition, the Applicant must: a. Maintain an adequate supply of materials necessary to control erosion at the project construction site. b. Prohibit erosion of stockpiles. Deploy compost berms, impervious materials, or other effective methods during rain events or when stockpiles are not moved or reshaped for more than 48 hours. c. Inspect erosion control measures daily and maintain erosion control measures as often necessary to ensure the continued effectiveness of measures. Erosion control measures must remain in place until all exposed soil is stabilized; i. If monitoring or inspection shows that the erosion and sediment controls are ineffective, Applicant must mobilize immediately to make repairs, install replacements, or install additional controls as necessary. ii. If sediment has reached 1/3 of the exposed height of a sediment or erosion control, Applicant must remove the sediment to its original contour. d. Use removable pads or mats to prevent soil compaction at all construction access points through, and staging areas in, riparian or wetland areas to prevent soil compaction, unless otherwise authorized by DEQ. e. Flag or fence off wetlands not specifically authorized to be impacted to protect from disturbance and/or erosion. f. Place dredged or other excavated material on upland areas with stable slopes to prevent materials from eroding back into waterways or wetlands. g. Place clean aggregate at all construction entrances, and utilize other BMPs, including, but not limited to as truck or wheel washes, when earth moving equipment is leaving the site and traveling on paved surfaces. The tracking of sediment off site by vehicles is prohibited. Rule: OAR 340-041-0007(8), ORS 468B.050, CWA Section 402, OAR 340-045 Justification: DEQ must ensure that pollution does not enter waterways.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	4 and 5	12) Vegetation Protection and Site Restoration: a. The Applicant must protect riparian, wetland, and shoreline vegetation in the authorized project area from disturbance through one or more of the following: i. Minimization of project and impact footprint; ii. Designation of staging areas and access points in open, upland areas; iii. Fencing and other barriers demarking construction areas; and iv. Use of alternative equipment (e.g., spider hoe or crane). b. If authorized work results in vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, the Applicant must successfully reestablish vegetation to a degree of function equivalent or better than before the disturbance. c. Pesticides (including herbicides) and fertilizers must be applied per manufacturer's instructions by a professionally licensed applicator. If chemical treatment is necessary, the Applicant is responsible for ensuring that pesticide application laws, including with the NPDES System 2300-A general permit, are met. Please review the information on the following website for more information: https://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx i. For pesticide application within stormwater treatment facilities or within 150 feet of waters of the state, the Applicant must adopt an Integrated Pest Management (IPM) plan that describes pest prevention, monitoring and control techniques with a focus on prevention of inputs to waters of the state, or coverage under an NPDES permit, if required. ii. Pesticide application should be applied during the dry season and avoid direct water application; iii. Unless otherwise approved in writing by DEQ, applying surface fertilizer within stormwater treatment facilities or within 50 feet of any stream channel is prohibited. Rule: OAR 340-041, OAR 340-012, OAR 340-041-0033 Justification: Riparian, wetland, and shoreline vegetation help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DEQ 401	7 and 8	19) Turbidity: d. BMPs to Minimize In-stream Turbidity: The Applicant must implement the following BMPs, unless accepted in writing by DEQ: i. Sequence/Phasing of work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances. ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented; iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary at the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate; iv. Machinery may not be driven into the flowing channel, unless authorized in writing by DEQ; and v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled. vi. Containment measures such as silt curtains, geotextile fabric, and silt fences must be in place and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity. Rule: OAR 340-041-0036, OAR 340-041 Justification: DEQ must ensure that pollution does not enter waterways.	Construction	Contractor
DSL 64462RF	8	2. Authorization to Conduct Removal and/or Fill: This permit authorizes 0.17 acres of wetland and 292 linear feet of waterway impact(s) with associated removal and fill of material in Tax Lot(s) 5N28000000100, 5N28000001900, 5N29000000800, 5N29000001000, 5N29000001100, 5N29000001101, in Umatilla County, as referenced in the application, map and drawings (See Attachment B for project location(s)), dated November 11, 2024.	Construction	City
DSL 64462RF	8	3. Work Period in Jurisdictional Areas: Fill or removal activities below the ordinary high water elevation of Columbia River must be conducted between December 1 and March 31, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.	Construction	Contractor
DSL 64462RF	9	7. Stormwater Management Approval Required Before Beginning Work: Prior to the start of construction, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.	Pre-Construction	Contractor
DSL 64462RF	9	8. Pre-construction Resource Area Fencing or Flagging: Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.	Pre-Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DSL 64462RF	9	10. Erosion Control Methods: The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state. a. All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation. b. Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands. c. To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours. d. Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed. e. Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting. f. Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands. g. Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized. h. All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.	Construction	Contractor
DSL 64462RF	10	11. Fuels, Hazardous, Toxic, and Waste Material Handling: Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, material treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminates from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.	Construction	Contractor
DSL 64462RF	10	12. Archaeological Resources: If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.	Construction	Contractor
DSL 64462RF	10	13. Construction Corridor: There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Project Site Plan).	Construction	Contractor
DSL 64462RF	10	14. Hazards to Recreation, Navigation or Fishing: The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DSL 64462RF	10	15. Operation of Equipment in the Water: Heavy equipment may not be positioned on or traverse areas below ordinary high water or highest measured tide at any time unless the equipment is operating from a barge as described in the application. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.	Construction	Contractor
DSL 64462RF	10	16. Work Area Isolation: The work area must be isolated from the water during construction by using a coffer dam in accordance with the work area isolation plan in the application. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.	Construction	Contractor
DSL 64462RF	10	17. Fish Salvage Required: Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or Fish.Research@state.or.us.	Construction	Contractor, City review
DSL 64462RF	10	18. Fish Passage Required: The project must meet Oregon Department of Fish and Wildlife requirements for fish passage, as required in ORS 509.585. Contact the local ODFW District Fish Biologist (Taylor McCroskey, taylor.mccroskey@odfw.oregon.gov, 541-318-7969 x87969) to ensure your project meets the state's fish passage requirements.	Design	City
DSL 64462RF	10	19. Raising or Redirecting Water: The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.	Construction	Contractor
DSL 64462RF	11	22. Payment-in-Lieu Mitigation: Wetland mitigation for the unavoidable loss of 0.021 acres of riverine, PEM wetland and 36 linear feet of stream impact has been accomplished via payment to DSL's Removal-Fill Mitigation Fund in the amount of $30,924.77. Once the authorized fill has commenced, the payment is non-refundable.	Pre-Construction	City
DSL 64462RF	11	23. Post-Construction Report Required: A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL within 90 days of revegetation, which shall occur during the fall, winter, or spring immediately following the completion of grading within the required planting areas. The post-construction report must include: a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following: i. Finished contours of the site. ii. Current tax lot and right-of-way boundaries. iii. Photo point locations. iv. Permanently and temporarily impacted wetland and waterway boundaries identified separately, with square foot listed. b. Photos from fixed photo points. This should clearly show the site conditions. c. A narrative that describes any deviation from the approved plan.	Post-Construction	City and Contractor
DSL 64462RF	11	24. Annual Monitoring Reports Required: Monitoring of rectification of temporary impacts is required until DSL has officially released the site from further monitoring. The permittee must monitor the site to determine whether the site is meeting performance standards for a minimum period of 3 growing seasons after completion of all the initial plantings. Annual monitoring reports are required and are due by November 1. Failure to submit the required monitoring report by the due date may result in an extension of the monitoring period and/or enforcement action.	Construction / Post-Construction	City

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DSL 64462RF	12	25. Extension of the Monitoring Period: The monitoring period may be extended, at the discretion of DSL, for failure of the site to meet performance standards for the final two consecutive years without corrective or remedial actions (such as irrigation, significant weed/invasive plants treatment or replanting) or when needed to evaluate corrective or remedial actions.	Post-Construction	City
DSL 64462RF	12	26. Contents of the Annual Monitoring Report: The annual monitoring report must include the following information: a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards. b. Site location map(s) that clearly shows the impact site and rectification site boundaries. c. Site Plan that clearly shows at least the following: i. The area seeded, with the square foot area listed. ii. Current tax lot and right-of-way boundaries. iii. Permanent monitoring plot locations that correspond to the data collected and fixed photo-points. These points should be overlaid on the as-built map. iv. PEM wetlands and waterways, clearly identified separately and the area (square foot or acreage) of each noted. d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site. e. Data collected to support the conclusions related to the status of the site relative to the performance standards listed in this permit (include summary/analysis in the report and raw data in the appendix). Data should be submitted using the DSL Mitigation Monitoring Vegetation Spreadsheet or presented in a similar format as described in DSL's Routine Monitoring Guidance for Vegetation. f. Photos from fixed photo points (include in the appendix). g. Other information necessary or required to document compliance with the performance standards listed in this permit.	Construction / Post-Construction	City
DSL 64462RF	12	27. Corrective Action May Be Required: DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.	Post-Construction	City
DSL 64462RF	12	28. Establishment of Permanent Monitoring Locations Required: Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.	Construction / Post-Construction	City
DSL 64462RF	12	29. Native Species Cover: The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.	Post-Construction	City

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
DSL 64462RF	13	30. Invasive Species Cover: The cover of invasive species is no more than 10%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list, plus known problem species including Phalaris arundinacea, Mentha pulegium, Holcus lanatus, Anthoxanthum odoratum, and the last crop plant if it is non-native. Non-native plants should be labeled as such if they are listed as non-native on the USDA Plants Database. Beginning in Year 2 of monitoring, DSL will consider a non-native plant species invasive if it comprises more than 15% cover in 10% or more of the sample plots in any habitat class and increases in cover or frequency from the previous monitoring period. Plants that meet this definition will be considered invasive for all successive years of monitoring.	Post-Construction	City
DSL 64462RF	13	31. Bare Substrate Cover: Bare substrate represents no more than 20% cover.	Post-Construction	City
DSL 64462RF	13	32. Species Diversity: By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class and occur in at least 10% of the plots sampled.	Post-Construction	City
DSL 64462RF	13	33. Moisture Prevalence Index: Prevalence Index is <3.0.	Post-Construction	City
USACE 404 NWP-2022-467-1	Enclosure 2: 04	1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.	Construction - IWW	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 05	11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 05 and 06	12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 06	13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The affected areas must be revegetated, as appropriate.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE 404 NWP-2022-467-1	Enclosure 2: 06	14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 06	17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 10	21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.	Construction	Contractor, City notification required
USACE 404 NWP-2022-467-1	Enclosure 2: 15-16	30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.	Post-Construction	City
USACE 404 NWP-2022-467-1	Enclosure 2: 23	3. Cultural Resources and Human Burials-Inadvertent Discovery Plan: In addition to the requirements in NWP GCs 20 and 21, the permittee shall immediately notify the District Engineer if, at any time during the course of the work authorized, human burials, cultural items, or historic properties, as defined by the National Historic Preservation Act and Native American Graves Protection and Repatriation Act, are discovered. The permittee shall implement the following procedures as outlined on the Inadvertent Discovery Plan posted on the Portland District Regulatory website at https://www.nwp.usace.army.mil/Missions/Regulatory/Nationwide.aspx Notify the Portland District Engineer as soon as possible following discovery but in no case later than 24 hours. Notification shall be sent electronically (cenwp.notify@usace.army.mil) and shall identify the Corps project number and clearly specify the purpose is to report a cultural resource discovery. The permittee shall also notify the Corps representative (by email and telephone) identified in the verification letter.	Construction	Contractor, City notification required

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE 404 NWP-2022-467-1	Enclosure 2: 24	6. Work Area Isolation and Dewatering: Appropriate best management practices shall be implemented to prevent erosion and to prevent sediments from entering waters of the U.S. a. All in-water work shall be isolated from the active channel or conducted during low seasonal stream flows to the maximum extent practicable. b. Cofferdams shall be constructed of non-erosive material, such as concrete jersey barriers, sand and gravel bag dams, or water bladders. Constructing a cofferdam by pushing material from the streambed or sloughing material from the streambanks is not authorized. c. Sand and gravel bag dams shall be lined with a plastic liner or geotextile fabric to reduce permeability and prevent sediments and/or construction materials from entering waters of the U.S. d. Upstream and downstream flows shall be maintained by routing flows around the construction site. e. When dewatering is necessary for construction, a sediment basin, or other applicable method, shall be used to settle sediments prior to releasing the water back into the waterbody. Settled water shall be returned to the waterbody in such a manner as to avoid erosion. Sediment basins shall be placed in uplands. f. Fish and other aquatic species must be salvaged (i.e., safely captured and relocated away from the project or development site) prior to dewatering. Contact ODFW for additional information regarding fish salvage.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 24	7. Dredging: For NWP-authorized activities that involve removal of sediment from waters of the U.S., the permittee shall ensure that any necessary sediment characterization regarding size, composition, and potential contaminants is conducted and reviewed prior to dredging. Sediment characterization must be conducted per the Sediment Evaluation Framework for the Pacific Northwest (available at: http://www.nwp.usace.army.mil/Missions/Environmental-Stewardship/DMM.aspx). Note: The return water from a contained disposal area is defined as a discharge of dredged material by 33 CFR part 323.2(d) and requires separate authorization from the District Engineer (e.g., by NWP 16).	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 24 and 25	8. Mechanized Equipment: In addition to the requirements in NWP GC 11, permittee shall implement the following practices to prevent or minimize impacts to the aquatic environment from mechanized equipment: a. Operate equipment from the top of a streambank and conduct work outside of the active stream channel, unless specifically authorized by the District Engineer. b. Spill prevention and containment materials shall be maintained and be readily accessible at vehicle staging areas. The amount of spill response materials(such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials, shovels, brooms, and containment bags) maintained on-site must be appropriate for the size of the authorized activity. Note: See Regional Condition 10 regarding timeframes for temporary fills.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 25	9. Erosion Control: During construction and until the site is stabilized, the permittee shall ensure all practicable measures are implemented and maintained to prevent erosion and runoff. Temporary stockpiles of excavated or dredged material shall be stabilized to prevent erosion. Once soils or slopes have been stabilized, permittee shall completely remove and properly dispose of or re-use all non-biodegradable components of installed control measures.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE 404 NWP-2022-467-1	Enclosure 2: 25	10. Temporary Fills and Impacts: To ensure no more than minimal adverse environmental effects from temporary fills and impacts to waters of the U.S: a. Temporary fills and/or impacts to waters of the U.S. shall not exceed six months unless otherwise approved by the District Engineer. b. No more than one-half (½) acre of waters of the U.S. may be temporarily filled or impacted unless otherwise approved by the District Engineer (temporary fills and impacts do not affect specified limits for loss of waters associated with specific nationwide permits). c. Native soils and/or sediments removed from waters of the U.S. for project construction shall be stockpiled and used for site restoration to the maximum extent practicable. d. Site restoration of temporarily filled or impacted areas shall include returning the area to pre-project ground surface contours. The permittee shall appropriately revegetate temporarily filled or impacted areas with native, noninvasive herbs, shrubs, and/or tree species sufficient in number, spacing, and diversity to replace affected aquatic functions. Note: The Corps will determine compensatory mitigation requirements for temporary fills and impacts on a case-by-case basis depending on the duration and nature of the temporary fill or impact and the type of aquatic resource affected.	Construction	Contractor
USACE 404 NWP-2022-467-1	Enclosure 2: 25 and 26	11. Contractor Notification of Permit Requirements: The permittee must provide a copy of the Nationwide Permit verification letter, conditions, and permit drawings to all contractors and any other parties performing the authorized work, prior to the commencement of any work in waters of the U.S.	Construction	City
USACE 404 NWP-2022-467-1	Enclosure 2: 25 and 26	12. Inspection of the Project Site: The permittee shall allow representatives of the District Engineer to inspect the authorized activity to confirm compliance with nationwide permit terms and conditions. A request for access to the site will normally be made sufficiently in advance to allow a property owner or representative the option to be on site during the inspection.	Construction	City and Contractor
USACE License	3	11. RESTORATION On or before the expiration of this license or its termination by the Grantee, the Grantee shall vacate the premises, remove the property of the Grantee, and restore the premises to a condition satisfactory to said officer. If, however, this license is revoked, the Grantee shall vacate the premises, remove said property and restore the premises to the aforesaid condition within such time as the District Engineer may designate. In either event, if the Grantee shall fail or neglect to remove said property and restore the premises, then, at the option of said officer, the property shall either become the property of the United States without compensation therefor, or said officer may cause the property to be removed and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work. The Grantee shall also pay the United States on demand any sum which may be expended by the United States after the expiration, revocation, or termination of this license in restoring the premises.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE License	4	14. ENVIRONMENTAL PROTECTION a. Within the limits of their respective legal powers, the parties to this license shall protect the premises against pollution of its air, ground and water. The Grantee shall comply with any laws, regulations, conditions, or instructions affecting the activity hereby authorized if and when issued by the Environmental Protection Agency, or any Federal, state, interstate or local governmental agency having jurisdiction to abate or prevent pollution. The disposal of any toxic or hazardous materials within the premises is specifically prohibited. Such regulations, conditions, or instructions in effect or prescribed by said Environmental Protection Agency, or any Federal, state, interstate or local governmental agency are hereby made a condition of this license. The Grantee shall not discharge waste or effluent from the premises in such a manner that the discharge will contaminate streams or other bodies of water or otherwise become a public nuisance. b. The Grantee will use all reasonable means available to protect the environment and natural resources, and where damage nonetheless occurs from the Grantee's activities, the Grantee shall be liable to restore the damaged resources. c. The Grantee must obtain approval in writing from said officer before any pesticides or herbicides are applied to the premises.	Construction/ Post-Construction	City and Contractor
USACE License	4	15. HISTORIC PRESERVATION The Grantee shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archaeological, architectural or other cultural artifacts, relics, remains or objects of antiquity. In the event such items are discovered on the premises, the Grantee shall immediately notify said officer and protect the site and the material from further disturbance until said officer gives clearance to proceed.	Construction	Contractor, City notification required
USACE License	5	17. SITE-SPECIFIC CONDITION ON PESTICIDES AND NOXIOUS WEED CONTROL Noxious species management on the premises shall be performed in accordance with the most up-to-date U.S. Army Corps of Engineers, Walla Walla District, Pest Management Program Implementation as well as any additional consultations to the instructions and related documents pertaining to pest treatment activities. Guidance regarding methodology, authorized control measures, forms and reporting is available on request from the address for the United States found in Condition 3. NOTICES, or by visiting https://www.nww.usace.army.mil/Missions/Pest-ManagemenU.	Construction/ Post-Construction	City and Contractor
USACE License	5	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES In-Water Work Restrictions: Fish Exclusion During In-Water Work: Use fish exclusion screens to protect ESA listed fish species. Follow NMFS guidelines and design fish screens to prevent fish entrainment. Seasonal In-Water Work Windows: Limit in-water construction to Dec. 1 - March 31, adhering to in-water work restrictions for fish and water quality protection per USACE and NMFS standards.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE License	5	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Water Quality Protection: Sediment Control and Erosion Prevention : Employ turbidity curtains, silt fences, and sediment traps around work areas to minimize sedimentation in the Columbia River. Monitor water quality regularly during construction to ensure compliance with state and federal standards. Stormwater Management Systems: Implement best practices for managing runoff, such as sediment basins, filter socks, and silt fences, following the USACE's Construction Stormwater General Permit requirements.	Construction	Contractor
USACE License	5	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Conservation Measures: Track and monitor project construction to ensure that the conservation measures are meeting the objective of minimizing take.	Construction	City and Contractor
USACE License	6	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Historic and Ecological Resource Protection: Historic Resource Coordination: Work with local tribes (e .g., Confederated Tribes of the Umatilla Indian Reservation) to ensure protection of archaeological and historic sites. Implement monitoring during excavation as per Section 106 requirements. Riparian Habitat Protection: Minimize impact to riparian zones by marking sensitive areas and restoring vegetation with native species post-construction, in compliance with USACE guidelines for wetlands and riparian habitat restoration.	Construction	City and Contractor
USACE License	6	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Aquatic and Wildlife Habitat Protection: Fish and Wildlife Habitat Protection: Follow USACE and state guidelines to avoid disturbing critical fish habitats, especially for ESA-listed species like salmon and steelhead. Use fish screens on the intake structure to ensure compliance with NMFS guidelines. Flow Regulation and Wildlife Habitat: Implement a flow distribution structure to manage water allocation to the Wanaket Wildlife Area and other users, ensuring it does not adversely impact wildlife habitat.	Design	City
USACE License	6	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Sediment and Soil Management: Erosion Control in Sensitive Areas: Install erosion control measures like coir logs, erosion blankets, and geotextiles to stabilize soils, particularly in areas of high wind or riverbank exposure in the Umatilla region. Soil Restoration: Use native plant species to revegetate disturbed areas in accordance with USACE's native vegetation restoration practices to support long-term ecological recovery.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE License	7	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Equipment and Construction Management: Trenchless Construction Techniques: Utilize trenchless methods, such as horizontal directional drilling (HOD), to minimize soil disturbance and preserve environmentally sensitive areas, as per USACE's commitment to minimizing land disturbance. Dust Control Measures: Apply water or dust control agents on active construction sites, especially in dry, wind-prone areas, in compliance with local air quality standards.	Construction	Contractor
USACE License	7	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Wildlife and Species Protection: Endangered Species Protection: Implement protocols for avoiding or minimizing impacts to ESA-listed species. Follow USACE's Section 7 consultation requirements and implement actions for species protection. Invasive Species Control: Ensure equipment is cleaned before entering work zones to prevent the spread of invasive species, following USACE invasive species management protocols.	Construction	Contractor
USACE License	7	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Fire Risk and Safety: Wildfire Risk Mitigation: Adhere to USACE's fire prevention protocols, including keeping fire safety equipment on-site, restricting fire-prone activities during high-risk periods, and training workers in emergency fire response.	Construction	Contractor
USACE License	7	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Groundwater and Spill Management: Fuel and Chemical Spill Prevention: Implement secondary containment systems for fuel and chemicals and train personnel on spill response procedures as outlined in USACE spill prevention and response protocols. Conduct regular inspections of storage areas to ensure compliance.	Construction	Contractor
USACE License	8	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Visual Impact Considerations: Visual impact BMPs included relocating electrical lines underground, consolidating diversion points, and repositioning the pump station within the sloped riverbank while reducing its size and above-ground height. Additional measures included using split HVAC systems to avoid roof-mounted equipment, minimizing access road width, and selecting gravel instead of asphalt to reduce impervious surfaces and visual intrusion.	Design	City
USACE License	8	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Blasting: Provide the Blasting Plan to NMFS at least 1 week prior to blasting. Along with the blasting plan, submit a comprehensive monitoring plan that includes provisions for fish protection, and provides evidence that all limits adopted for the project will be met by the proposed blast designs. The maximum allowable charge for blasting will be calculated to prevent harmful pressure waves from reaching the Columbia River. Visually monitor the action area for injured or dead salmon and steelhead. If injured or dead salmon and steelhead are observed, modify blasting methods and/or techniques, if safe to do so, to limit blast-related air overpressure and ground vibrations to non-injurious levels.	Construction	Contractor, City review

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE License	9	20. SITE-SPECIFIC CONDITION ON AS BUILT DRAWINGS Within 6 months from completion of construction, an as-built drawing of the installed facilities will be provided to Grantor for processing of the 50-year easement.	Post-Construction	City
USACE License	4 and 5	16. SITE-SPECIFIC CONDITION ON NATIONAL HISTORIC PRESERVATION ACT Except as authorized herein, the Grantee shall not engage in any construction, alteration, demolition, or ground disturbing activities on the premises, unless such activities have been reviewed and approved by the District Engineer in accordance with the requirements of the National Historic Preservation Act of 1966 (54 USC § 3001 et seq.). The Grantee shall be responsible for all costs , and any actions directed or required by the District Engineer, which are associated with the National Historic Preservation Act review process, or other applicable law.	Construction	Contractor
USACE License	5 and 6	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Turbidity Monitoring: Conduct turbidity monitoring as follows: Daily, every 4 hours during daylight hours, while in-water work is conducted. Observations shall occur daily before, during, and after commencement of in water work and compared to observable sediment load upstream of the action area. Measure or observe background turbidity levels at an undisturbed site approximately 100 feet upstream of the project area. Measure or observe turbidity levels approximately 300 feet from any in water work activities, or within any visible turbidity plume.	Construction	City
USACE License	7 and 8	18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES Local Environmental Considerations: Shallow Aquifer Protection: Avoid construction activities near vulnerable groundwater areas or use appropriate barriers to prevent contamination. Follow USACE guidelines for managing construction-related impacts on shallow aquifers in sensitive areas like Umatilla. Sediment Control and Restoration: Implement erosion control measures and soil stabilization practices consistent with USACE guidelines for minimizing sediment runoff and restoring disturbed areas with native vegetation.	Construction	Contractor

Permit Conditions Summary

Permit	Ref. Page #	Condition Text	Phase	Responsible Party
USACE License	8 and 9	19. SITE-SPECIFIC CONDITION ON PROJECT REPORT Grantee shall submit a completion of project report to NMFS no later than two months after project completion. The completion report shall include, at a minimum, the following: Starting and ending dates for work completed, with in-water work period specified. Dimensions of the cofferdam. Summary and details of turbidity monitoring. Any daily observed sediment plume within 300 feet of turbidity generating activities. A summary of pollution and erosion control inspection results, including results of implementing required conservation measures, and including a description of any erosion control failure, contaminant release, and efforts to correct such incidences. Start and end dates, locations, areal extent, and methodology of work area isolations. Dates, locations, size/area, and methodology of fish salvages. Number of juvenile salmon and steelhead captured and released without injury during fish salvage. Location and condition of juvenile salmon and steelhead released. Any incidence of injury or mortality of salmon and steelhead. Dates the tug and barge are on site. Number, species, and area of seeding and riparian plantings. Dates and hours blasting was conducted. Results of visual monitoring for injured or dead salmon and steel head from blasting. Results of cultural resource monitoring during blasting. Measured ground accelerations during blasting. Reference to NMFS consultation number WCRO-2025-00422. All reports should be sent to: crbo.consultationrequest.wcr@noaa.gov If the amount or extent of take is exceeded, stop project activities, and notify NMFS immediately.	Post-Construction	City and Contractor

1) US Army, Corps of Engineers 299 Easement

LICENSE NO. DACW68-3-26-14

DEPARTMENT OF THE ARMY LICENSE
MCNARY LOCK AND DAM
UMATILLA COUNTY, OREGON
TRACTS
A-OR, AA-2009, BB-2050, BB-2064,

THE SECRETARY OF THE ARMY, hereinafter referred to as the Secretary, acting under and by virtue of the authority vested in the Secretary by Title 10, United States Code, Section 2668, having found that the granting of this license will not be against the public interest, hereby grants to **CITY OF UMATILLA,** hereinafter referred to as the Grantee, a license for Construction of a new pump station, occupying +/- 17.27 acres over, across, in and upon lands of the United States, as identified in **EXHIBIT A**, attached hereto and made a part hereof, hereinafter referred to as the premises.

THIS LICENSE is granted subject to the following conditions:

1. TERM

This license is granted for a term of two (2) years, beginning February 18, 2026, and ending February 17, 2028, but revocable at will by the Secretary.

2. CONSIDERATION

The consideration for this license shall be the construction, operation and maintenance of the premises for the benefit of the general public in accordance with the terms and conditions hereinafter set forth.

3. NOTICES

All notices and correspondence to be given pursuant to this license shall be addressed, if to the Grantee, to **City of Umatilla P.O. Box 130 Umatilla, OR 97882**; and if to the United States, to the **District Engineer, Attention: Chief, Real Estate, Real Estate Division, 201 North 3rd Avenue, Walla Walla, WA 99362-1876**; or as may from time to time otherwise be directed by the parties. Notice shall be deemed to have been duly given if and when enclosed in a properly sealed envelope addressed as aforesaid, and deposited, postage prepaid, in a post office regularly maintained by the United States Postal Service.

4. AUTHORIZED REPRESENTATIVES

Except as otherwise specifically provided, any reference herein to "Secretary", "District Engineer", "Installation Commander", or "said officer" shall include their duly authorized representatives. Any reference to "Grantee" shall include any duly authorized representatives.

5. SUPERVISION BY THE DISTRICT ENGINEER

The use and occupation of the premises shall be subject to the general supervision and approval of the District Engineer, Walla Walla District hereinafter referred to as said officer, and to such rules and regulations as may be prescribed from time to time by said officer.

6. APPLICABLE LAWS AND REGULATIONS

The Grantee shall comply with all applicable Federal, state, county and municipal laws, ordinances and regulations wherein the premises are located.

7. CONDITIONAL USE BY GRANTEE

The exercise of the privileges herein granted shall be:

a. without cost or expense to the United States;

b. subject to the right of the United States to improve, use or maintain the premises;

c. subject to other outgrants of the United States on the premises;

d. personal to the Grantee, and this license, or any interest herein, may not be transferred or assigned.

8. CONDITION OF PREMISES

The Grantee acknowledges that it has inspected the premises, knows its condition, and understands that the same is granted without any representations or warranties whatsoever and without any obligation on the part of the United States.

9. COST OF UTILITIES

The Grantee shall pay the cost, as determined by the officer having immediate supervision over the premises, of producing and/or supplying any utilities and other services furnished by the Government or through Government-owned facilities for the use of the Grantee, including the Grantee's proportionate share of the cost of operation and maintenance of the Government-owned facilities by which such utilities or services

are produced or supplied. The Government shall be under no obligation to furnish utilities or services. Payments shall be made in the manner prescribed by the officer having such jurisdiction.

10. PROTECTION OF PROPERTY

The Grantee shall keep the premises in good order and in a clean, safe condition by and at the expense of the Grantee. The Grantee shall be responsible for any damage that may be caused to property of the United States by the activities of the Grantee under this license and shall exercise due diligence in the protection of all property located on the premises against fire or damage from any and all other causes. Any property of the United States damaged or destroyed by the Grantee incident to the exercise of the privileges herein granted shall be promptly repaired or replaced by the Grantee to a condition satisfactory to said officer, or at the election of said officer, reimbursement made therefore by the Grantee in an amount necessary to restore the property to a condition satisfactory to said officer.

11. RESTORATION

On or before the expiration of this license or its termination by the Grantee, the Grantee shall vacate the premises, remove the property of the Grantee, and restore the premises to a condition satisfactory to said officer. If, however, this license is revoked, the Grantee shall vacate the premises, remove said property and restore the premises to the aforesaid condition within such time as the District Engineer may designate. In either event, if the Grantee shall fail or neglect to remove said property and restore the premises, then, at the option of said officer, the property shall either become the property of the United States without compensation therefor, or said officer may cause the property to be removed and no claim for damages against the United States or its officers or agents shall be created by or made on account of such removal and restoration work. The Grantee shall also pay the United States on demand any sum which may be expended by the United States after the expiration, revocation, or termination of this license in restoring the premises.

12. NON-DISCRIMINATION

a. The Grantee shall not discriminate against any person or persons because of race, color, age, sex, handicap, national origin, religion, sexual orientation, or gender identity in the conduct of operations on the premises.

b. The Grantee, by acceptance of this license, is receiving a type of Federal assistance and, therefore, hereby gives assurance that it will comply with the provisions of Title VI of the Civil Rights Act of 1964 as amended (42 U.S.C. § 2000d); the Age Discrimination Act of 1975 (42 U.S.C. § 6102); the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794); and all requirements imposed by or pursuant to the Directive of the Department of Defense (32 CFR Part 195) issued as Department of Defense Directive 5500.11 and 1020.1, and Army Regulation 600-7.

13. TERMINATION

This license may be terminated by the Grantee at any time by giving the District Engineer at least ten (10) days notice in writing provided that no refund by the United States of any consideration previously paid shall be made and provided further, that in the event said notice is not given at least ten (10) days prior to the rental due date, the Grantee shall be required to pay the consideration for the period shown in the Condition on **CONSIDERATION**.

14. ENVIRONMENTAL PROTECTION

a. Within the limits of their respective legal powers, the parties to this license shall protect the premises against pollution of its air, ground and water. The Grantee shall comply with any laws, regulations, conditions, or instructions affecting the activity hereby authorized if and when issued by the Environmental Protection Agency, or any Federal, state, interstate or local governmental agency having jurisdiction to abate or prevent pollution. The disposal of any toxic or hazardous materials within the premises is specifically prohibited. Such regulations, conditions, or instructions in effect or prescribed by said Environmental Protection Agency, or any Federal, state, interstate or local governmental agency are hereby made a condition of this license. The Grantee shall not discharge waste or effluent from the premises in such a manner that the discharge will contaminate streams or other bodies of water or otherwise become a public nuisance.

b. The Grantee will use all reasonable means available to protect the environment and natural resources, and where damage nonetheless occurs from the Grantee's activities, the Grantee shall be liable to restore the damaged resources.

c. The Grantee must obtain approval in writing from said officer before any pesticides or herbicides are applied to the premises.

15. HISTORIC PRESERVATION

The Grantee shall not remove or disturb, or cause or permit to be removed or disturbed, any historical, archaeological, architectural or other cultural artifacts, relics, remains or objects of antiquity. In the event such items are discovered on the premises, the Grantee shall immediately notify said officer and protect the site and the material from further disturbance until said officer gives clearance to proceed.

16. SITE-SPECIFIC CONDITION ON NATIONAL HISTORIC PRESERVATION ACT

Except as authorized herein, the Grantee shall not engage in any construction, alteration, demolition, or ground disturbing activities on the premises, unless such activities have been reviewed and approved by the District Engineer in accordance with the requirements of the National Historic Preservation Act of 1966 (54 USC § 3001 et seq.). The Grantee shall be responsible for all costs, and any actions directed or

required by the District Engineer, which are associated with the National Historic Preservation Act review process, or other applicable law.

17. SITE-SPECIFIC CONDITION ON PESTICIDES AND NOXIOUS WEED CONTROL

Noxious species management on the premises shall be performed in accordance with the most up-to-date U.S. Army Corps of Engineers, Walla Walla District, Pest Management Program Implementation as well as any additional consultations to the instructions and related documents pertaining to pest treatment activities. Guidance regarding methodology, authorized control measures, forms and reporting is available on request from the address for the United States found in Condition **3. NOTICES**, or by visiting https://www.nww.usace.army.mil/Missions/Pest-Management/.

18. SITE-SPECIFIC CONDITION ON BEST MANAGEMENT PRACTICES

In-Water Work Restrictions:

- Fish Exclusion During In-Water Work: Use fish exclusion screens to protect ESA-listed fish species. Follow NMFS guidelines and design fish screens to prevent fish entrainment.

- Seasonal In-Water Work Windows: Limit in-water construction to Dec. 1 - March 31, adhering to in-water work restrictions for fish and water quality protection per USACE and NMFS standards.

Water Quality Protection:

- Sediment Control and Erosion Prevention: Employ turbidity curtains, silt fences, and sediment traps around work areas to minimize sedimentation in the Columbia River. Monitor water quality regularly during construction to ensure compliance with state and federal standards.

- Stormwater Management Systems: Implement best practices for managing runoff, such as sediment basins, filter socks, and silt fences, following the USACE's Construction Stormwater General Permit requirements.

Conservation Measures

- Track and monitor project construction to ensure that the conservation measures are meeting the objective of minimizing take.

Turbidity Monitoring

- Conduct turbidity monitoring as follows:

- Daily, every 4 hours during daylight hours, while in-water work is conducted.

- Observations shall occur daily before, during, and after commencement of in water work and compared to observable sediment load upstream of the action area.

- Measure or observe background turbidity levels at an undisturbed site approximately 100 feet upstream of the project area.

- Measure or observe turbidity levels approximately 300 feet from any in water work activities, or within any visible turbidity plume.

Historic and Ecological Resource Protection:

- Historic Resource Coordination: Work with local tribes (e.g., Confederated Tribes of the Umatilla Indian Reservation) to ensure protection of archaeological and historic sites. Implement monitoring during excavation as per Section 106 requirements.

- Riparian Habitat Protection: Minimize impact to riparian zones by marking sensitive areas and restoring vegetation with native species post-construction, in compliance with USACE guidelines for wetlands and riparian habitat restoration.

Aquatic and Wildlife Habitat Protection:

- Fish and Wildlife Habitat Protection: Follow USACE and state guidelines to avoid disturbing critical fish habitats, especially for ESA-listed species like salmon and steelhead. Use fish screens on the intake structure to ensure compliance with NMFS guidelines.

- Flow Regulation and Wildlife Habitat: Implement a flow distribution structure to manage water allocation to the Wanaket Wildlife Area (WWA) and other users, ensuring it does not adversely impact wildlife habitat.

Sediment and Soil Management:

- Erosion Control in Sensitive Areas: Install erosion control measures like coir logs, erosion blankets, and geotextiles to stabilize soils, particularly in areas of high wind or riverbank exposure in the Umatilla region.

- Soil Restoration: Use native plant species to revegetate disturbed areas in accordance with USACE's native vegetation restoration practices to support long-term ecological recovery.

Equipment and Construction Management:

- Trenchless Construction Techniques: Utilize trenchless methods, such as horizontal directional drilling (HDD), to minimize soil disturbance and preserve environmentally sensitive areas, as per USACE's commitment to minimizing land disturbance.

- Dust Control Measures: Apply water or dust control agents on active construction sites, especially in dry, wind-prone areas, in compliance with local air quality standards.

Wildlife and Species Protection:

- Endangered Species Protection: Implement protocols for avoiding or minimizing impacts to ESA-listed species. Follow USACE's Section 7 consultation requirements and implement actions for species protection.

- Invasive Species Control: Ensure equipment is cleaned before entering work zones to prevent the spread of invasive species, following USACE invasive species management protocols.

Fire Risk and Safety:

- Wildfire Risk Mitigation: Adhere to USACE's fire prevention protocols, including keeping fire safety equipment on-site, restricting fire-prone activities during high-risk periods, and training workers in emergency fire response.

Hydrology and Floodplain Management:

- Floodplain Function Protection: Follow USACE guidance for floodplain management to ensure that construction activities do not disrupt natural floodplain functions. Use designs that allow for natural water flow and minimize obstructions.

- River Hydrodynamic Monitoring: Monitor hydrological conditions during cofferdam installation and other in-water work to ensure they do not interfere with river hydrodynamics, following USACE hydrology standards.

Groundwater and Spill Management:

- Fuel and Chemical Spill Prevention: Implement secondary containment systems for fuel and chemicals and train personnel on spill response procedures as outlined in USACE spill prevention and response protocols. Conduct regular inspections of storage areas to ensure compliance.

Local Environmental Considerations:

- Shallow Aquifer Protection: Avoid construction activities near vulnerable groundwater areas or use appropriate barriers to prevent contamination. Follow USACE guidelines for managing construction-related impacts on shallow aquifers in sensitive areas like Umatilla.

- Sediment Control and Restoration: Implement erosion control measures and soil stabilization practices consistent with USACE guidelines for minimizing sediment runoff and restoring disturbed areas with native vegetation.

Visual Impact Considerations

- Visual impact BMPs included relocating electrical lines underground, consolidating diversion points, and repositioning the pump station within the sloped riverbank while reducing its size and above-ground height. Additional measures included using split HVAC systems to avoid roof-mounted equipment, minimizing access road width, and selecting gravel instead of asphalt to reduce impervious surfaces and visual intrusion.

Blasting

- Provide the Blasting Plan to NMFS at least 1 week prior to blasting.

- Along with the blasting plan, submit a comprehensive monitoring plan that includes provisions for fish protection, and provides evidence that all limits adopted for the project will be met by the proposed blast designs.

- The maximum allowable charge for blasting will be calculated to prevent harmful pressure waves from reaching the Columbia River.

- Visually monitor the action area for injured or dead salmon and steelhead. If injured or dead salmon and steelhead are observed, modify blasting methods and/or techniques, if safe to do so, to limit blast-related air overpressure and ground vibrations to non-injurious levels.

19. SITE-SPECIFIC CONDITION ON PROJECT REPORT

Grantee shall submit a completion of project report to NMFS no later than two months after project completion. The completion report shall include, at a minimum, the following:

- Starting and ending dates for work completed, with in-water work period specified.

- Dimensions of the cofferdam.

- Summary and details of turbidity monitoring.

• Any daily observed sediment plume within 300 feet of turbidity generating activities.

• A summary of pollution and erosion control inspection results, including results of implementing required conservation measures, and including a description of any erosion control failure, contaminant release, and efforts to correct such incidences.

• Start and end dates, locations, areal extent, and methodology of work area isolations.

• Dates, locations, size/area, and methodology of fish salvages.

• Number of juvenile salmon and steelhead captured and released without injury during fish salvage.

• Location and condition of juvenile salmon and steelhead released.

• Any incidence of injury or mortality of salmon and steelhead.

• Dates the tug and barge are on site.

• Number, species, and area of seeding and riparian plantings.

• Dates and hours blasting was conducted.

• Results of visual monitoring for injured or dead salmon and steelhead from blasting.

• Results of cultural resource monitoring during blasting.

• Measured ground accelerations during blasting.

• Reference to NMFS consultation number WCRO-2025-00422.

• All reports should be sent to: crbo.consultationrequest.wcr@noaa.gov

• If the amount or extent of take is exceeded, stop project activities, and notify NMFS immediately.

20. SITE-SPECIFIC CONDITION ON AS BUILT DRAWINGS

Within 6 months from completion of construction, an as-built drawing of the installed facilities will be provided to Grantor for processing of the 50-year easement.

21. EXECUTIVE ORDER 14026

It has been determined this contract is not subject to Executive Order 14026 or the regulations issued by the Secretary of Labor in 29 CFR part 23 pursuant to the Executive Order, and the following provisions.

22. EXECUTIVE ORDER 14026 HOLD HARMLESS AND INDEMNIFICATION

If a duly authorized representative of the United States discovers or determines, whether before or subsequent to executing this contract, that an erroneous determination regarding the applicability of Executive Order 14026 was made, contractor, to the extent permitted by law, agrees to indemnify and hold harmless the United States, its officers, agents, and employees, for and from any and all liabilities, losses, claims, expenses, suits, fines, penalties, judgments, demands or actions, costs, fees, and damages directly or indirectly arising out of, caused by, related to, resulting from or in any way predicated upon, in whole or in part, the erroneous Executive Order 14026 determination. This includes contractor releasing any claim or entitlement it would otherwise have to an equitable adjustment to the contract and indemnifying and holding harmless the United States from the claims of subcontractors and contractor employees.

23. EXECUTIVE ORDER 13706

It has been determined this contract is not subject to Executive Order 13706 or the regulations issued by the Secretary of Labor in 29 CFR part 13 pursuant to the Executive Order.

24. DISCLAIMER

This license is effective only insofar as the rights of the United States in the premises are concerned; and the Grantee shall obtain any permit or license which may be required by Federal, state, or local statute in connection with the use of the premises. It is understood that the granting of this license does not preclude the necessity of obtaining a Department of the Army permit for activities which involve the discharge of dredge or fill material or the placement of fixed structures in the waters of the United States, pursuant to the provisions of Section 10 of the Rivers and Harbors Act of 3 March 1899 (33 U.S.C. § 403), and Section 404 of the Clean Waters Act (33 U.S.C. § 1344).

THIS LICENSE is not subject to Title 10, United States Code, Section 2662, as amended.

IN WITNESS WHEREOF I have hereunto set my hand by authority of the Secretary of the Army this 18th day of February, 2026.

Allison D. Needham
Chief, Real Estate
Real Estate Contracting Officer

THIS LICENSE is also executed by the Grantee this 6th day of February, 2026.

David Stockdale
City Manager
City of Umatilla

ACKNOWLEDGMENT

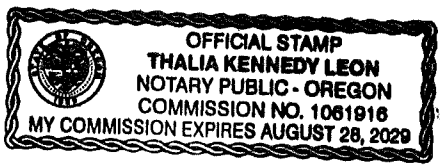
STATE OF Oregon)

: ss

COUNTY OF Umatilla)

On this 6th day of February, 2026, before me David Stockdale, known to me to be the person described in and who executed the within and foregoing instrument, and acknowledged that he/she/they signed the same as his/her/their free and voluntary act and deed, for the uses and purposes therein mentioned.

Given under my hand and seal of the office this 6th day of February, 2026.



Thalia Kennedy Leon

Notary Public in and for the State of Oregon,

residing at Umatilla, OR

(SEAL)

My commission expires on August 28, 2029

CERTIFICATE OF AUTHORITY

I, Nanci Sandoval, certify that I am the City Recorder of
(Name of the Clerk or Appropriate Official) (Position Title)

the City of Umatilla, that David Stockdale
(Name of the Entity) (Name of the Person Executing this Outgrant)

who signed the foregoing instrument on behalf of the Grantee was then City Manager
(Position Title of the Person Executing this Outgrant)

City of Umatilla. I further certify that the said officer was acting within
(Name of the Entity)

the scope of powers delegated to this officer by the governing body of the Grantee in executing said instrument.

Date: February 10, 2026 _____
(Name of the Clerk or Appropriate Official)

(Affix Corporate Seal)

CITY OF UMATILLA SEAL

ACKNOWLEDGMENT

STATE OF WASHINGTON)
: ss
COUNTY OF WALLA WALLA)

On this 18th day of February, 2026, before me the undersigned Notary Public, personally appeared Allison D. Needham, Chief, Real Estate Division, U.S. Army Corps of Engineers, Walla Walla, Washington, known to me to be the person described in the foregoing instrument, who acknowledged that he executed the same in the capacity therein stated by authority of the Secretary of the Army and for the purposes therein contained.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 18th day of February 2026.

Notary Public
State of Washington
VICKIE L KNUDSON
COMM. # 26003610
MY COMM. EXP. 02/26/2030

Notary Public in and for the State of Washington
residing at 201 N. 3rd Ave Walla Walla
My commission expires on 2/26/2030

(SEAL)

THIS INSTRUMENT PREPARED BY:

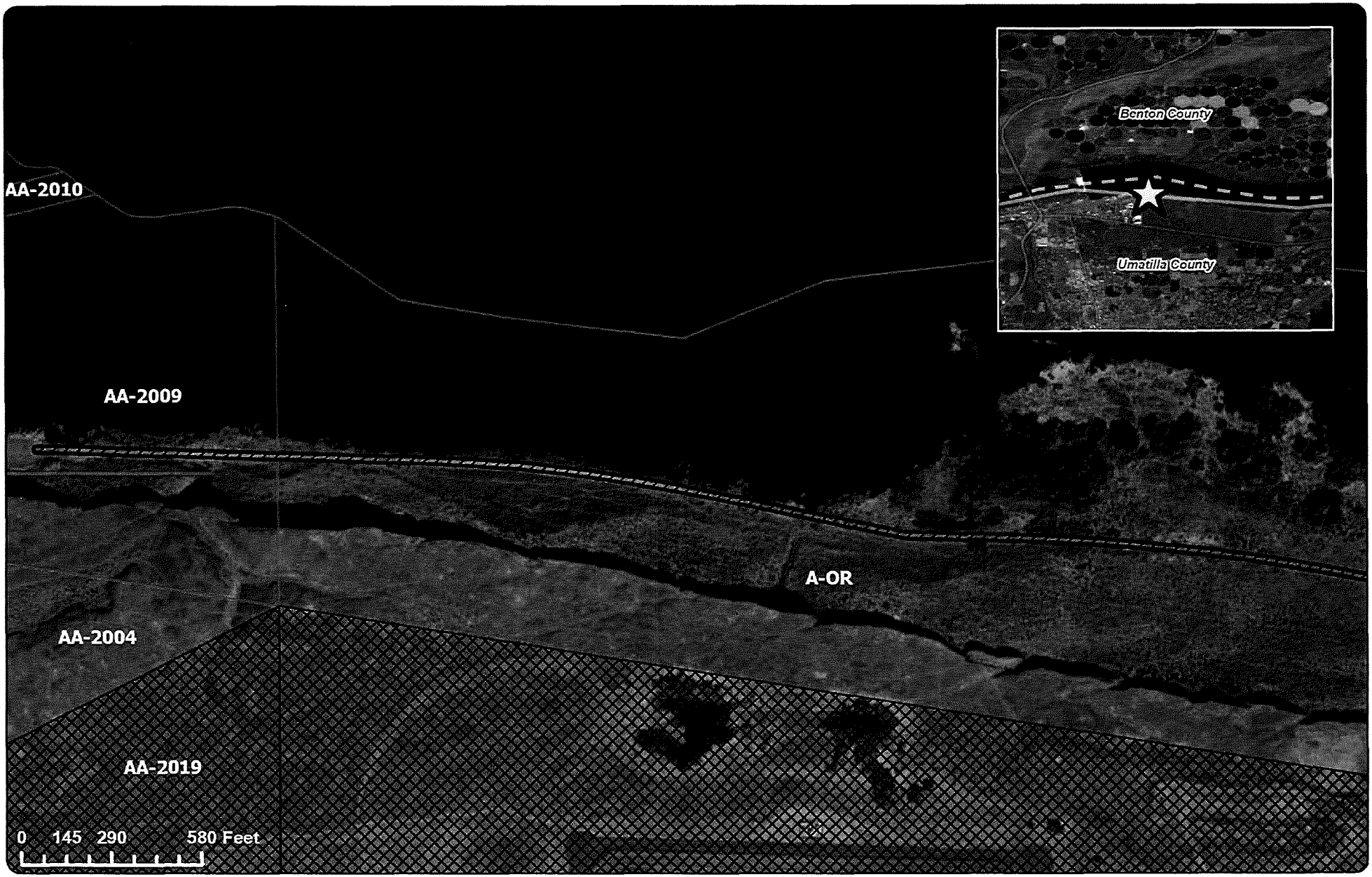
Natasha Susin Date: 1/14/2026

Natasha Susin, Realty Specialist
Real Estate Division
Walla Walla District
U.S. Army Corps of Engineers
201 North 3rd Avenue
Walla Walla, WA 99362-1876
(509) 527-7002

REVIEWED FOR LEGAL SUFFICIENCY BY:

Evan Carden Date: 1/15/2026

Evan Carden, Assistant District Counsel
Office of Counsel
Walla Walla District
U.S. Army Corps of Engineers
201 North 3rd Avenue
Walla Walla, WA 99362-1876
(509) 527-7717



City of Umatilla Pump Station Construction License

DACW68-3-26-14 **Exhibit "A-1"**

USACE Land Tracts
USACE Disposal Tracts
Construction License

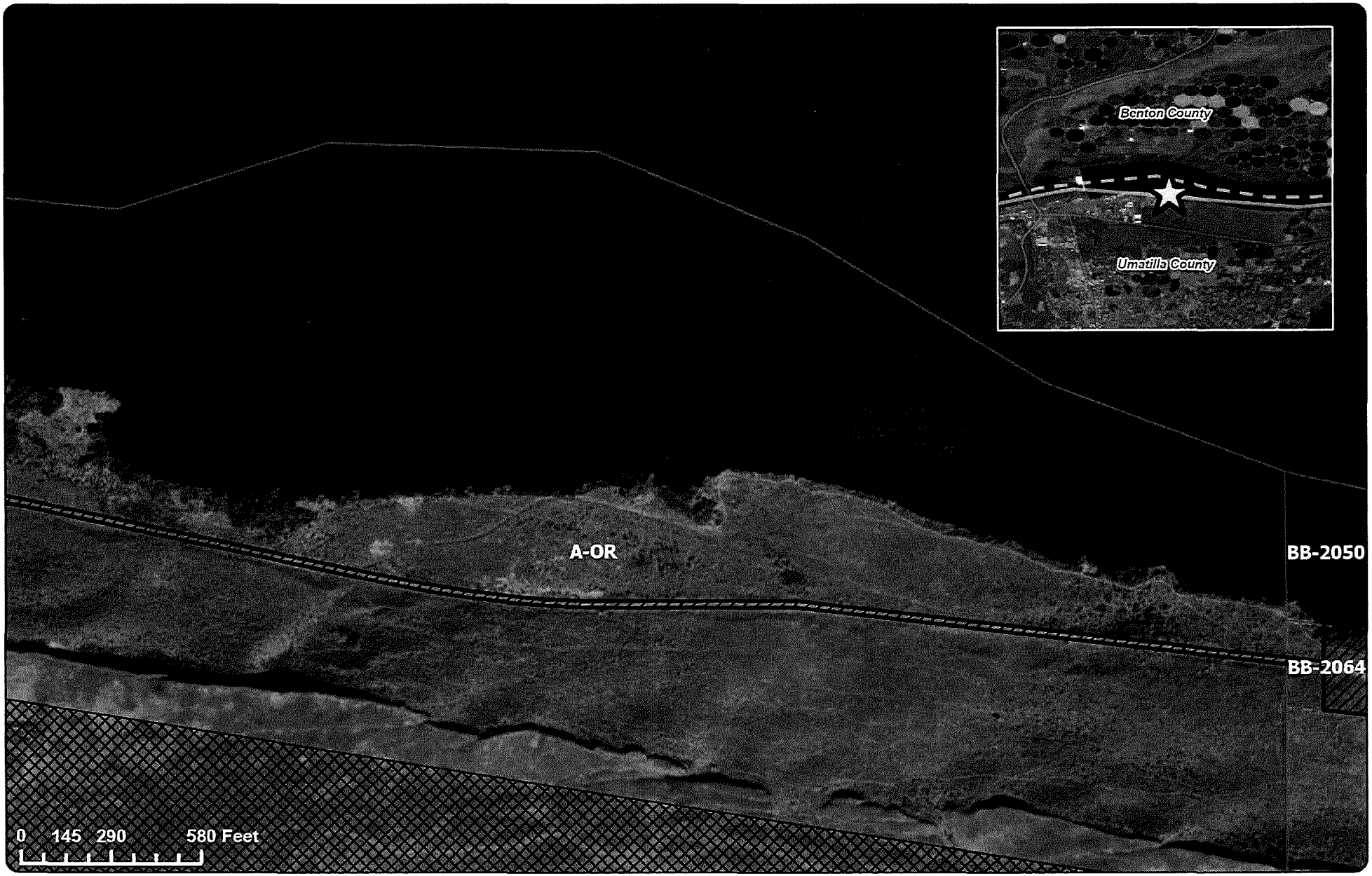
Umatilla County, Oregon
Sections 7 & 12
Township 05N Range 28E & 29E
USACE Tracts: A-OR, AA-2009, BB-2050, BB-2064
Construction License Acreage: +/- 17.27

Disclaimer: This mapping is for the purpose of marking the boundaries of a real estate instrument. Any other use may be inaccurate/incomplete and the Corps assumes no liability for any use of this map/data

Scale 1:5,000

N

US Army Corps of Engineers
Walla Walla District



City of Umatilla Pump Station Construction License

DACW68-3-26-14

Exhibit "A-2"

USACE Land Tracts
USACE Disposal Tracts
Construction License

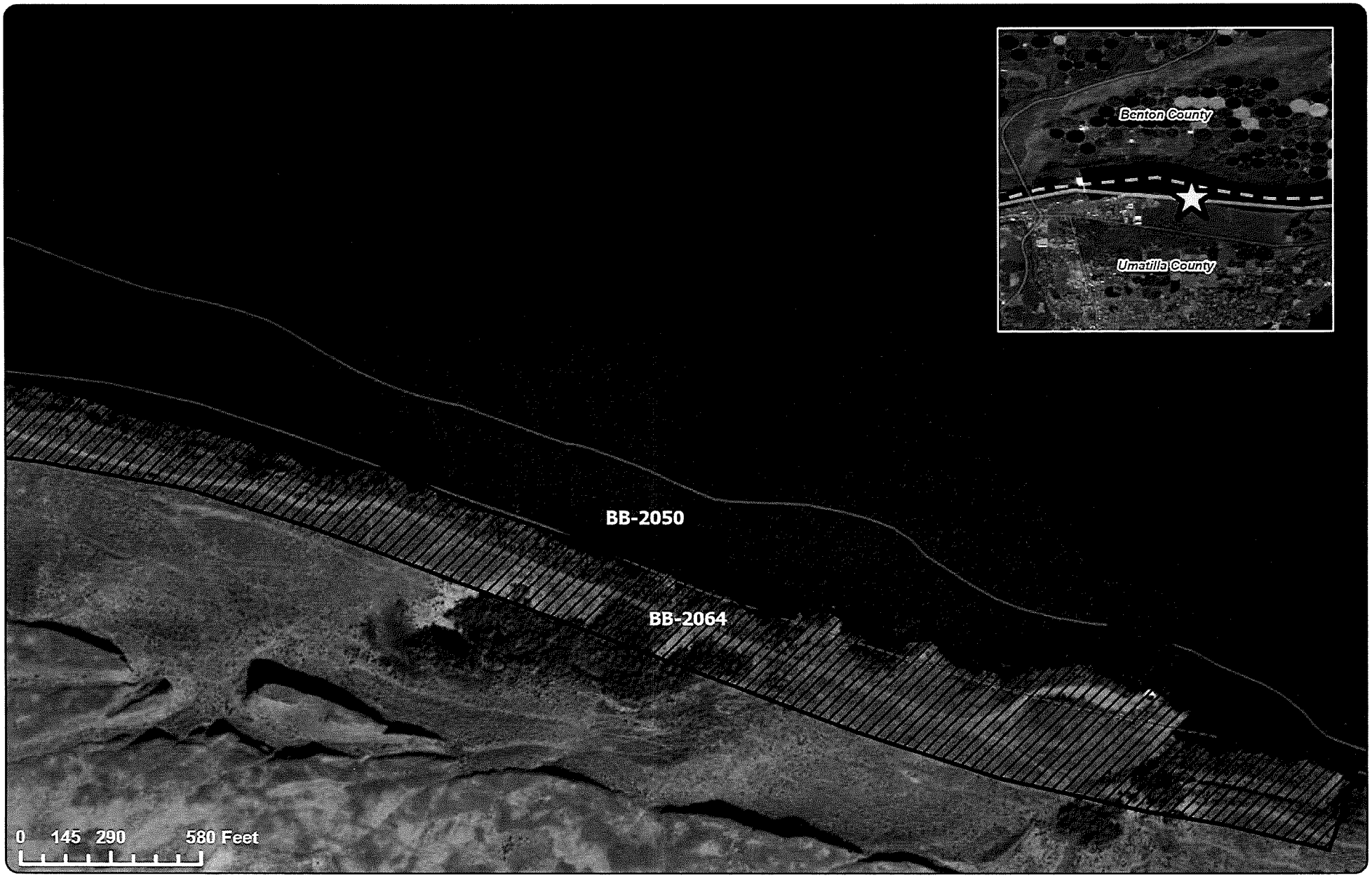
Umatilla County, Oregon
Sections 7 & 12
Township 05N Range 28E & 29E
USACE Tracts: A-OR, AA-2009, BB-2050, BB-2064
Construction License Acreage: +/- 17.27

Disclaimer: This mapping is for the purpose of marking the boundaries of a real estate instrument. Any other use may be inaccurate/incomplete and the Corps assumes no liability for any use of this map/data

Scale 1:5,000

N

US Army Corps of Engineers
Walla Walla District



City of Umatilla Pump Station Construction License

DACW68-3-26-14

Exhibit "A-3"

USACE Land Tracts
USACE Disposal Tracts
Construction License

Umatilla County, Oregon
Sections 7 & 12
Township 05N Range 28E & 29E
USACE Tracts: A-OR, AA-2009, BB-2050, BB-2064
Construction License Acreage: +/- 17.27

Disclaimer: This mapping is for the purpose of marking the boundaries of a real estate instrument. Any other use may be inaccurate/incomplete and the Corps assumes no liability for any use of this map/data

Scale 1:5,000

N

US Army Corps of Engineers
Walla Walla District

2) US ARMY, CORPS OF ENGINEERS SECTION 404 PERMIT

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

February 5, 2026

Regulatory Branch
Corps No. NWP-2022-00467-1

Mr. David Stockdale
City of Umatilla
P.O. Box 130
Umatilla, OR 97882
david.stockdale@umatilla.gov

Dear Mr. Stockdale:

The U.S. Army Corps of Engineers (Corps) received your request for Department of the Army authorization to construct a new pump station and to remove an existing pump station. The project is proposed in the Columbia River, approximately river mile 296, located in Umatilla, Umatilla County, Oregon (Latitude/Longitude: 45.92756932, -119.23408134). This letter verifies your project as depicted on the enclosed drawings (Enclosure 1) is authorized by Nationwide Permit (NWP) No. 58, Utility Line Activities for Water and Other Substances (Federal Register, January 13, 2021, Vol. 86, No. 8).

You are authorized to permanently discharge up to 310 cubic yards (cy) of concrete and mud slab fill material within an area measuring 0.027-acre below the ordinary high water mark (OHWM) of the Columbia River to construct a new pump station foundation and structure. You are authorized to permanently remove up to 243 cy of overburden, foundation, and pipes from an area measuring 0.03-acre below the OHWM of the Columbia River. You are also authorized to temporarily discharge up to 205 cy of fill material within an area measuring 0.01-acre below the OHWM of the Columbia River to construct a cofferdam to isolate the work area during construction. The cofferdam will be constructed with steel pilings and a sheetpile wall.

A work barge will be staged in the Columbia River for up to 18-months, and the cofferdam would also remain in place for up to 18-months. You are authorized to use a vibratory hammer to install and remove the temporary pilings. Work will also occur from the shoreline where sediment fencing will be installed. You will ensure any excess materials removed, including structural components, are taken to an appropriate upland facility for disposal.

In order for this authorization to be valid, you must ensure the work is performed in accordance with the enclosed Nationwide Permit 58 Terms and Conditions (Enclosure 2); the Oregon Department of Environmental Quality (DEQ) Section 401 Water Quality Certification Conditions (Enclosure 3); and the following special conditions:

a. All in-water work shall be performed during the in-water work period of December 1 to March 31 to minimize impacts to aquatic species.

b. Permittee shall notify the U.S. Coast Guard District of the project by email at D13-SMB-D13-LNM@uscg.milat least 14 days prior to commencing construction so the project information can be issued in the Local Notice to Mariners.

c. Permittee shall ensure all appropriate sediment and erosion control devices are installed and in proper working order prior to construction. Devices shall remain in place until the area is stabilized and construction is complete. If necessary, sediment and erosion control may be left in place after construction is complete to facilitate stabilization. However, upon stabilization all devices shall be removed from the area and disposed of in an upland location.

d. Wet or green concrete shall be allowed to cure a minimum of 72 hours prior to coming into contact with the waterway.

e. You must comply with the mandatory terms and conditions that apply to the activities within the Corps' jurisdiction to implement the reasonable and prudent measures associated with "incidental take" of those species identified in the enclosed National Marine Fisheries Service (NMFS), Biological Opinion (NMFS Reference Number: WCRO-2025-00422, December 15, 2025, Enclosure 4). The Corps' jurisdiction is limited to activities that require Department of the Army authorization. All of the mandatory terms and conditions in the enclosed Biological Opinion apply to the activity. The NMFS has the final authority to determine compliance with the terms and conditions of its Biological Opinion, and with the Endangered Species Act.

f. This Corps permit does not authorize you to take an endangered species, in particular the bull trout (*Salvelinus confluentus*). On August 13, 2025, the U.S. Fish and Wildlife Service (USFWS) concurred your project if implemented as proposed, is not likely to adversely affect a listed species and/or adversely modify designated critical habitat nor constitute take of a listed species (USFWS Reference Number FWS/R1/2025-0065482, Enclosure 5). Failure to implement the project as proposed may constitute noncompliance with the Endangered Species Act and your Corps permit. The USFWS has the final authority to determine compliance with the ESA.

g. Permittee shall take the necessary precautions to prevent any petroleum products, chemicals, or deleterious or toxic materials from entering waterways during construction.

h. Heavy equipment shall be clean and free of leaks when operated in or near the active channel. All vehicles shall be stored and fueled a minimum of 150 feet from any waterbody.

i. Permittee shall submit an as built report to the Corps by December 31 of the year the project is completed. The report shall contain photographs of the site and the initial grading survey. A map identifying the locations and directions of the photographs shall be included in the as-built report. The as-built report shall be provided by e-mail to cenwp.notify@usace.army.mil and the email subject line shall include: NWP-2022-00467-1, Umatilla County. If you are submitting files larger than 20 MB, contact your county Regulatory Project Manager for instructions.

j. Permittee shall dispose of excavated materials at a suitable upland location, and materials shall be adequately stabilized to minimize increases in turbidity levels and indirect impacts to wetlands and other aquatic systems. The material shall be placed in a location and manner that prevents its discharge into waterways or wetlands. In the event of spills, affected material shall be taken to an appropriate upland location (and properly disposed of in accordance with any state standards or requirements).

We have reviewed your project pursuant to the requirements of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act and the National Historic Preservation Act. We have determined the project complies with the requirements of these laws provided you comply with all of the permit general and special conditions.

The DEQ has issued a Section 401 Water Quality Certification for this project. No further coordination with DEQ is required provided the work is performed in accordance with all of the enclosed conditions.

Please note, Portland District NWP Regional General Condition 3, *Cultural Resources and Human Burials-Inadvertent Discovery Plan*, describes procedures should an inadvertent discovery occur. You must ensure that you comply with this condition during the construction of your project.

The Corps has determined the Columbia River within the review area are waters of the United States. The enclosed drawing (Enclosure 1, Page 3) identifies the size and boundaries of the delineated waters of the United States. The Corps has also determined Ditch and Wetland are not waters of the United States. The enclosed *Memorandum for Record* (MFR) (Enclosure 6) provides the size, criteria and rationale for jurisdiction for all aquatic resources within the review area.

This AJD is valid for a period of five years from the date of this letter unless new information warrants revisions of the determination.

The delineation included herein has been conducted to identify the location and extent of the aquatic resources for purposes of the Clean Water Act for the particular site identified in this request. This delineation may not be valid for the Wetland Conservation Provisions of the Food Security Act of 1985, as amended. If you or your tenant are U.S. Department of Agriculture (USDA) program participants, or anticipate participation in USDA programs, you should discuss the applicability of a Natural Resources Conservation Service Certified Wetland Determination with the local USDA service center, prior to starting work.

This letter contains an AJD for the subject site. If you object to the enclosed AJD, you may request an administrative appeal under the Corps regulations at 33 CFR Part 331. Enclosed you will find a *Notification of Administrative Appeal Options and Process (NAP) and Request for Appeal* (*RFA*) form (Enclosure 7). If you request to appeal this AJD, you must submit a completed RFA form to the Corps Northwestern Division Office at the following address:

Melinda Larsen, Regulatory Appeals Review Officer
U.S. Army Corps of Engineers, Northwestern Division
1201 NE Lloyd Blvd., Suite 400
Portland, OR 97232

You may contact the Appeals Review Officer by phone at 503-808-3888 or by email at melinda.m.larsen@usace.army.mil. In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR § 331.5, and that it has been received by the Division Office within 60 days from the date on the NAP. Should you decide to submit an RFA form, it must be received at the above address by April 6, 2026. It is not necessary to submit an RFA form to the Division Office if you do not object to the enclosed AJD.

As stated in Part D of the enclosed NWP Terms and Conditions, this NWP verification does not grant any property rights or exclusive privileges, to include Corps property. If you require access to Corps property to complete the project, please contact the Corps Real Estate Division natatasha.v.susin@usace.army.mil for any necessary authorizations.

The verification of this NWP is valid until March 14, 2026, unless the NWP is modified, reissued, or revoked prior to that date. If the authorized work has not been completed by that date and you have commenced or are under contract to commence this activity before March 14, 2026, you will have until March 14, 2027, to complete the

activity under the enclosed terms and conditions of this NWP. If the work cannot be completed by March 14, 2027, you will need to obtain a new NWP verification or authorization by another type of Department of the Army permit.

Our verification of this NWP is based on the project description and construction methods provided in your permit application. If you propose changes to the project, you must submit revised plans to this office and receive our approval of the revisions prior to performing the work. Failure to comply with all terms and conditions of this NWP verification invalidates this authorization and could result in a violation of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. You must also obtain all local, state, and other federal permits that apply to this project.

Upon completing the authorized work, you must fill out and return the enclosed *Certification of Compliance with Department of the Army Permit* form (Enclosure 8). We would like to hear about your experience working with the Portland District, Regulatory Branch. Please complete a customer service survey form available on our website (https://regulatory.ops.usace.army.mil/customer-service-survey/).

If you have any questions regarding this NWP verification, please contact Ms. Danielle Erb by telephone at (503) 808-4368 or by email at danielle.h.erb@usace.army.mil.

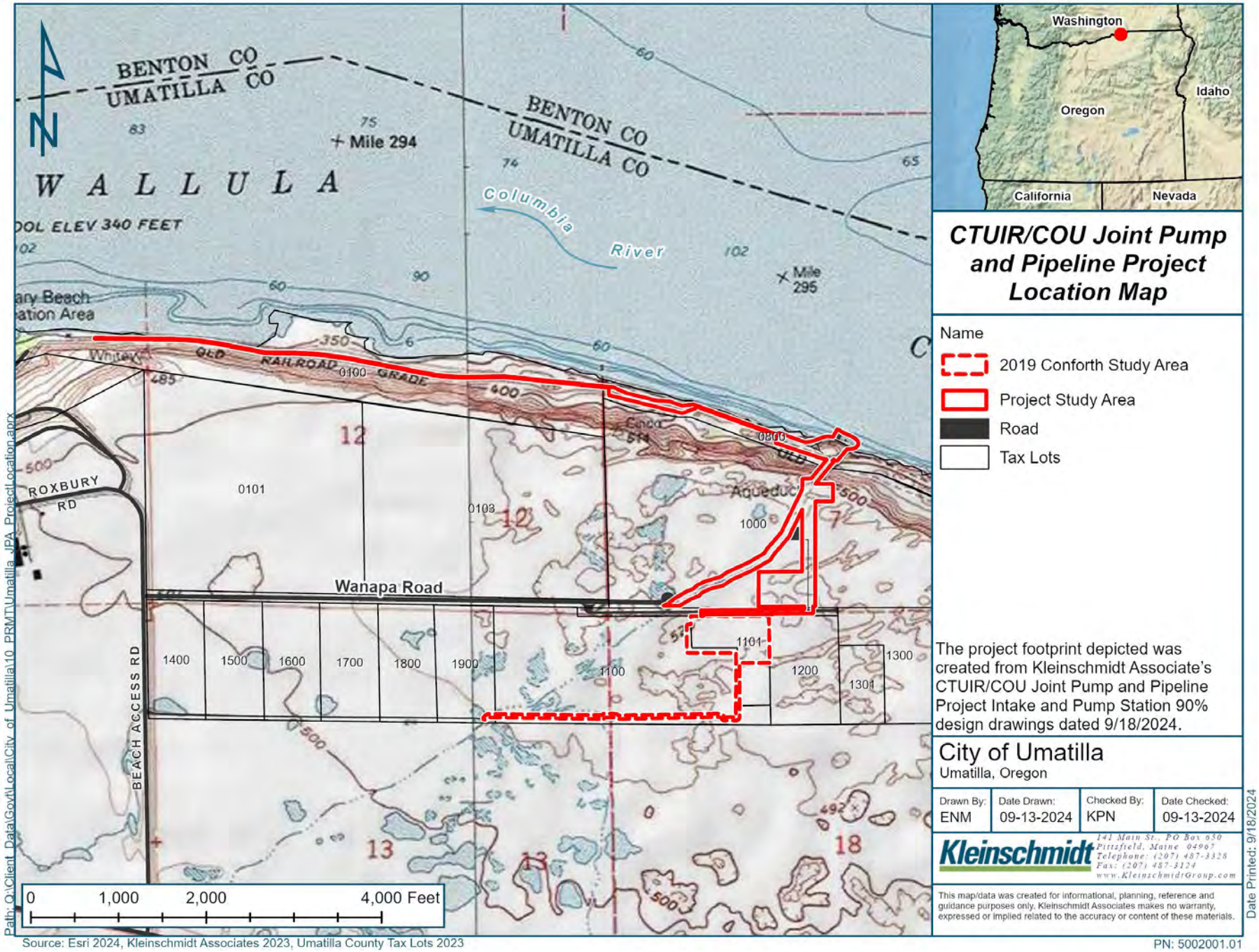
FOR THE COMMANDER, LARRY D. CASWELL, JR., PE, PMP, COLONEL, U.S. ARMY, DISTRICT COMMANDER and DISTRICT ENGINEER:

Melody J. White

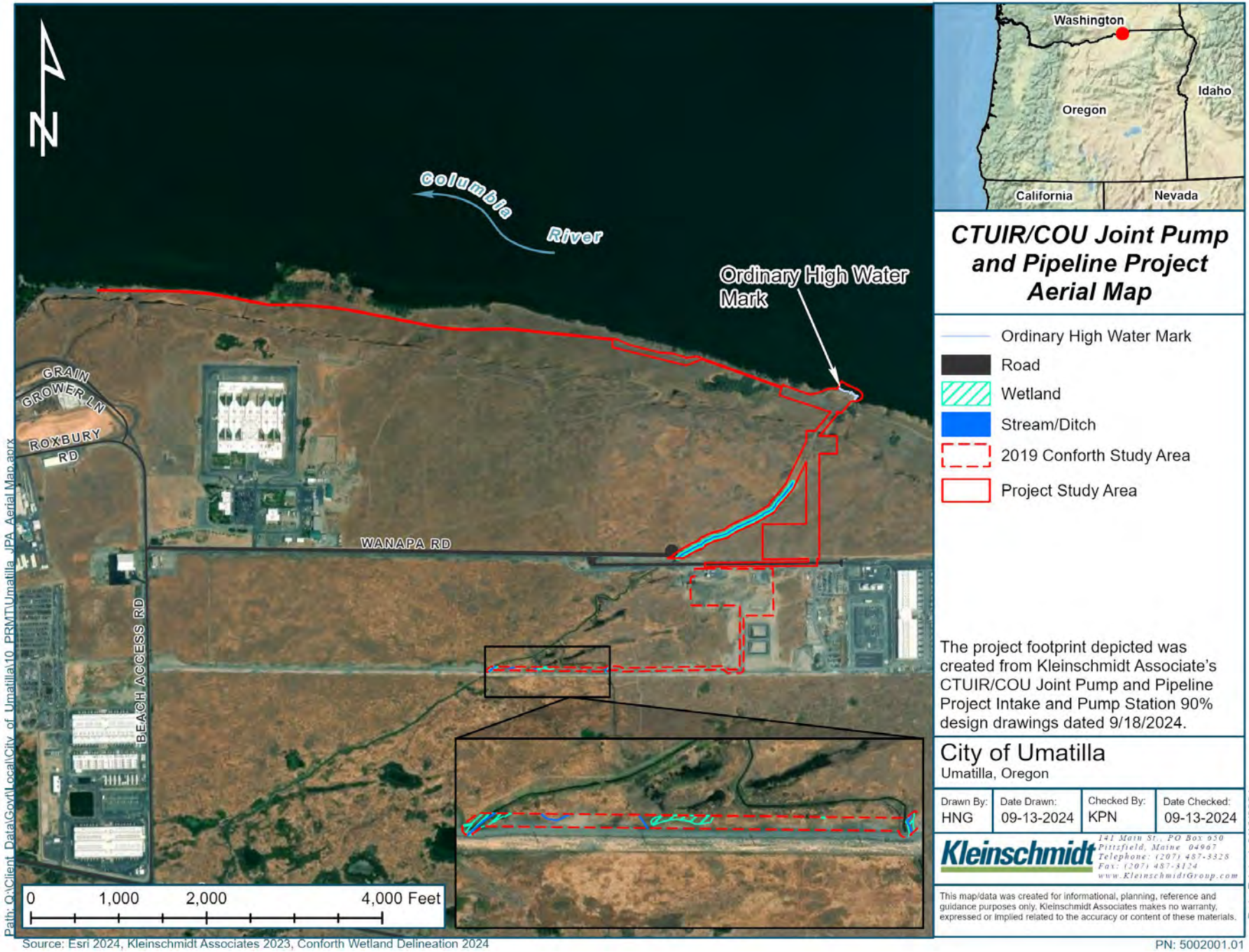
For: William D. Abadie
Chief, Regulatory Branch

Enclosures

cc:
Kleinschmidt Associates (Kai Steimle, kai.Steimle@kleinschmidtgroup.com)
Oregon Department of State Lands (Richard Fitzgerald, richard.w.fitzgerald@dsl.oregon.gov)
Oregon Department of Environmental Quality (Delia Negru, delia.negru@deq.oregon.gov)
Corps, NWP Waterways Maintenance Section (Casey O'Donnell, casey.p.odonnell@usace.army.mil)
Corps, NWW Real Estate (Natasha Susin, natasha.v.susin@usace.army.mil; Austen Whelan, austen.p.whelan@usace.army.mil)



Location Map


Columbia River
Ordinary High Water Mark
GRAIN GROWER LN
ROXBURY RD
WANAPA RD
BEACH ACCESS RD
0
1,000
2,000
4,000 Feet
Washington
Idaho
Oregon
California
Nevada
CTUIR/COU Joint Pump and Pipeline Project Aerial Map
Ordinary High Water Mark
Road
Wetland
Stream/Ditch
2019 Conforth Study Area
Project Study Area
The project footprint depicted was created from Kleinschmidt Associate's CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station 90% design drawings dated 9/18/2024.
City of Umatilla
Umatilla, Oregon
Drawn By: HNG
Date Drawn: 09-13-2024
Checked By: KPN
Date Checked: 09-13-2024
Kleinschmidt
141 Main St., PO Box 650
Pittsfield, Maine 04967
Telephone: (207) 487-3328
Fax: (207) 487-3124
www.KleinschmidtGroup.com
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Date Printed: 9/18/2024
Path: Q:\Client_Data\Govt\Local\City_of_Umatilla\10_PRMT\Umatilla_JPA_Aerial Map.aprx
Source: Esri 2024, Kleinschmidt Associates 2023, Conforth Wetland Delineation 2024
PN: 5002001.01

Aerial Map

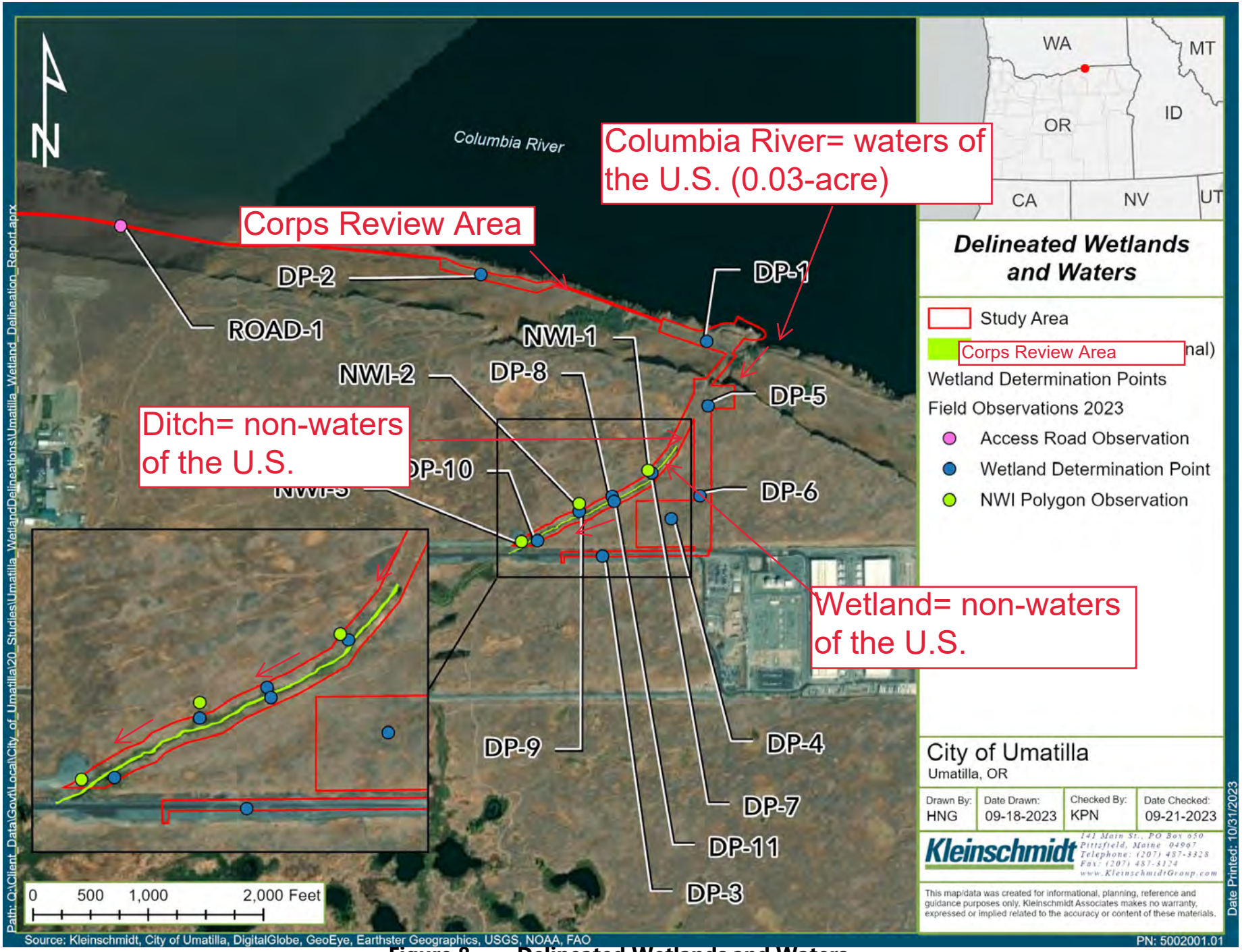
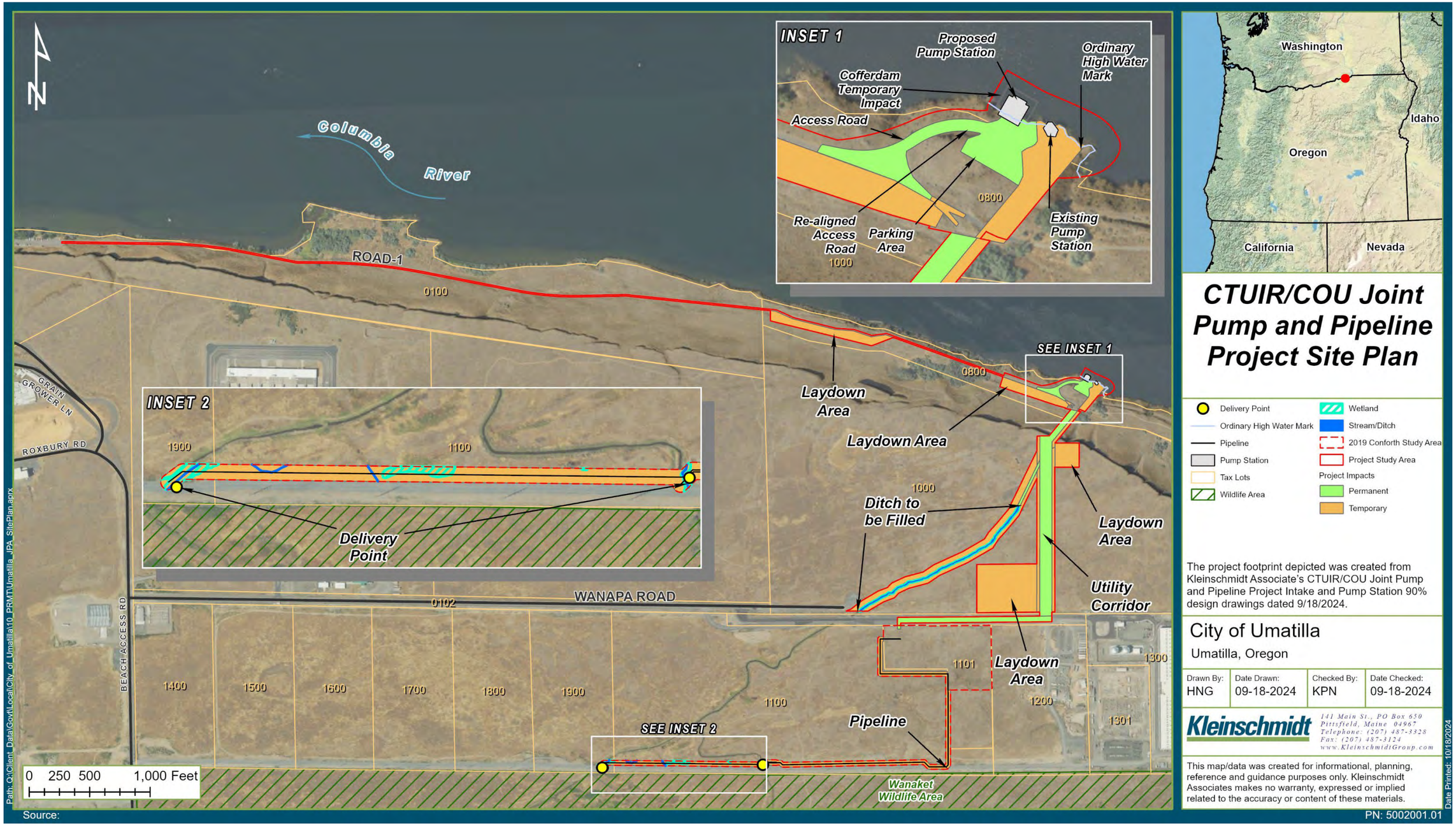


Figure 8 Delineated Wetlands and Waters



CTUIR/COU Joint Pump and Pipeline Project Site Plan

- Delivery Point
- Ordinary High Water Mark
- Pipeline
- Pump Station
- Tax Lots
- Wildlife Area
- Wetland
- Stream/Ditch
- 2019 Conforth Study Area
- Project Study Area
- Project Impacts
  - Permanent
  - Temporary

The project footprint depicted was created from Kleinschmidt Associate's CTUIR/COU Joint Pump and Pipeline Project Intake and Pump Station 90% design drawings dated 9/18/2024.

City of Umatilla

Umatilla, Oregon

Drawn By:	Date Drawn:	Checked By:	Date Checked:
HNG	09-18-2024	KPN	09-18-2024

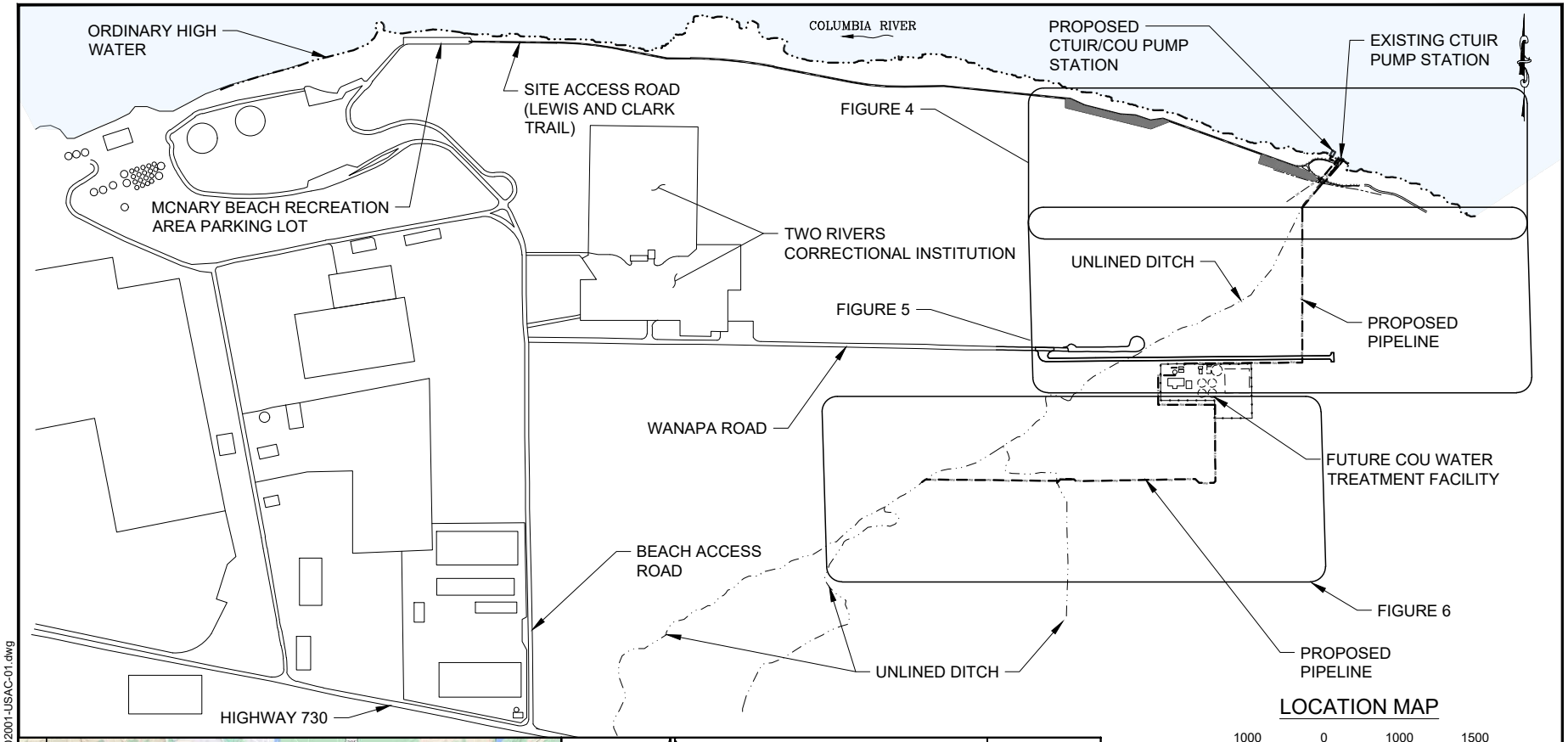
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Date Printed: 10/18/2024

PN: 5002001.01

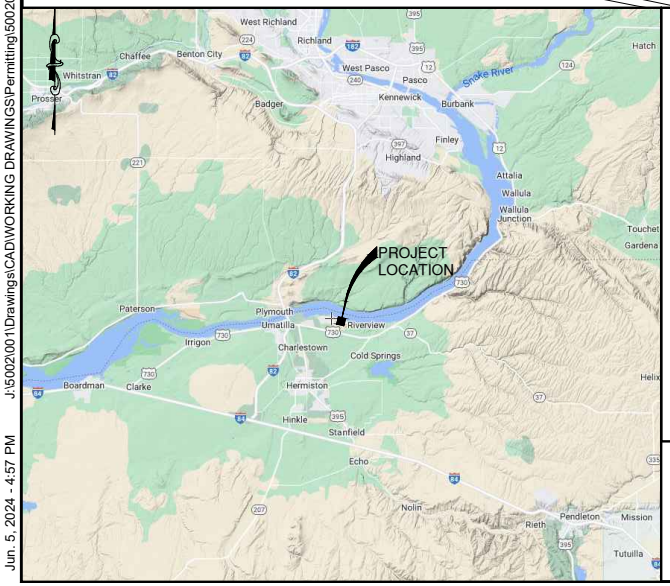
Project Site Plan

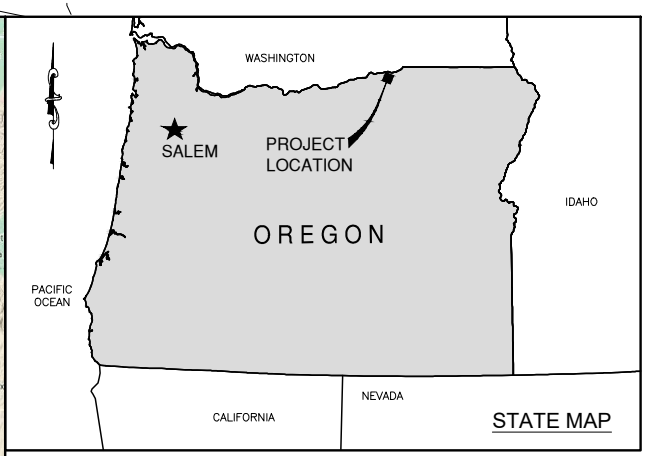


LOCATION MAP

1000 0 1000 1500

SCALE IN FEET





STATE MAP

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

LOCATION PLAN

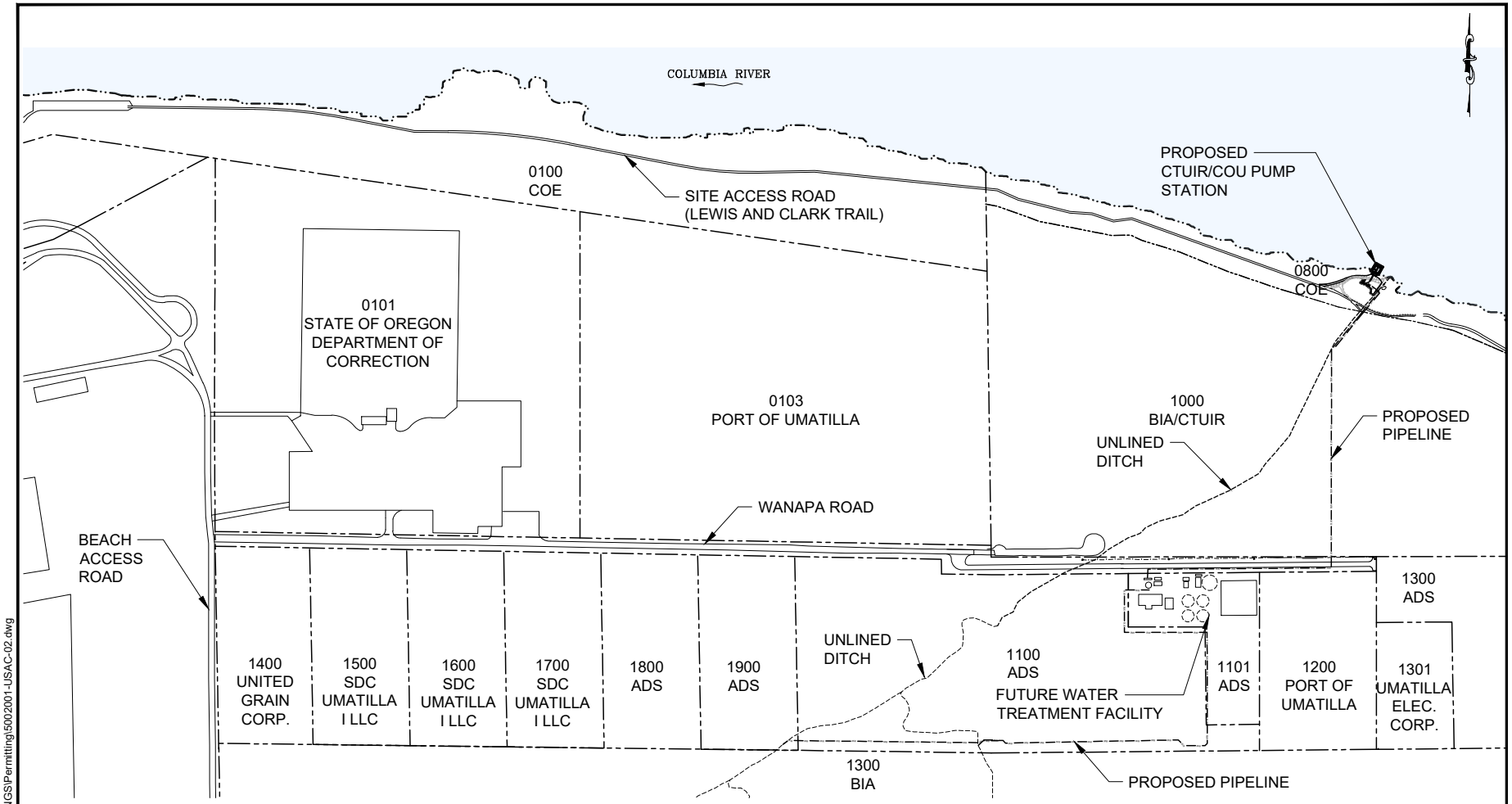
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Project No.	Date :	
5002-01	06-07-24	FIGURE 1

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Jun. 5, 2024 - 4:57 PM



SITE MAP

500 0 500 1000

SCALE IN FEET

RW —— RW —— PROPOSED RAW WATER PIPE

—— – – —— PROPERTY LINE

UE —— UE —— PROPOSED UNDERGROUND ELECTRICAL

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET

Revisions:	
Date	Initials

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

PROPERTY OWNERSHIP

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Project No.	Date :	
5002-01	06-07-24	FIGURE 2

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Removal

Wetland / Waterbody Name	Removal Dimensions					Time Removal is to remain	Material	Figure Impact is Shown On
	Average Length (ft.)	Average Width (ft.)	Average Depth (ft.)	Area (sqft or ac.)	Volume (c.y.)			
Columbia River	33	36	5	1,188 sqft (0.027 ac)	221	Permanent	Rock and soil overburden	Figure 10
Columbia River	53	2.5	1.2	124 sqft (0.003 ac)	6	Permanent	Existing CTUIR pump station intake and drain pipes	Figure 10
Unlined earthen ditch (tax lot 1000)	0	0	0	0	0	–	–	Figure 8
Wetlands around ditch (tax lot 1000)	1,790	2	1	0.16 ac	265	Permanent	Previously excavated ditch material and commercial fill	Figure 8
West crossing of unlined earthen ditch (Tax Lot 1900)	55	5	4	275 sqft (0.006 ac)	41	Permanent	Ditch substrate, wetland vegetation and soil	Figure 11
	55	35	0.5	1925 sqft (0.04 ac)	36	Temporary		
West crossing of associated wetland (Tax Lot 1900)	25	5	4	125 sqft (0.003 ac)	18	Permanent		
	25	44	0.5	1100 sqft (0.03 ac)	20	Temporary		
Center crossing of wetland (tax lot 1100)	50	5	2	250 sqft (0.006 ac)	19	Permanent		
	50	40	0.5	2000 sqft (0.05 ac)	37	Temporary		
East crossing of unlined earthen ditch (tax lot 1100)	50	5	2	250 sqft (0.006 ac)	19	Permanent		
	50	26	0.5	1300 sqft (0.03 ac)	19	Temporary		
East crossing of associated wetland (tax lot 1100)	-	-	-	-	-	Permanent		
	-	-	-	-	-	Temporary		

Fill

Wetland / Waterbody Name	Fill Dimensions					Time Fill is to remain	Material	Figure Impact is Shown On
	Average Length (ft.)	Average Width (ft.)	Average Depth (ft.)	Area (sqft or ac.)	Volume (c.y.)			
Columbia River	173	2	16	346 sqft (0.01 ac)	205	Temporary; 18 months	Steel sheetpiles and tremie-placed concrete	Figure 10
Columbia River	33	36	7	1,188 sqft (0.027 ac)	310	Permanent	Unreinforced Concrete Mud Slab and Reinforced Concrete Pump Station Structure	Figure 10
Unlined earthen ditch (tax lot 1000)	1,781	6.3	2	11,225 sqft (0.26 ac)	831	Permanent	Previously excavated ditch material and commercial fill	Figure 8
Wetlands around ditch (tax lot 1000)	0	0	0	0	0	–	–	Figure 8
West crossing of unlined earthen ditch (Tax Lot 1900)	55	5	4	275 sqft (0.006 ac)	41	Permanent	Pipeline	Figure 11
	55	35	0.5	1925 sqft (0.04 ac)	36	Temporary	Existing disturbed material, to be revegetated	
West crossing of associated wetland (Tax Lot 1900)	25	5	4	125 sqft (0.003 ac)	18	Permanent	Pipeline	
	25	44	0.5	1100 sqft (0.03 ac)	20	Temporary	Existing disturbed material, to be revegetated	
Center crossing of wetland (tax lot 1100)	50	5	4	250 sqft (0.006 ac)	37	Permanent	Pipeline	
	50	40	0.5	2000 sqft (0.05 ac)	37	Temporary	Existing disturbed material, to be revegetated	
East crossing of unlined earthen ditch (tax lot 1100)	50	5	4	250 sqft (0.006 ac)	37	Permanent	Pipeline	
	50	26	0.5	1300 sqft (0.03 ac)	19	Temporary	Existing disturbed material, to be revegetated	
East crossing of associated wetland (tax lot 1100)	-	-	-	-	-	Permanent	Pipeline	
	-	-	-	-	-	Temporary	Existing disturbed material, to be revegetated	

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

IMPACT TABLES

Revisions:

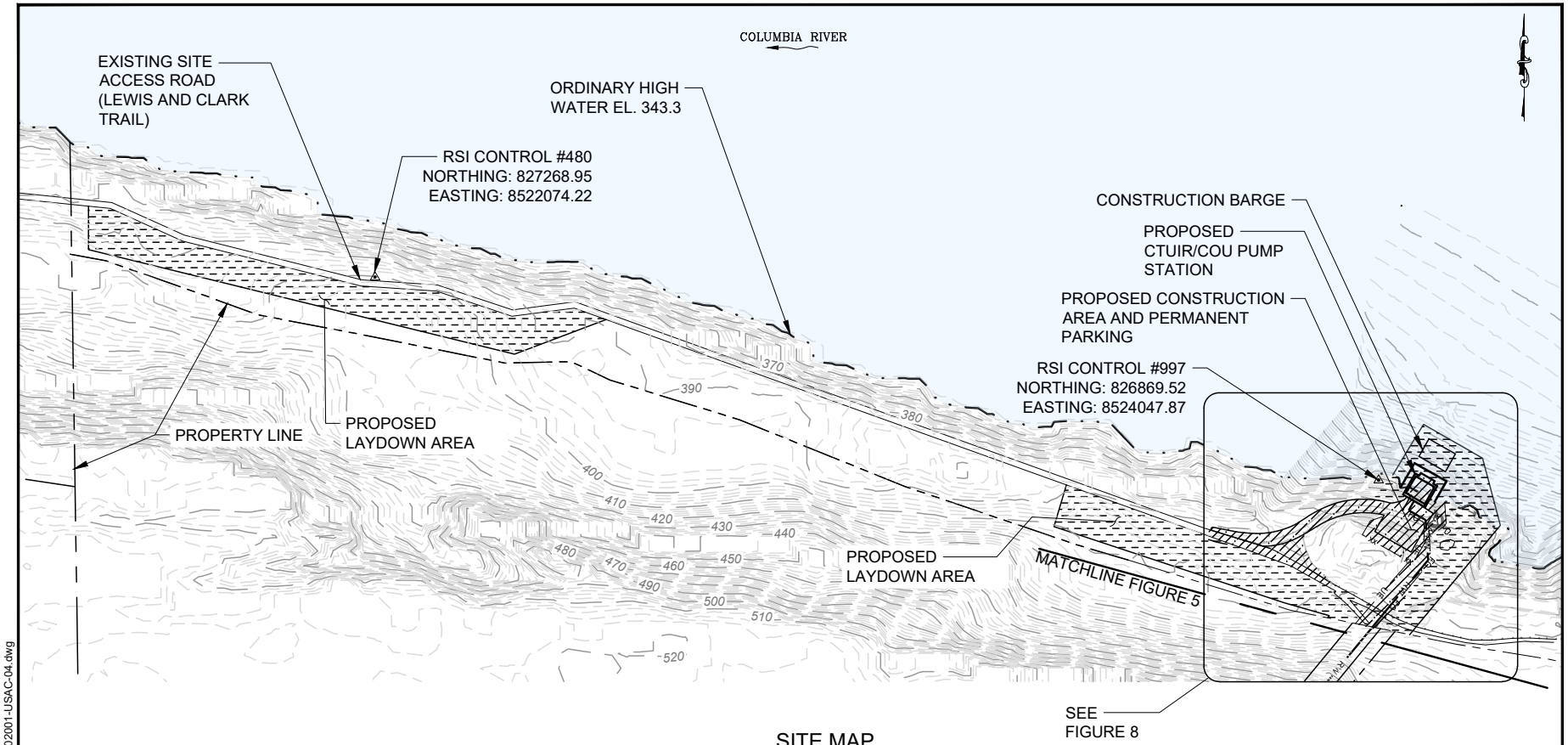
Date	Initials

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Project No.	Date :	
5002-01	06-07-24	FIGURE 3

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SITE MAP

150 0 150 300

SCALE IN FEET

FOR IMPACT TABLES SEE FIGURE 3

PERMANENT IMPACT

TEMPORARY IMPACT

RW — RW — PROPOSED RAW WATER PIPE

PROPERTY LINE

UE — UE — PROPOSED UNDERGROUND ELECTRICAL

FO — FO — PROPOSED UNDERGROUND FIBER OPTICS

X — X — PROPOSED SECURITY FENCE

NOTES:

1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL
09-18-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

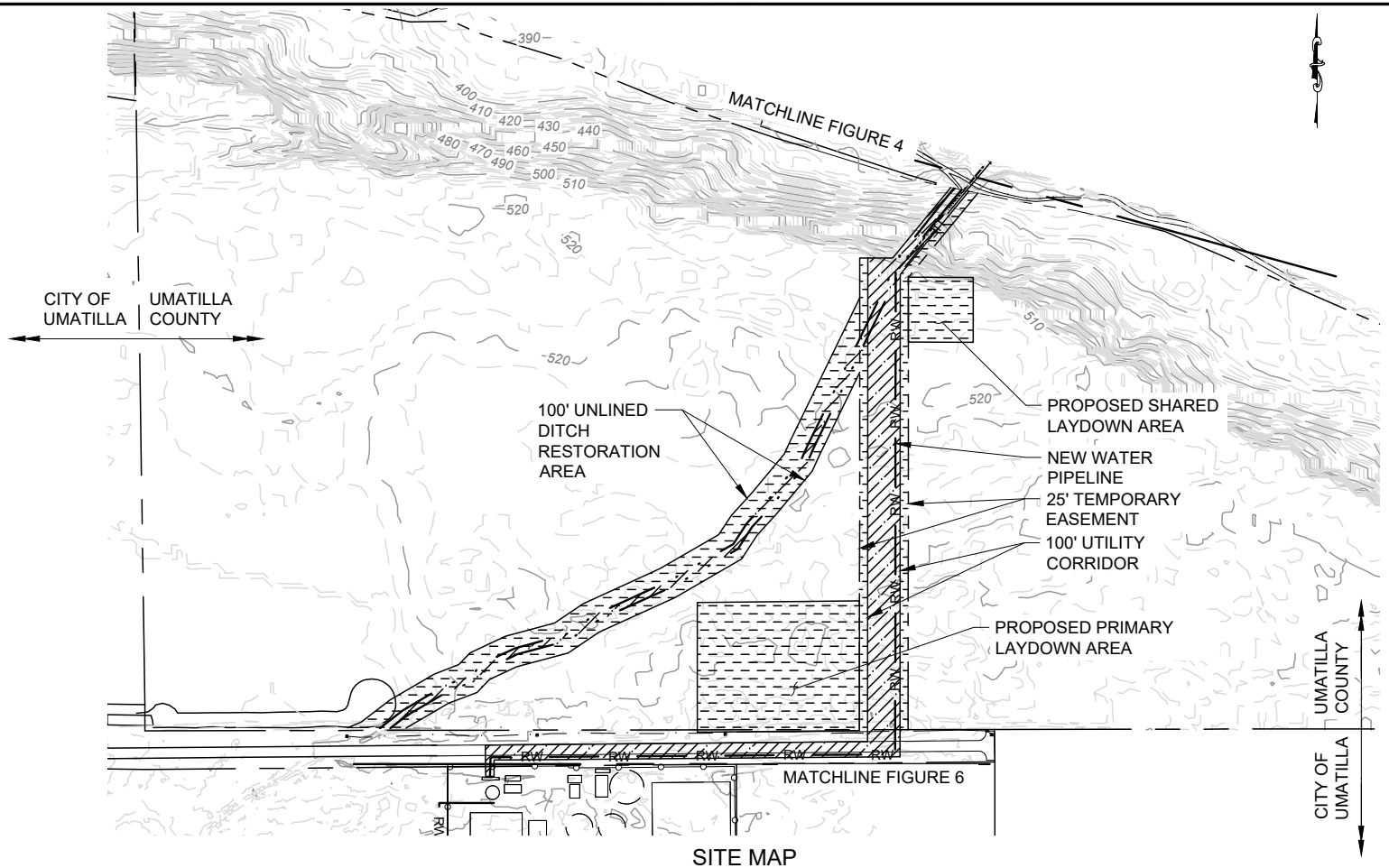
AREAS OF DISTURBANCE

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Project No.	Date :	
5002-01	09-18-24	FIGURE 4

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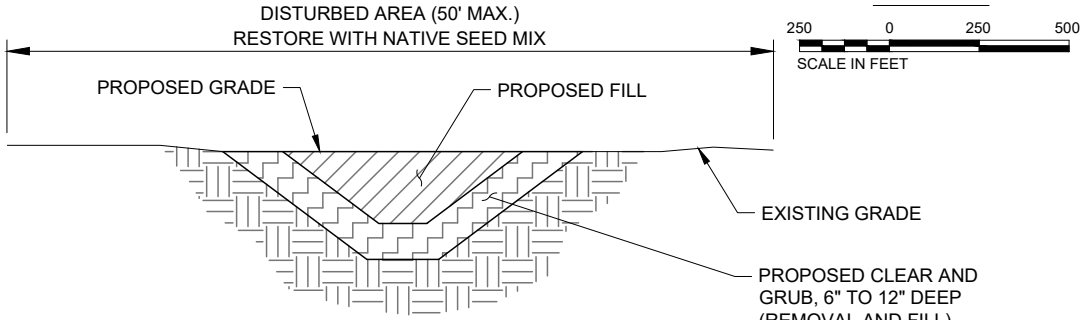
SITE MAP

250 0 250 500
SCALE IN FEET

FOR IMPACT TABLES SEE FIGURE 3

PERMANENT IMPACT

TEMPORARY IMPACT



TYPICAL DITCH RESTORATION SECTION
NOT TO SCALE

RW PROPOSED RAW WATER PIPE

PROPERTY LINE

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

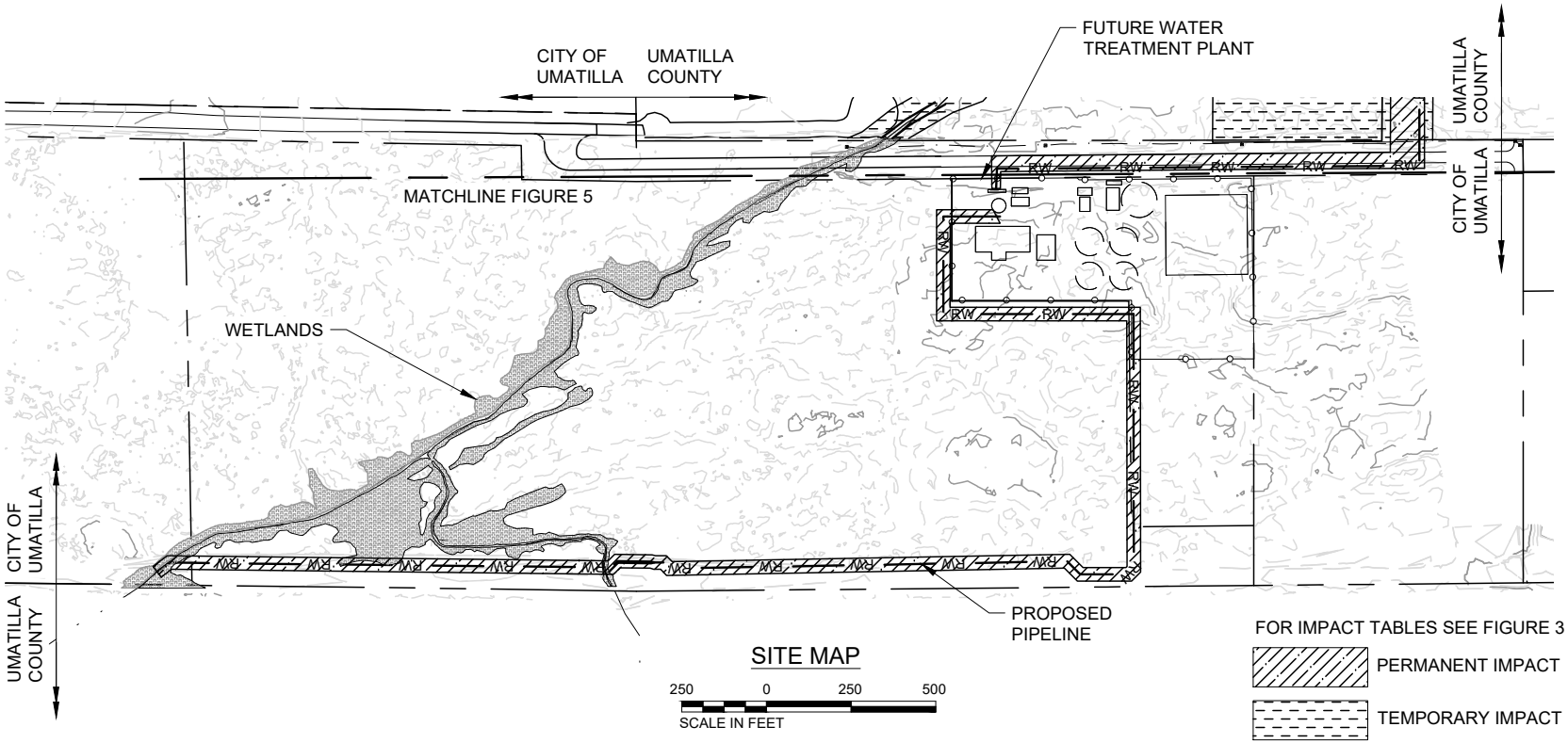
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Project No.	Date :	
5002-01	06-07-24	FIGURE 5

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SITE MAP

250 0 250 500

SCALE IN FEET

FOR IMPACT TABLES SEE FIGURE 3

PERMANENT IMPACT

TEMPORARY IMPACT

RW PROPOSED RAW WATER PIPE

PROPERTY LINE

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials

CITY OF UMATILLA

UMATILLA, OREGON

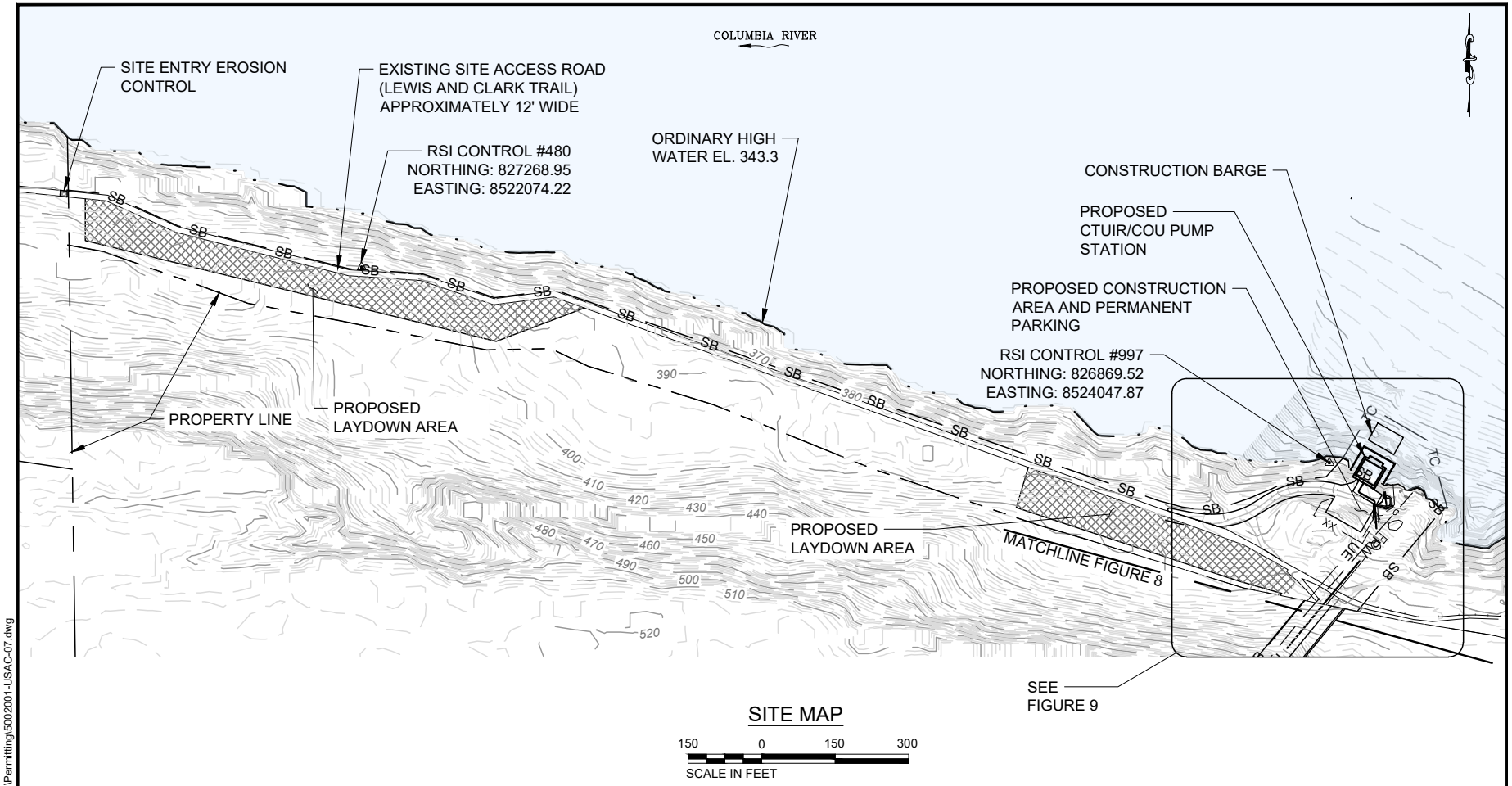
CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

AREAS OF DISTURBANCE

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Project No.	Date :	
5002-01	06-07-24	FIGURE 6

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SITE MAP

150 0 150 300

SCALE IN FEET

- SB — SEDIMENTATION BARRIER
- TC — TURBIDITY CURTAIN
- RW — PROPOSED RAW WATER PIPE
- PROPERTY LINE
- UE — PROPOSED UNDERGROUND ELECTRICAL
- FO — PROPOSED UNDERGROUND FIBER OPTICS
- X — PROPOSED SECURITY FENCE

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL
09-18-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

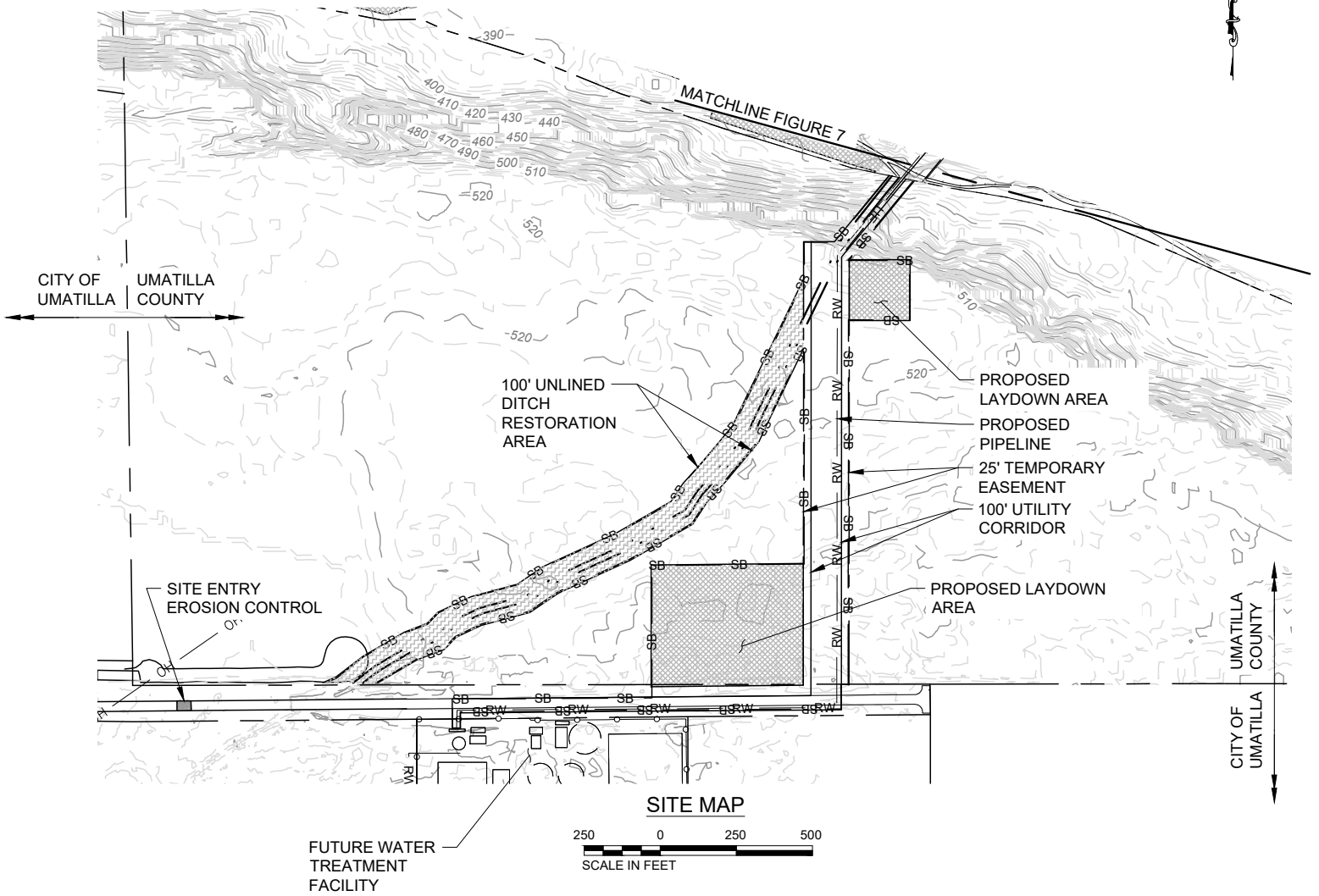
EROSION AND SEDIMENT CONTROL

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Project No.	Date :	
5002-01	09-18-24	FIGURE 7

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SITE MAP

250 0 250 500

SCALE IN FEET

SB — SEDIMENTATION BARRIER

RW — PROPOSED RAW WATER PIPE

PROPERTY LINE

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

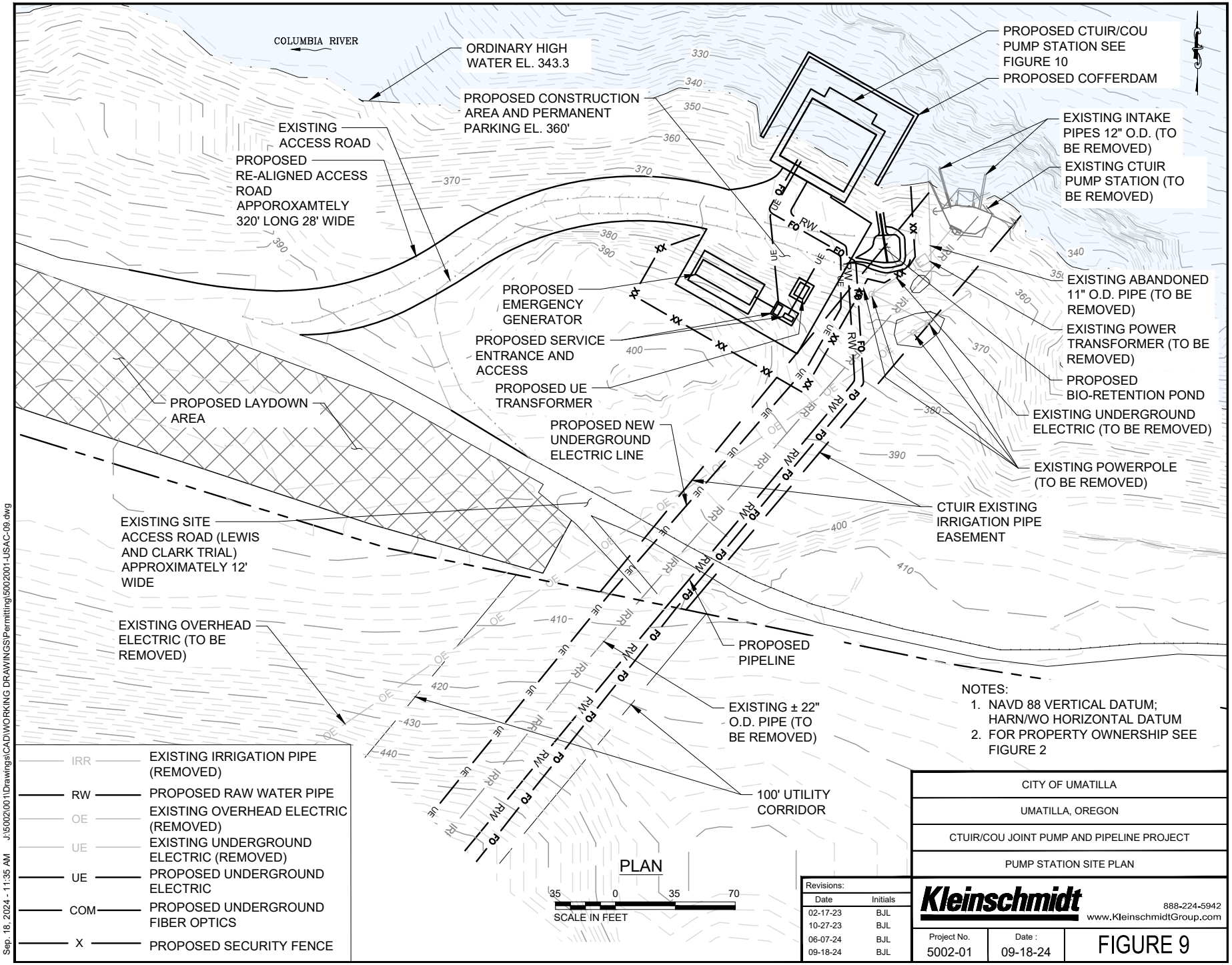
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Project No.	Date :	
5002-01	06-07-24	FIGURE 8

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NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	BJL
09-18-24	BJL

CITY OF UMATILLA

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CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

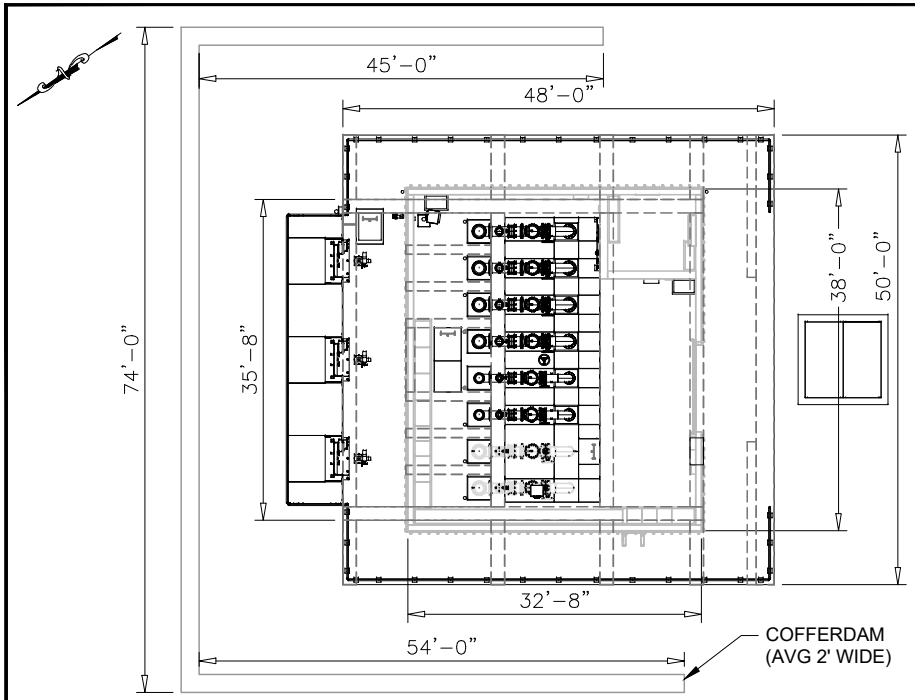
PUMP STATION SITE PLAN

Kleinschmidt

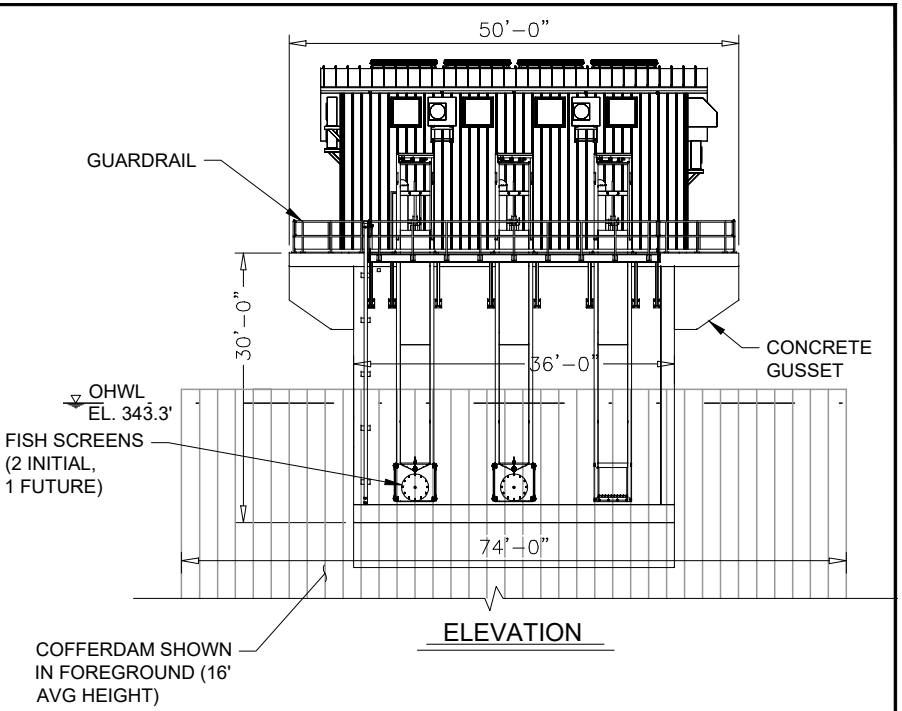
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Project No.	Date :	
5002-01	09-18-24	FIGURE 9

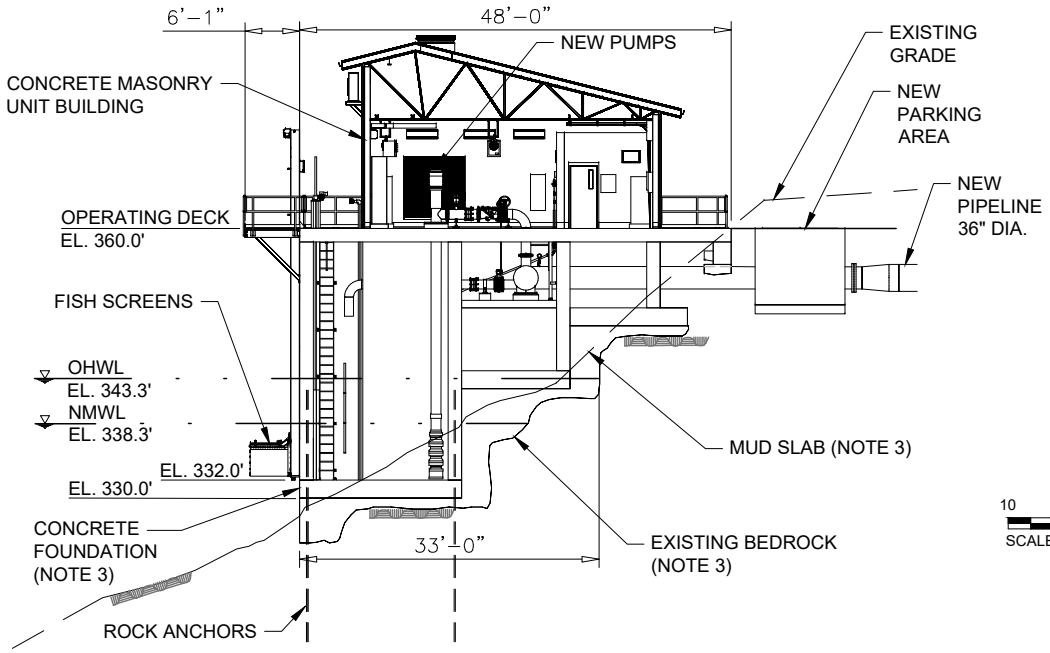
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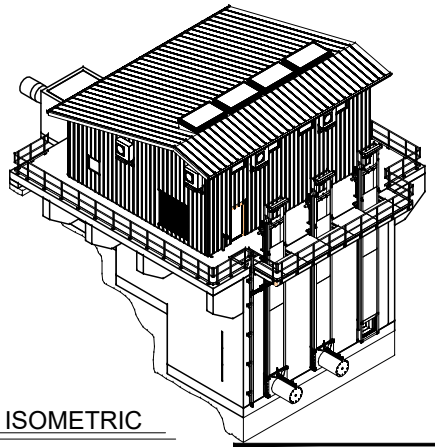
PLAN



ELEVATION



SECTION



ISOMETRIC

NOTES:
1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. OHWL = ORDINARY HIGH WATER LEVEL
   NMWL = NORMAL MINIMUM WATER LEVEL
3. AVERAGE DEPTH OF REMOVAL BELOW OHWL = 5'-0".
   AVERAGE DEPTH OF FILL BELOW OHWL = 7'-0"

10 0 10 20
SCALE IN FEET

Revisions:	
Date	Initials
02-17-23	BJL
03-25-24	JGE
06-07-24	BJL

CITY OF UMATILLA

UMATILLA, OREGON

CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

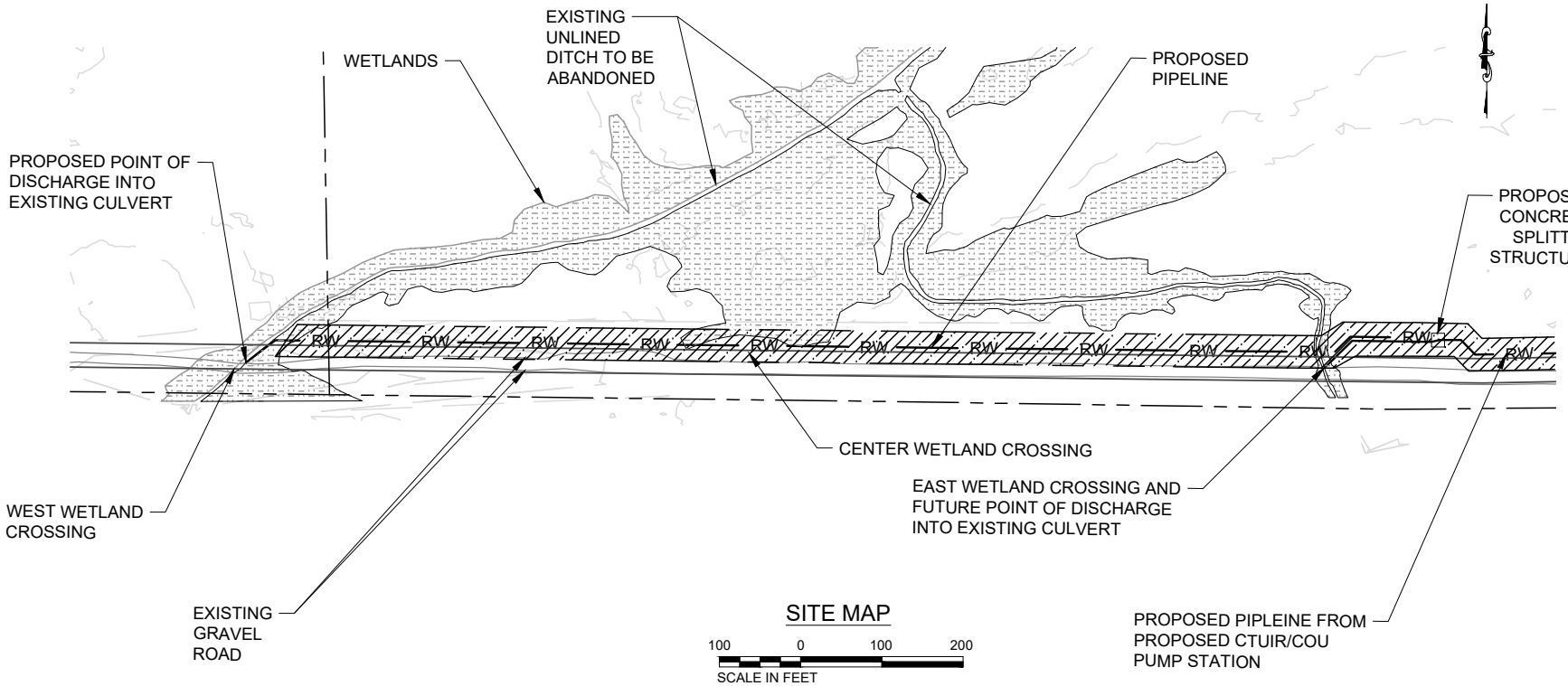
PUMP STATION PLAN AND DETAILS

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Project No.	Date :	
5002-01	06-07-24	FIGURE 10

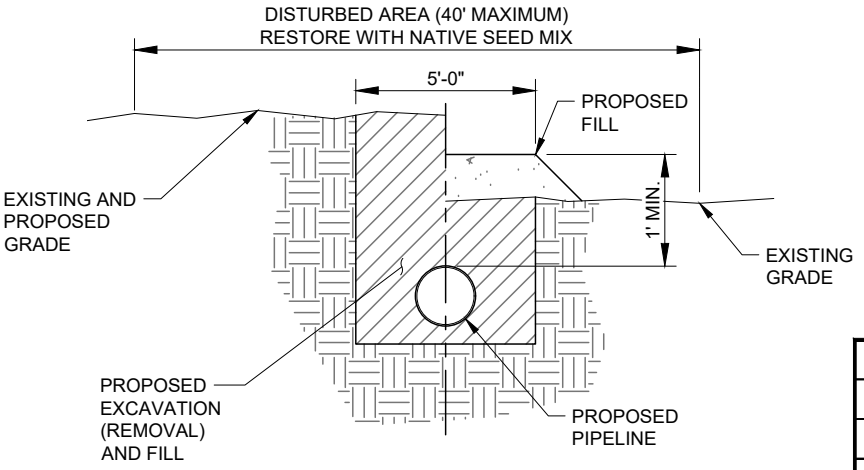
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SITE MAP

100 0 100 200

SCALE IN FEET



TYPICAL PIPE SECTION

NOT TO SCALE

PERMANENT IMPACT

RW PROPOSED RAW WATER PIPE

PROPERTY LINE

NOTES:

1. NAVD 88 VERTICAL DATUM; HARN/WO HORIZONTAL DATUM
2. TO CONVERT TO NGVD29 VERTICAL DATUM SUBTRACT 3.3 FEET
3. FOR PROPERTY OWNERSHIP SEE FIGURE 2

Revisions:	
Date	Initials
02-17-23	BJL
10-27-23	BJL
06-07-24	SFG

CITY OF UMATILLA

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CTUIR/COU JOINT PUMP AND PIPELINE PROJECT

AREAS OF DISTURBANCE

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Project No.	Date :	
5002-01	06-07-24	FIGURE 11

Jun. 6, 2024 - 3:18 PM J:\5002\001\Drawings\CAD\WORKING DRAWINGS\Permitting\5002001-USAC-11.dwg

US Army Corps of Engineers ®
Portland District

Nationwide Permit 58
Terms and Conditions

Effective Date: March 15, 2021

A. Description of Activities Authorized by Nationwide Permit 58
B. Nationwide Permit General Conditions
C. District Engineer's Decision
D. Further Information
E. Portland District Regional General Conditions
F. Portland District Nationwide Permit Specific Regional Condition

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In addition to any special conditions that may be required on a case-by-case basis by the District Engineer, the following terms and conditions must be met, as applicable, for a Nationwide Permit authorization to be valid in Oregon.

A. Description of Activities Authorized by Nationwide Permit (NWP) 58
58. *Utility Line Activities for Water and Other Substances*. Activities required for the construction, maintenance, repair, and removal of utility lines for water and other substances, excluding oil, natural gas, products derived from oil or natural gas, and electricity. Oil or natural gas pipeline activities or electric utility line and telecommunications activities may be authorized by NWPs 12 or 57, respectively. This NWP also authorizes associated utility line facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines for water and other substances, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose that is not oil, natural gas, or petrochemicals. Examples of activities authorized by this NWP include utility lines that convey water, sewage, stormwater, wastewater, brine, irrigation water, and industrial products that are not petrochemicals. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in

such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for above-ground utility lines: This NWP authorizes the construction or maintenance of foundations for above-ground utility lines in all waters of the United States, provided the foundations are the minimum size necessary.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges of dredged or fill material into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (see 33 CFR part 322). Overhead utility lines constructed over Section 10 waters and utility lines that are routed in or under Section 10 waters without a discharge of dredged or fill material require a Section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during

horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) a Section 10 permit is required; or (2) the discharge will result in the loss of greater than 1/10-acre of waters of the United States. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: Where the utility line is constructed, installed, or maintained in navigable waters of the United States (i.e., Section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

Note 3: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 4: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to the General Bridge Act of 1946. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a Section 404 permit (see NWP 15).

Note 5: This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act Section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

Note 6: For activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b)(4) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

B. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. *Navigation*. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. *Aquatic Life Movements*. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be

used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. *Spawning Areas*. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. *Migratory Bird Breeding Areas*. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. *Shellfish Beds*. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. *Suitable Material*. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. *Water Supply Intakes*. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. *Adverse Effects from Impoundments*. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. *Management of Water Flows*. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. *Fills Within 100-Year Floodplains*. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. *Equipment*. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. *Soil Erosion and Sediment Controls*. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and

all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. *Removal of Temporary Structures and Fills*. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. *Proper Maintenance*. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. *Single and Complete Project*. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. *Wild and Scenic Rivers*. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a “study river” for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. Permittees shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. *Tribal Rights*. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. *Endangered Species*. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA Section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA Section 7 consultation, as well as 50 CFR 402.17, which provides further explanation under ESA Section 7 regarding "activities that are reasonably certain to occur" and "consequences caused by the proposed action."

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA (see 33 CFR 330.4(f)(1)). If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA Section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under Section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat or critical habitat proposed for such designation, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation), the pre-construction notification must include the name(s) of the endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or that utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. For activities where the non-Federal applicant has identified listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species (or species proposed for listing or designated critical habitat (or critical habitat proposed for such designation), or until ESA Section 7 consultation or conference has been completed. If the non-Federal

applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation or conference with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA Section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA Section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA Section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA Section 7 consultation conducted for the ESA Section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA Section 7 consultation for the ESA Section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA Section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA Section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA Section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. *Migratory Birds and Bald and Golden Eagles*. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and

available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. *Historic Properties*. (a) No activity is authorized under any NWP which may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)(1)). If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under Section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with Section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts commensurate with potential impacts, which may include background research, consultation, oral history interviews, sample field investigation, and/or field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of Section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect.

(d) Where the non-Federal applicant has identified historic properties on which the proposed NWP activity might have the potential to cause effects and has so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA Section 106 consultation has been completed. For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. If NHPA Section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that Section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. *Discovery of Previously Unknown Remains and Artifacts*. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. *Designated Critical Resource Waters*. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, 52, 57 and 58 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed by permittees in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after she or he determines that the impacts to the critical resource waters will be no more than minimal.

23. *Mitigation*. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) Compensatory mitigation at a minimum one-for-one ratio will be required for all losses of stream bed that exceed 3/100-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. This compensatory mitigation requirement may be satisfied through the restoration or enhancement of riparian areas next to streams in accordance with paragraph (e) of this general condition. For losses of stream bed of 3/100-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream

rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. If restoring riparian areas involves planting vegetation, only native species should be planted. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f).)

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan

may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)). If permittee-responsible mitigation is the proposed option, and the proposed compensatory mitigation site is located on land in which another federal agency holds an easement, the district engineer will coordinate with that federal agency to determine if proposed compensatory mitigation project is compatible with the terms of the easement.

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan needs to address only the baseline conditions at the impact site and the number of credits to be provided (see 33 CFR 332.4(c)(1)(ii)).

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may

be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. *Safety of Impoundment Structures*. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state or federal, dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. *Water Quality*. (a) Where the certifying authority (state, authorized tribe, or EPA, as appropriate) has not previously certified compliance of an NWP with CWA Section 401, a CWA Section 401 water quality certification for the proposed discharge must be obtained or waived (see 33 CFR 330.4(c)). If the permittee cannot comply with all of the conditions of a water quality certification previously issued by certifying authority for the issuance of the NWP, then the permittee must obtain a water quality certification or waiver for the proposed discharge in order for the activity to be authorized by an NWP.

(b) If the NWP activity requires pre-construction notification and the certifying authority has not previously certified compliance of an NWP with CWA Section 401, the proposed discharge is not authorized by an NWP until water quality certification is obtained or waived. If the certifying authority issues a water quality certification for the proposed discharge, the permittee must submit a copy of the certification to the district engineer. The discharge is not authorized by an NWP until the district engineer has notified the permittee that the water quality certification requirement has been satisfied by the issuance of a water quality certification or a waiver.

(c) The district engineer or certifying authority may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. *Coastal Zone Management*. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). If the permittee cannot comply with all of the conditions of a coastal zone management consistency concurrence previously issued by the state, then the permittee must obtain an individual coastal zone management consistency concurrence or presumption of concurrence in order for the activity to be authorized by an NWP. The district engineer or a state may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. *Regional and Case-By-Case Conditions*. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe,

or U.S. EPA in its CWA Section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. *Use of Multiple Nationwide Permits*. The use of more than one NWP for a single and complete project is authorized, subject to the following restrictions:

(a) If only one of the NWPs used to authorize the single and complete project has a specified acreage limit, the acreage loss of waters of the United States cannot exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1⁄3-acre.

(b) If one or more of the NWPs used to authorize the single and complete project has specified acreage limits, the acreage loss of waters of the United States authorized by those NWPs cannot exceed their respective specified acreage limits. For example, if a commercial development is constructed under NWP 39, and the single and complete project includes the filling of an upland ditch authorized by NWP 46, the maximum acreage loss of waters of the United States for the commercial development under NWP 39 cannot exceed 1/2-acre, and the total acreage loss of waters of United States due to the NWP 39 and 46 activities cannot exceed 1 acre.

29. *Transfer of Nationwide Permit Verifications*. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

“When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.”

_____
(Transferee)

_____
(Date)

30. *Compliance Certification*. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of

ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. *Activities Affecting Structures or Works Built by the United States*. If an NWP activity also requires review by, or permission from, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires Section 408 permission and/or review is not authorized by an NWP until the appropriate Corps office issues the Section 408 permission or completes its review to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. *Pre-Construction Notification*. (a) *Timing*. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) *Contents of Pre-Construction Notification*: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) (i) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures.

(ii) For linear projects where one or more single and complete crossings require pre-construction notification, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters (including those single and complete crossings authorized by an NWP but do not require PCNs). This information will be used by the district engineer to evaluate the cumulative adverse environmental effects of the proposed linear project, and does not change those non-PCN NWP activities into NWP PCNs.

(iii) Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial and intermittent streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45-day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-federal permittees, if any listed species (or species proposed for listing) or designated critical habitat (or critical habitat proposed for such designation) might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat (or critical habitat proposed for such designation), the PCN must include the name(s) of those endangered or threatened species (or species proposed for listing) that might be affected by the proposed activity or utilize the designated critical habitat (or critical habitat proposed for such designation) that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must

state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an NWP activity that requires permission from, or review by, the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for Section 408 permission from, or review by, the Corps office having jurisdiction over that USACE project.

(c) *Form of Pre-Construction Notification*: The nationwide permit pre-construction notification form (Form ENG 6082) should be used for NWP PCNs. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) *Agency Coordination*: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iii) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an

additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure that the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

C. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the single and complete crossings of waters of the United States that require PCNs to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings of waters of the United States authorized by an NWP. If an applicant requests a waiver of an applicable limit, as provided for in NWPs 13, 36, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by an NWP and whether those cumulative adverse environmental effects are

no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands or 3/100-acre of stream bed, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters. The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure that the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP

and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

D. Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

E. Portland District Regional Conditions

1. *Notification:* For permittees that received written NWP approval, upon starting the authorized activities, you shall notify the U.S. Army Corps of Engineers, Portland District, Regulatory Branch that the work has started. Notification shall be provided by e-mail to cenwp.notify@usace.army.mil and the email subject line shall include: Corps project number and the project location by county.

2. *Aquatic Resources of Special Concern*: Pre-construction notification to the District Engineer is required for all activities proposed in waters of the U.S. within, or directly affecting, an aquatic resource of special concern. Aquatic resources of special concern are resources that are difficult to replace, unique, and/or have high ecological function. For the purpose of this regional condition, aquatic resources of special concern are native eel grass (Zostera marina) beds, mature forested wetlands, bogs, fens, vernal pools, alkali wetlands, wetlands in dunal systems along the Oregon coast, estuarine wetlands, Willamette Valley wet prairie wetlands, marine gardens, marine reserves, kelp beds, and rocky substrate in tidal waters.

In addition to the content requirements of NWP General Condition (GC) 32, the pre-construction notification must include a statement explaining why the effects of the

proposed activity are no more than minimal. Written approval from the District Engineer must be obtained prior to commencing work.

Note: If the District Engineer determines that the adverse effects of the proposed activity are more than minimal, then the District Engineer will notify the applicant that either:

a. the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit;

b. the activity is authorized under the NWP subject to submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or

c. the activity is authorized under the NWP with specific modifications or conditions.

3. *Cultural Resources and Human Burials-Inadvertent Discovery Plan*: In addition to the requirements in NWP GCs 20 and 21, the permittee shall immediately notify the District Engineer if, at any time during the course of the work authorized, human burials, cultural items, or historic properties, as defined by the National Historic Preservation Act and Native American Graves Protection and Repatriation Act, are discovered. The permittee shall implement the following procedures as outlined on the Inadvertent Discovery Plan posted on the Portland District Regulatory website at *https://www.nwp.usace.army.mil/Missions/Regulatory/Nationwide.aspx*

Notify the Portland District Engineer as soon as possible following discovery but in no case later than 24 hours. Notification shall be sent electronically (cenwp.notify@usace.army.mil) and shall identify the Corps project number and clearly specify the purpose is to report a cultural resource discovery. The permittee shall also notify the Corps representative (by email and telephone) identified in the verification letter.

4. *Essential Fish Habitat:* Activities which may adversely affect essential fish habitat, as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA), are not authorized by NWP until essential fish habitat requirements have been met by the applicant and the Corps. Non-federal permittees must submit a pre-construction notification to the District Engineer if essential fish habitat may be affected by, or is in the vicinity of, a proposed activity and shall not begin work until notified by the District Engineer that the requirements of the essential fish habitat provisions of the MSA have been satisfied and the activity is authorized. The notification must identify the type(s) of essential fish habitat (e.g., Pacific coast salmon, Pacific coast groundfish, and/or Coastal-pelagic species) managed by a Fishery Management Plan that may be affected. Information about essential fish habitat is available at NOAA's website: *http://www.westcoast.fisheries.noaa.gov*

5. *Bank Stabilization:* Permittee shall include the use of bioengineering techniques and natural materials in the project design to the maximum extent practicable and shall

minimize the use of rock. Bioengineering bank stabilization techniques are those that increase the strength and structure of soils with a combination of biological and mechanical elements (e.g., vegetation, root wads and woody debris, rock structures). Riparian plantings shall be included in all project designs unless the permittee can demonstrate that such plantings are not practicable.

6. *Work Area Isolation and Dewatering:* Appropriate best management practices shall be implemented to prevent erosion and to prevent sediments from entering waters of the U.S.

a. All in-water work shall be isolated from the active channel or conducted during low seasonal stream flows to the maximum extent practicable.

b. Cofferdams shall be constructed of non-erosive material, such as concrete jersey barriers, sand and gravel bag dams, or water bladders. Constructing a cofferdam by pushing material from the streambed or sloughing material from the streambanks is not authorized.

c. Sand and gravel bag dams shall be lined with a plastic liner or geotextile fabric to reduce permeability and prevent sediments and/or construction materials from entering waters of the U.S.

d. Upstream and downstream flows shall be maintained by routing flows around the construction site.

e. When dewatering is necessary for construction, a sediment basin, or other applicable method, shall be used to settle sediments prior to releasing the water back into the waterbody. Settled water shall be returned to the waterbody in such a manner as to avoid erosion. Sediment basins shall be placed in uplands.

f. Fish and other aquatic species must be salvaged (i.e., safely captured and relocated away from the project or development site) prior to dewatering. Contact ODFW for additional information regarding fish salvage.

7. *Dredging:* For NWP-authorized activities that involve removal of sediment from waters of the U.S., the permittee shall ensure that any necessary sediment characterization regarding size, composition, and potential contaminants is conducted and reviewed prior to dredging. Sediment characterization must be conducted per the Sediment Evaluation Framework for the Pacific Northwest (available at: *http://www.nwp.usace.army.mil/Missions/Environmental-Stewardship/DMM.aspx*).

Note: The return water from a contained disposal area is defined as a discharge of dredged material by 33 CFR part 323.2(d) and requires separate authorization from the District Engineer (*e.g.*, by NWP 16).

8. *Mechanized Equipment:* In addition to the requirements in NWP GC 11, permittee shall

implement the following practices to prevent or minimize impacts to the aquatic environment from mechanized equipment:

a. Operate equipment from the top of a streambank and conduct work outside of the active stream channel, unless specifically authorized by the District Engineer.

b. Spill prevention and containment materials shall be maintained and be readily accessible at vehicle staging areas. The amount of spill response materials (such as straw matting/bales, geotextiles, booms, diapers, and other absorbent materials, shovels, brooms, and containment bags) maintained on-site must be appropriate for the size of the authorized activity.

Note: See Regional Condition 10 regarding timeframes for temporary fills.

9. *Erosion Control:* During construction and until the site is stabilized, the permittee shall ensure all practicable measures are implemented and maintained to prevent erosion and runoff. Temporary stockpiles of excavated or dredged material shall be stabilized to prevent erosion. Once soils or slopes have been stabilized, permittee shall completely remove and properly dispose of or re-use all non-biodegradable components of installed control measures.

10. *Temporary Fills and Impacts:* To ensure no more than minimal adverse environmental effects from temporary fills and impacts to waters of the U.S:

a. Temporary fills and/or impacts to waters of the U.S. shall not exceed six months unless otherwise approved by the District Engineer.

b. No more than one-half (½) acre of waters of the U.S. may be temporarily filled or impacted unless otherwise approved by the District Engineer (temporary fills and impacts do not affect specified limits for loss of waters associated with specific nationwide permits).

c. Native soils and/or sediments removed from waters of the U.S. for project construction shall be stockpiled and used for site restoration to the maximum extent practicable.

d. Site restoration of temporarily filled or impacted areas shall include returning the area to pre-project ground surface contours. The permittee shall appropriately revegetate temporarily filled or impacted areas with native, noninvasive herbs, shrubs, and/or tree species sufficient in number, spacing, and diversity to replace affected aquatic functions.

Note: The Corps will determine compensatory mitigation requirements for temporary fills and impacts on a case-by-case basis depending on the duration and nature of the temporary fill or impact and the type of aquatic resource affected.

11. *Contractor Notification of Permit Requirements:* The permittee must provide a copy of the Nationwide Permit verification letter, conditions, and permit drawings to all

contractors and any other parties performing the authorized work, prior to the commencement of any work in waters of the U.S.

12. Inspection of the Project Site: The permittee shall allow representatives of the District Engineer to inspect the authorized activity to confirm compliance with nationwide permit terms and conditions. A request for access to the site will normally be made sufficiently in advance to allow a property owner or representative the option to be on site during the inspection.

F. Portland District Nationwide Permit 58 Specific Regional Condition

NWP 58: Manholes placed in streams or other waterways require specific approval by the District Engineer.

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263
FAX (503) 229-6945
TTY 711

March 27, 2025

David Stockdale
City of Umatilla
P.O. Box 130
Umatilla, OR 97882

RE: 401 Water Quality Certification Approval for 2022-467-1, CTUIR/COU Joint Pump and Pipeline Project

The US Army Corps of Engineers (USACE) has determined that your project will be authorized under Nationwide Permit (NWP) category #58. As described in the application package received and reviewed by the Oregon Department of Environmental Quality (DEQ), the project qualifies for the expedited 401 Water Quality Certification (WQC), subject to the conditions outlined below. If you cannot meet all conditions of this 401 WQC, you may apply for a standard individual certification. A standard individual certification will require additional information, a public notice, and a higher review fee.

Certification Decision: Based on information provided by the USACE and the Applicant, DEQ has determined that implementation eligible activities under the proposed NWP will be consistent with water quality requirements including applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41, and other appropriate requirements of state law, provided the following conditions are incorporated into the federal permit and strictly adhered to by the Applicant.

Duration of Certificate: This 401 WQC for impacts to waters, including dredge and fill activities, is valid for the duration of the USACE Section 404 permit. A new 401 WQC must be requested with any modification of the USACE 404 permit.

In addition to all USACE national and regional permit conditions, the following 401 WQC conditions apply to all NWP categories that qualify for the Nationwide 401 WQC.

401 GENERAL CERTIFICATION CONDITIONS

1) **Responsible parties:** This 401 WQC applies to the Applicant. The Applicant is responsible for the work of its contractors and sub-contractors, as well as any other entity that performs work related to this WQC.
Rule: *40 CFR 121, OAR 340-048-0015*
Justification: *DEQ must be aware of responsible parties to ensure compliance.*

2) **Work Authorized:** Work authorized by this 401 WQC is limited to the work described in the Permit Application and additional application materials (hereafter "the permit application

materials"), unless otherwise authorized by DEQ. If the project is operated in a manner not consistent with the project description contained in the permit application materials, the Applicant is not in compliance with this 401 WQC and may be subject to enforcement.
Rule: *OAR 340-048-0015*
Justification: *To ensure the project will comply with water quality standards, DEQ must understand all work involved in the construction and operation of the project.*

3) **401 WQC on Site:** A copy of this 401 WQC must be kept on the job site and readily available for reference by the Applicant and its contractors and subcontractors, as well as by DEQ, USACE, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), and other state and local government inspectors.
Rule: *OAR 340-012*
Justification: *All parties must be aware of and comply with the 401 WQC, including on-site contractors.*

4) **Project Changes:** DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, if the project changes or project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant is otherwise in violation of the conditions of this certification.
Rule: *OAR 340-048-0050*
Justification: *To ensure the project will comply with water quality standards, DEQ must understand all work involved in the construction and operation of the project.*

5) **Land Use Compatibility Statement:** In accordance with OAR 340-048-0020(2) (i), each Applicant must submit findings prepared by the local land use jurisdiction that demonstrates the activity's compliance with the local comprehensive plan. Such findings can be submitted using Section 11 of the Joint Permit Application, signed by the appropriate local official and indicating:

   a. "This project is consistent with the comprehensive plan and land use regulations;" or,

   b. "This project will be consistent with the comprehensive plan and land use regulations when the following local approvals are obtained," accompanied by the obtained local approvals.

   c. Rarely, such as for federal projects on federal land, "this project is not regulated by the comprehensive plan" will be acceptable.

   In lieu of submitting the appropriate section of the USACE & Department of State Lands (DSL) Joint Permit Application, the Applicant may use DEQ's Land Use Compatibility Statement form found at: http://www.oregon.gov/deq/FilterDocs/lucs.pdf
   Rule: *OAR 340-048-0020(2) (i), OAR 340-018*
   Justification: *DEQ must ensure compliance with water quality land use laws at the local level.*

6) **Access:** The Applicant and its contractors must allow DEQ access to the project site with or without prior notice, including staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including:

   a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC;

   b. To inspect best management practices (BMPs), monitoring or equipment or methods; and

c. To collect samples or monitor any discharge of pollutants.

Rule: *OAR 340-012*
Justification: *DEQ must inspect facilities for compliance with all state rules and laws.*

7) Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.
Rule: *OAR 340-012*
Justification: *If the project is not being constructed or operated as proposed, it may not be consistent with water quality requirements.*

FOR PROJECTS THAT PROPOSE CONSTRUCTION, THE FOLLOWING GENERAL CONDITIONS APPLY

8) **Erosion and Sediment Control**: During construction, erosion control measures must be implemented to prevent or control movement of soil into waters of the state. The Applicant is required to develop and implement an effective erosion and sediment control plan. A project that disturbs more than one acre may be required to obtain a National Pollutant Discharge Elimination System (NPDES) 1200-C construction stormwater general permit. Contact the DEQ Stormwater Program for more information at: https://www.oregon.gov/deq/wq/wqpermits/Pages/Stormwater-Construction.aspx

In addition, the Applicant must:

a. Maintain an adequate supply of materials necessary to control erosion at the project construction site.

b. Prohibit erosion of stockpiles. Deploy compost berms, impervious materials, or other effective methods during rain events or when stockpiles are not moved or reshaped for more than 48 hours.

c. Inspect erosion control measures daily and maintain erosion control measures as often necessary to ensure the continued effectiveness of measures. Erosion control measures must remain in place until all exposed soil is stabilized;

i. If monitoring or inspection shows that the erosion and sediment controls are ineffective, Applicant must mobilize immediately to make repairs, install replacements, or install additional controls as necessary.

ii. If sediment has reached 1/3 of the exposed height of a sediment or erosion control, Applicant must remove the sediment to its original contour.

d. Use removable pads or mats to prevent soil compaction at all construction access points through, and staging areas in, riparian or wetland areas to prevent soil compaction, unless otherwise authorized by DEQ.

e. Flag or fence off wetlands not specifically authorized to be impacted to protect from disturbance and/or erosion.

f. Place dredged or other excavated material on upland areas with stable slopes to prevent materials from eroding back into waterways or wetlands.

g. Place clean aggregate at all construction entrances, and utilize other BMPs, including, but not limited to as truck or wheel washes, when earth moving equipment is leaving the site and traveling on paved surfaces. The tracking of sediment off site by vehicles is prohibited.

Rule: *OAR 340-041-0007(8), ORS 468B.050, CWA Section 402, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

9) **Deleterious Waste Materials:** The Applicant is prohibited from placing biologically harmful materials and construction debris where they could enter waters of the state, including wetlands (wetlands are waters of the state). This includes, but is not limited to: petroleum products; chemicals; cement cured less than 24 hours; welding slag and grindings; concrete saw cutting by-products; sandblasted materials; chipped paint; tires; wire; steel posts; asphalt; and waste concrete.

The following specific requirements apply:

a. Cure concrete, cement, or grout for at least 24 hours before any contact with flowing waters;

b. Use only clean fill, free of waste and polluted substances;

c. Employ all practicable controls to prevent discharges of spills of harmful materials to surface or groundwater;

d. Maintain at the project construction site, and deploy as necessary, an adequate supply of materials needed to contain deleterious materials during a weather event;

e. Remove all foreign materials, refuse, and waste from the project area

Rule: *OAR 340-041-0007(8), ORS 468B.050, CWA Section 402*
Justification: *DEQ must ensure that pollution does not enter waterways.*

10) **Spill Prevention:** The Applicant must fuel, operate, maintain and store vehicles, and must store construction materials, in areas that will not disturb habitat directly or result in potential discharges.
Rule: *ORS 468B.025(1)(a)*
Justification: *DEQ must ensure that pollution does not enter waterways.*

11) **Spill & Incident Reporting:**

a. In the event that deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge must be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311) within 24 hours. Containment and cleanup must begin immediately and be completed as soon as possible.

b. If the project operations cause a water quality problem that results in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, ODFW, NMFS, and US Fish and Wildlife Service (USFW).

Rule: *ORS 466.645(1); OAR 340-142-0030(1)(b)(B), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways and must be protective of beneficial uses, including fish.*

12) **Vegetation Protection and Site Restoration:**

a. The Applicant must protect riparian, wetland, and shoreline vegetation in the authorized project area from disturbance through one or more of the following:

   i. Minimization of project and impact footprint;

   ii. Designation of staging areas and access points in open, upland areas;

   iii. Fencing and other barriers demarking construction areas; and

   iv. Use of alternative equipment (e.g., spider hoe or crane).

b. If authorized work results in vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, the Applicant must successfully reestablish vegetation to a degree of function equivalent or better than before the disturbance.

c. Pesticides (including herbicides) and fertilizers must be applied per manufacturer's instructions by a professionally licensed applicator. If chemical treatment is necessary, the Applicant is responsible for ensuring that pesticide application laws, including with the NPDES System 2300-A general permit, are met. Please review the information on the following website for more information: https://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx

   i. For pesticide application within stormwater treatment facilities or within 150 feet of waters of the state, the Applicant must adopt an Integrated Pest Management (IPM) plan that describes pest prevention, monitoring and control techniques with a focus on prevention of inputs to waters of the state, or coverage under an NPDES permit, if required.

   ii. Pesticide application should be applied during the dry season and avoid direct water application;

   iii. Unless otherwise approved in writing by DEQ, applying surface fertilizer within stormwater treatment facilities or within 50 feet of any stream channel is prohibited.

Rule: *OAR 340-041, OAR 340-012, OAR 340-041-0033*
Justification: *Riparian, wetland, and shoreline vegetation help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

13) **Buffers:** The Applicant shall avoid and protect from harm, all wetlands and provide a 50 foot buffer to waters of the state, unless proposed, necessary, and approved as part of the project. If a local jurisdiction has a more stringent buffer requirement, that requirement will take the place of this certification requirement.
Rule: *OAR 340-041, OAR 340-012*
Justification: *Riparian, wetland, and shoreline buffers help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

14) **Previously Contaminated Soil and Groundwater:** If any contaminated soil or groundwater is encountered, it must be handled and disposed of in accordance with the soil and groundwater management plan for the site, as well as local, state and federal regulations. The Applicant must notify the Environmental Cleanup Section of DEQ at 1-800-452-4011.
Rule: *OAR 340-041, OAR 340-012, OAR 340-122, OAR 340-040*
Justification: *DEQ must ensure that pollution does not enter waterways. As sediments are disturbed, pollutants could become redistributed.*

FOR PROJECTS THAT PROPOSE IN-STREAM WORK IN JURISDICTIONAL WATERS

15) **Fish protection/ Oregon Department of Fish and Wildlife timing:** The Applicant must perform in-water work only within the ODFW preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, or as authorized otherwise under a USACE permit and/or DSL removal/fill permit. Exceptions to the timing window must be recommended by ODFW, NMFS and/or the USFW as appropriate, and approved by DSL when applicable.
Rule: *OAR 340-041-0011*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

16) **Aquatic life movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity, unless otherwise approved in the approved application.
Rule: *OAR 340-041-0016; OAR 340-041-0028*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

17) **Isolation of in-water work areas:** The Applicant must isolate in-water work areas from the active flowing stream, unless otherwise authorized as part of the approved application, or authorized by DEQ.
Rule: *OAR 340-041, OAR 340-012, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

18) **Cessation of Work:** The Applicant must cease project operations under high-flow conditions that will result in inundation of the project area. Only efforts to avoid or minimize turbidity or other resource damage as a result of inundation of the exposed project area are allowed during high-flow conditions.
Rule: *OAR 340-041, OAR 340-012*
Justification: *DEQ must ensure that pollution does not enter waterways*.

19) **Turbidity**: The Applicant must implement BMPs to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below:

a. **Monitoring**: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two-hour intervals each day when in-water work is being conducted. A properly calibrated turbidimeter is required **unless another monitoring method is proposed and authorized by DEQ**.

i. **Representative Background Point**: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet up-current of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring down-current at the compliance point described below.

ii. **Compliance Point:** The Applicant must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet down-current from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

b. **Compliance**: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances are allowed as followed:

MONITORING WITH A TURBIDIMETER *EVERY 2 HOURS*	
TURBIDITY LEVEL	***Restrictions to Duration of Activity***
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

c. **Reporting**:
   i. Record all turbidity monitoring required by subsections (a) and (b) above in daily logs which must include: calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; and location; date; time; and tidal stage (if applicable) for each reading.

   ii. A narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to regulatory agencies including DEQ, USACE, NMFS, USFWS, and ODFW upon request.

   iii. Keep records on file for the duration of the permit cycle.

d. **BMPs to Minimize In-stream Turbidity:** The Applicant must implement the following BMPs, unless accepted in writing by DEQ:

   i. Sequence/Phasing of work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances.

   ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;

   iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary at the least sensitive areas

and amend these crossing sites with clean gravel or other temporary methods as appropriate;

iv. Machinery may not be driven into the flowing channel, unless authorized in writing by DEQ; and

v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

vi. Containment measures such as silt curtains, geotextile fabric, and silt fences must be in place and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity.

Rule: *OAR 340-041-0036, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

SPECIFIC CONDITIONS FOR POST-CONSTRUCTION STORMWATER MANAGEMENT

20) **Post Construction Stormwater Management:** For projects which propose new impervious surfaces or the redevelopment of existing surfaces, the Applicant must submit a post-construction stormwater management plan to DEQ. The plan must be reviewed and approved prior to construction to ensure compliance with water quality standards. The Applicant must implement BMPs as proposed in the stormwater management plan, including construction, operation, and maintenance. If proposed stormwater facilities change due to site conditions, the Applicant must notify DEQ in writing.

In lieu of a complete stormwater management plan, the Applicant may submit documentation of acceptance of the stormwater into a DEQ permitted NPDES Phase I Municipal Separate Storm Sewer System (MS4).
Rule: *ORS 468B.050, OAR 340-045, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

21) **Stormwater Management & System Maintenance:** The Applicant is required to implement effective operation and maintenance practices for the lifetime of the proposed facility. Long-term operation and maintenance of stormwater treatment facilities will be the responsibility of the applicant or the entity listed in the approved post-construction stormwater management plan.

Maintenance of stormwater treatment facilities subject to an MS4 permit is regulated by the permit.
Rule: *OAR 340-041, OAR 340-012, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

22) **Corrective Action May Be Required:** DEQ retains the authority to require corrective action in the event the stormwater management facilities are not built or performing as described in the plan.
Rule: *OAR 340-041, OAR 340-012*
Justification: *DEQ must ensure that pollution does not enter waterways.*

CATEGORY SPECIFIC CONDITIONS

In addition to all national and regional conditions of the USACE permit and the 401 Water Quality Certification general conditions above, the following conditions apply to the noted specific categories of authorized activities.

NWP 7 – Outfall Structures and Associated Intake Structures:

7.1) The following actions are denied certification:

a. Discharge outfalls that are not subject to an NPDES permit; and

b. Outfalls that discharge stormwater without pollutant removal demonstrated to meet water-quality standards prior to discharge to waters of the state.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways. Untreated stormwater is considered pollution.*

7.2) If an Applicant cannot obtain an NPDES permit or submit an approvable stormwater management plan per DEQ's Guidelines found at: http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways. Untreated stormwater is considered pollution.*

NWP 13 – Bank Stabilization:

13.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

13.2) Projects that propose permanent fill in adjacent wetlands are denied certification.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Water adjacent wetlands provide water quality benefits.*

13.3) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

NWP 14 – Linear Transportation:

14.1) For projects that include bank stabilization, bioengineering must be a component of the project, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

14.2) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

NWP 16 - Return Water from Contained Upland Disposal Areas: Water-quality criteria and guidance values for toxics, per OAR 340-041-0033, are available in Tables 30, 31, and 40 at: https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=68746.

16.1) Discharge of return water from contaminated dredged material that exceeds a chronic or acute toxicity water quality standard is prohibited.
Rule: *OAR 340-041-0053(b)(A), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

16.2) Water removed with contaminated dredged material that could or does exceed chronic water-quality criteria must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration.
Rule: *OAR 340-041-0053(b)(A), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

16.3) If a Modified Elutriate Test (MET) is performed for the known contaminants of concern (CoCs) and CoC concentrations are below DEQ chronic water-quality criteria, return water discharge is not limited.

a. The MET must be performed before dredging.
a. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
b. DEQ must review the results and provide approval of discharge from return water, in writing, prior to dredging.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 20 – Response Operations for Oil and Hazardous Waste:

20.1) Coordination with DEQ's Emergency Response program is required. See: http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx.
Rule: *OAR 340-142-0130(3), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 22 – Removal of Vessels:

22.1) Coordination with DEQ's Emergency Response program is required. See:

http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Vessels may contain various fuels, lubricants, and other possible sources of pollution.*

NWP 31 – Maintenance of Existing Flood Control Facilities:

31.1) Projects in streams with temperature TMDLs which result in a net reduction of riparian shade are prohibited.
Rule: *OAR 340-041-0028, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 38 – Cleanup of Hazardous and Toxic Waste:

38.1) For removal of contaminated material from waters, dredging method is limited to diver assisted hydraulic suction, hydraulic suction, closed-lipped environmental bucket, or excavation in the dry, unless otherwise authorized by DEQ.

a. For in-water isolation measures, the Applicant is referred to Appendix D of DEQ's Oregon Erosion and Sediment Control Manual, April 2005 (or most current version), at: DEQ Erosion and Sediment Control Manual
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.2) Discharge to waters of the state resulting from dewatering during dredging or release of return water from an upland facility is prohibited except as provided below.

a. All water removed with sediment must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration; or,

b. A Modified Elutriate Test (MET) may be performed for the known Contaminants of Concern (CoCs) and if CoC concentrations are below DEQ chronic water-quality criteria; return water discharge is not limited.

i. The MET must be performed before dredging.
ii. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
iii. DEQ must review the results and provide approval of discharge from dewatering and return water in writing prior to dredging.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.3) Dredged material must be disposed of in compliance with DEQ Rules governing Hazardous Waste (see: http://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/default.aspx) or Solid Waste (see: http://www.oregon.gov/deq/mm/swpermits/Pages/Solid-Waste-Disposal-Sites-and-Landfill.aspx).
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.4) The new in-water surface must be managed to prevent exposure or mobilization of contaminants.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 41 - Reshaping Existing Drainage Ditches:

41.1) To the extent practicable, the Applicant must work from only one bank in order to minimize disturbance to existing vegetation, preferably the bank with the least existing vegetation;
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

41.2) Following authorized work, the Applicant must establish in-stream and riparian vegetation on reshaped channels and side-channels using native plant species wherever practicable. Plantings must be targeted to address water-quality improvement (e.g., provide shade to water to reduce temperature or provide bank stability through root systems to limit sediment inputs). Planting options may include clustering or vegetating only one side of a channel, preferably the side which provides maximum shade.
Rule: *OAR 340-041-0004(5)(a)*
Justification: *Riparian, wetland, and shoreline buffers help ensure excess sediment does not enter a waterway and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

NWP 42 – Recreational Facilities:

42.1) For facilities that include turf maintenance actions, the permittee must develop and implement an Integrated Pest Management Plan (IPM) that describes pest prevention, monitoring and control techniques with a focus on prevention of chemical and nutrient inputs to waters of the state, including maintenance of adequate buffers for pesticide application near salmonid streams, or coverage under an NPDES permit, if required (information is available at: http://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx).
Rule: *OAR 340-041-0033, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways, including excess pesticides and fertilizers.*

NWP 43 – Stormwater Management Facilities:

43.1) Projects that propose the following elements are denied expedited certification:
a. In-stream stormwater facilities;
b. Discharge outfalls not subject to an MS4 NPDES permit; and,
c. Proposals that do not demonstrate pollutant removal to meet water quality standards prior to discharge to waters of the state.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways; stormwater is considered a pollutant.*

43.2) To apply for certification for a project with in-stream stormwater facilities, without an NPDES permit, or without submittal of an approvable stormwater management plan per DEQ's Guidelines (at: http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf), the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways; stormwater is considered a pollutant.*

NWP 44 – Mining Activities:

44.1) Projects that do not obtain an NPDES 700-PM or Individual permit are denied expedited certification.
Rule: *OAR 340-045-0033, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways. Excess turbidity can be considered pollution.*

44.2) To apply for certification for a project without an NPDES permit, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways.*

44.3) The State of Oregon requires an In-Water Blasting Permit be obtained per OAR, 635-425-0000. Permittee is advised to contact the nearest ODFW office for further information at: https://www.dfw.state.or.us/lands/inwater/
Rule: *OAR 340-041-0011*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

NWP 51 – Land-Based Renewable Energy Generation Facilities:

51.1) For associated utility lines with directionally-bored stream or wetland crossings proposed, condition D.1 must be applied.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways*

NWP 53 – Removal of Low-Head Dams:

53.1) Projects that do *not* go through a PSET review if sediments are being dispersed are denied certification.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Sediments can be a carrier of contaminants.*

53.2) To apply for certification for a project without a PSET, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Sediments can be a carrier of contaminants.*

NWP 54 – Living Shorelines:

54.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion in the system.*

NWP 58 – Utility Lines:

58.1) For proposals that include directionally-bored stream or wetland crossings:

a. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, must be completely isolated, recovered, then recycled or disposed of to prevent entry into waters of the state. Recycling using a tank instead of drill recovery/recycling pits is preferable;

b. In the event that drilling fluids enter a water of the state, the equipment operator must stop work, immediately initiate containment measures and report the spill to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

c. An adequate supply of materials needed to control erosion and to contain drilling fluids must be maintained at the project construction site and deployed as necessary.

d. The Applicant must have a contingency plan in place prior to construction for the inadvertent return of drilling lubricant.

Rule: *OAR 340-142-0030, OAR 340-142-0040(1)*
Justification: *Drilling equipment and fluids that enter a waterbody would likely cause contamination of that waterbody.*

58.2) For proposals that include utility lines through wetlands, include anti-seep collars or equivalent technology to prevent draining the wetlands.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways*

If the Applicant is dissatisfied with the conditions contained in this certification, a hearing may be requested. Such request must be made in writing to DEQ's Office of Compliance and Enforcement at 700 NE Multnomah St, Suite 600, Portland Oregon 97232, within 20 days of the mailing of this certification.

The DEQ hereby certifies that this project complies with the Clean Water Act and state rules, with the above conditions. If you have any questions, please contact Delia Negru, at 503-593-2493, by email at delia.negru@deq.oregon.gov, or at the address on this letterhead.

Sincerely,

Theresa Burcsu,
Water Quality Manager
Northwest Region

ec: Danielle Erb, USACE
Richard Fitzgerald, DSL
Kai Steimle, Kleinschmidt Associates

State of Oregon
DEQ Department of Environmental Quality

401 Water Quality Certification Turbidity Monitoring Report

Project Name:	USACE Project #	DSL Project #

Name of Inspector(s):	Turbidimeter Model:	Calibration Standard Type (Circle One) Formazin Solution or Gelex	Calibration Standard Expiration Date:

Sampling Date:	Calibration Values:	*Upstream (Background) Point Location:	*Downstream (Compliance) Point Location:
	_____NTU (Standard) = _____NTU (Reading) _____NTU (Standard) = _____NTU (Reading) _____NTU (Standard) = _____NTU (Reading)	Latitude: Longitude:	Latitude: Longitude:

In-Water Work Start Time:	In-Water Work End Time:	Description of In-Water Work:

Upstream Sample		Downstream Sample		Change in Turbidity (NTU)	Observation of waterbody		NOTES (Describe any modifications made to BMPs)
Time	Turbidity (NTU)	Time	Turbidity (NTU)		Tidal Stage	Note any plume, sheen, floatables, color	

401 Water Quality Certification Turbidity Monitoring Report

** Include a figure with the turbidity sampling forms showing the sampling locations.*

Turbidity: The Applicant must implement appropriate Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidity is prohibited except as specifically provided below:

MONITORING WITH A TURBIDIMETER *EVERY 2 HOURS*	
TURBIDITY LEVEL	***Restrictions to Duration of Activity***
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

Monitoring: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted, including while dewatering or work area isolation measures are in place. A properly calibrated turbidimeter is required unless another monitoring method is proposed and authorized by DEQ.

Representative Background Point: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet upcurrent of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.

Compliance Point: The must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

Compliance: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the turbidity water quality standard are allowed as shown in the monitoring table shown here.

Reporting: The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs, kept on file for the duration of the permit cycle. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request.

BMPs to Minimize In-stream Turbidity: The Applicant must implement the following BMPs, unless otherwise accepted by DEQ:

i. Sequence/Phasing of Work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;
iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate;
iv. Machinery may not be driven into the flowing channel, unless authorized by DEQ; and
v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OR 97232-1274

December 15, 2025

Refer to NMFS No: WCRO-2025-00422

https://doi.org/10.25923/q0fk-1r31

Michael Erickson
Chief, Environmental Compliance Section
U.S. Army Corps of Engineers
Walla Walla District
201 North 3rd Avenue
Walla Walla, WA 99362-1876

Re: Endangered Species Act Section 7(a)(2) Condensed Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project, Columbia River (HUC 170701010206; 45.927773, -119.234564), Umatilla County, Oregon

Dear Mr. Erickson:

Thank you for your letter of February 18, 2025, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project (Project). The U.S. Corps of Engineers (Corps) proposes to issue a temporary construction license and easement to the City of Umatilla (COU) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) to construct a new pump station and pipeline. The Corps also proposes to issue a Clean Water Act Section 404 permit and Section 10 Permit. The proposed project would be located along the left side of the Columbia River (looking downstream), approximately 3.3 miles upstream of McNary Lock and Dam. Your request, including information submitted subsequent to that request, qualified for our expedited review and analysis because it met our screening criteria and contained all required information on, and analysis of, your proposed action and its potential effects to listed species and designated critical habitat.

Consultation History

The Corps submitted a consultation initiation package, including a Biological Assessment (BA) prepared by Kleinschmidt Associates (Corps 2025a), to NMFS on February 18, 2025. We reviewed the initiation package and sent an email to the Corps on February 25, 2025, requesting the engineered designs for the proposed project, which we received the same day. We also sent a request for additional information on March 6, 2025, regarding water rights and sizing of the new

facility, decommissioning of the existing pump station, project construction methodology, project operation and maintenance, and project effects. The Corps submitted the response to the additional information requested (Corps 2025b) on April 24, 2025. NMFS initiated consultation on April 24, 2025.

Multiple emails were also exchanged between NMFS and the Corps regarding clarification on the proposed blasting, water rights, and recommended project specific conservation measures, from February-September 2025. NMFS provided recommended conservation measures for blasting to the Corps on June 24, 2025, which have been accepted by the Corps. These conservation measures included:

- Consider the use of denotation delays between blasts to reduce the force of the shock wave;
- Charges shall be no larger than necessary to accomplish the task and shall be set in a manner (e.g., timing, frequency, and location) such that in-stream concussion is minimized;
- No explosive is to be detonated in or near fish habitat that produces, or is likely to produce, an instantaneous peak pressure greater than 200 decibels;
- Maintain a contingency plan for misfires and spills;
- Use of ammonium nitrate within 250 feet of a riparian area should be limited to minimize the potential for runoff and/or groundwater infiltration of ammonia or ammonia byproducts; and
- Submit a detailed description of the blasting method used, including materials, type of explosive, and sound pressures recorded.

NMFS initiated consultation on April 24, 2025, but consultation was held in abeyance for 43 days due to a lapse in appropriations and resulting government shutdown. Consultation resumed on November 13, 2025.

We reviewed the Corp's consultation request and related initiation package. Where relevant, we have adopted the information and analyses you have provided and/or referenced but only after our independent, science-based evaluation confirmed they meet our regulatory and scientific standards. In our biological opinion included below, we indicate what parts of your documents we have incorporated by reference, and where we are incorporating that information.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the ESA (89 FR 24268; 84 FR 45015). We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

Proposed Action

As described in Section 1 (Federal Action) of the BA (Corps 2025a), and additional submitted information (Corps 2025b), the Corps proposes to permit the COU and CTUIR to replace the existing CTUIR pump station and facilities with a larger pump station and associated water conveyance infrastructure and facilities. The new pump station will allow the COU and CTUIR to meet their long-term needs over the expected 75-year life of the project. Project construction includes:

1. A new pump station with a total capacity of 31.57 cubic feet per second (cfs) (Corps 2025 a, b), of which 23 cfs will be allocated to the COU (Permit S-4111) and 8.57 cfs will be allocated to the CTUIR (Water Right Certificates 90790 and 90765);
2. Two fish exclusion screens that meet NMFS guidelines, with a 25.23 cfs capacity. A third screen will be installed when water withdrawals exceed 25.23 cfs, which is expected to occur in approximately 2065;
3. A new 3,460-foot-long water pipeline to the COU Water Treatment Facility;
4. A new 4,550-foot-long water pipeline delivering up to 8.57 cfs of raw water to the 2,817-acre Wanaket Wildlife Area, managed by CTUIR;
5. Blasting upland bedrock to facilitate expansion of the parking area and construction of a new access road;
6. Expansion of the gravel parking area and concrete pads to 0.3 acres;
7. A Post-Construction Stormwater Management Plan which includes routing stormwater from the new road and parking area to a bioretention basin for treatment before discharge to the Columbia River;
8. A new 320 feet long and 28 feet wide access road; and
9. Decommissioning and removal of the existing CTUIR pump station after commissioning of the new pump station.

A temporary cofferdam comprised of sheet piles will be used to isolate the in-water work area associated with construction of the new pump station. Heavy machinery will be operated from a barge in the Columbia River and/or from a crane on shore. Best Management Practices (BMP) and conservation measures, including installation of turbidity curtains, will be employed to minimize project effects.

The Project is expected to take 18-24 months to complete. Construction was scheduled to begin in December 2025, with all in-water work and work below the ordinary high water mark (OHWM) scheduled to occur during the Oregon Department of Fish and Wildlife (ODFW) approved in-water work window of December 1-March 31. On November 19, 2025, the Corps requested an 8-week extension of the in-water work window to April-May 2026 for installation of a turbidity curtain and the cofferdam, and removal of the turbidity curtain after installation of the cofferdam. All other in-water work would still occur during the in-water work window. If project construction is delayed until December 2026, all work below the OHWM will occur December 1-March 31.

We considered, under the ESA, whether the proposed action would cause any other activities and determined that it would result in an increase in water withdrawals from the Columbia River.

BIOLOGICAL OPINION

We examined the status of each species that would be adversely affected by the proposed action to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. We also examined the condition of critical habitat throughout the designated area and discuss the function of the physical or biological features essential to the conservation of the species that create the conservation value of that habitat.

Rangewide Status of the Species and Critical Habitat

Section 2 (Federally Listed Species) of the BA includes descriptions of Upper Columbia River (UCR) spring-run Chinook salmon, Snake River (SR) spring/summer Chinook salmon, SR fall Chinook salmon, SR sockeye salmon, UCR steelhead, Snake River Basin (SRB) steelhead, and Middle Columbia River (MCR) steelhead, and their critical habitat in the action area, which is adopted here. NMFS' status of the species update for these salmon and steelhead species is available on the NOAA Fisheries website at ESA Section 7 Consultations on West Coast | NOAA Fisheries and incorporated by reference. NMFS also incorporates by reference the following 5-year reviews and recovery plans:

- 2022 5-Year Review: Summary & Evaluation of Upper Columbia River Spring-run Chinook Salmon and Upper Columbia River Steelhead (NMFS 2022a)
- 2022 5-Year Review: Summary & Evaluation of Snake River Spring/Summer Chinook Salmon (NMFS 2022b)
- 2022 5-Year Review: Summary & Evaluation of Snake River Fall-Run Chinook Salmon (NMFS 2022c)
- 2022 5-Year Review: Summary & Evaluation of Snake River Sockeye Salmon (NMFS 2022d)
- 2022 5-Year Review: Summary & Evaluation of Snake River Basin Steelhead (NMFS 2022e)
- 2022 5-Year Review: Summary & Evaluation of Middle Columbia River Steelhead (NMFS 2022f)
- Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (NMFS 2007). Recovery Plan for Upper Columbia Spring Chinook Salmon and Steelhead | NOAA Fisheries
- ESA Recovery Plan for Snake River Spring/Summer Chinook Salmon and Snake River Steelhead (2017a). Recovery Plan for Snake River Spring/Summer Chinook Salmon and Snake River Basin Steelhead | NOAA Fisheries
- ESA Recovery for Snake River Fall Chinook Salmon (NMFS 2017b). Recovery Plan for Snake River Fall Chinook Salmon | NOAA Fisheries
- ESA Recovery Plan for Snake River Sockeye Salmon (NMFS. 2015). Recovery Plan for Snake River Sockeye Salmon (Oncorhynchus nerka) | NOAA Fisheries
- Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan (NMFS 2009). Recovery Plan for Middle Columbia River Steelhead Distinct Population Segment | NOAA Fisheries

Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area includes the upstream extent of the turbidity curtain at the existing CTUIR pump station, which will be decommissioned, to 300 feet downstream of the turbidity curtain at the construction site of the new pump station, and out approximately 125 feet to the construction barge, the expected extent of turbidity plumes.

Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The impacts to listed species or designated critical habitat from federal agency activities or existing federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

The environmental baseline, and species and habitat use, are described in Section 3 of the BA (Corps 2025a), which is adopted here. In summary, the action area is located along the southern shoreline of the Columbia River at RM 296, a few miles upstream of McNary Dam within McNary Reservoir. The action area is in an impounded section of the Columbia River, with altered habitat and flow regimes caused by Columbia River hydrosystem development. The altered habitat and flow regimes create more favorable habitat conditions for invasive, non-native species that may compete with or prey upon juvenile salmonids. The shoreline is a steep bedrock bank, with riparian vegetation comprised of grasses and forbs. The substrate is bedrock with a silt/mud layer on top. The Columbia River within McNary Reservoir is 303(d) is listed for temperature, methylmercury, dioxin (2,3,7,8-TCDD), and total dissolved gas (ODEQ 2022).

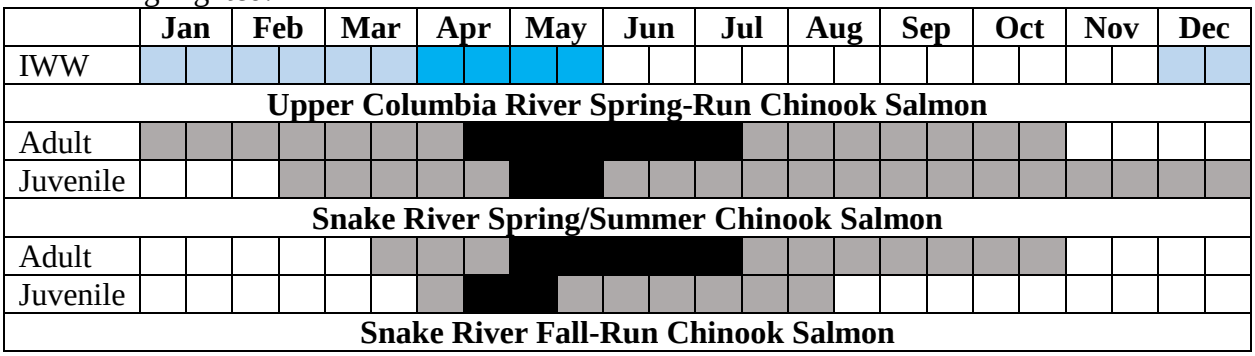
The Columbia River in the action area is designated critical habitat and supports rearing and migration of fish from all populations of the UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, and SR sockeye salmon evolutionary significant units (ESU), and the UCR steelhead and SRB steelhead distinct population segments (DPS). For the MCR steelhead, only a portion of the DPS will be affected by the action: all populations of the Yakima River major population group (MPG) and the Walla Walla population of the Umatilla/Walla Walla MPG. The action area provides physical and biological features (PBFs) of critical habitat for rearing and migration, though these persist in a largely degraded condition. The ability of critical habitat in the action area to support recovery of these seven species is primarily limited by impacts of hydropower development and operation.

Effects of the Action

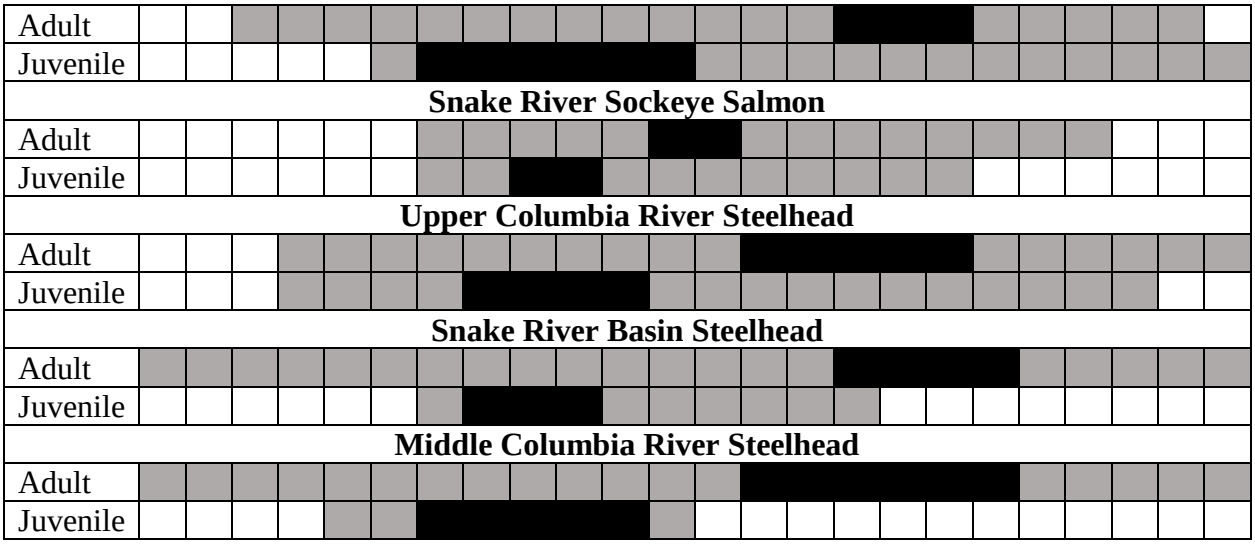
Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

Project construction is expected to take 18 to 24 months to complete. Throughout the year, different-sized species and age classes of salmon and steelhead use the action area for rearing and migration (Table 1). Within the action area, rearing of juveniles from all ESA-listed species subject to this opinion can occur year-round. Installation and removal of two turbidity curtains, removal of the cofferdam, and decommissioning of the existing pump station will occur during the ODFW in-water work window, December 1 to March 31, which avoids peak migration periods for juveniles and adults of all species covered in this opinion. Installation and removal of one turbidity curtain, and installation of the cofferdam, may occur in April-May 2026, which overlaps with adult migration of all species considered in this opinion, including peak adult migration of UCR spring-run Chinook salmon and SR spring/summer Chinook salmon. It also overlaps with peak juvenile downstream migration of all species considered in this opinion. Therefore, based on migration timing through McNary Reservoir and the potential for year-round rearing, NMFS expects: (1) large numbers of adult UCR spring-run Chinook salmon and SR spring/summer-run Chinook salmon; (2) small numbers of adult SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead; and (3) large numbers of juveniles of all these species will be present in the action area during in-water work.

Table 1. Migration timing of salmon and steelhead through the McNary Reservoir based on passive integrated transponder tag observations at McNary Dam and published reports.[1] The black boxes indicate the middle 50 percent of the run (i.e., peak of the run) and the grey boxes indicate presence at McNary Dam. Months are in chronological order, abbreviated to their first three letters, and divided into days 1-15 and 1-30 or 31. The Oregon Department of Fish and Wildlife in-water work window (IWW), December-March, and the extended IWW (April-May) for some project components, is also highlighted.



[1] Table derived from data reviewed on DART (DART PIT Tag Observations by Observation Site Graphics & Text | Columbia Basin Research, June 2025.



Effects on Species

An assessment of the effects of the proposed action is provided in Section 4 of the BA (Corps 2025a), and additional information submitted April 24, 2025 (Corps 2025b), and adopted here (50 CFR 402.14(h)(3)). The temporary and long-term effects of this proposed action on ESA-listed salmon and steelhead species as identified by the Corps in the BA and the additional submitted information, are:

1. **Water Quality, Turbidity** - Short-term, localized increases in background turbidity levels will likely occur as a result of cofferdam installation and removal, and during the removal of the intake screens associated with the existing pump station. These increases in turbidity can trigger avoidance behaviors, disrupt visual feeding, and alter predator avoidance behaviors (Bash et al. 2001).

2. **Water Quality, Chemical Contamination** - Accidental spills of construction materials or petroleum products through operation of heavy equipment could adversely affect water quality and potentially affect ESA-listed species.

3. **Entrainment** – Entrainment of juvenile ESA-listed fish species within the temporary cofferdam.

4. **Overwater Structure** - The presence of a 750-square-foot barge for up to 18 months may indirectly effect ESA-listed fish species by increasing the area of over-water structure; resulting in potential impact to fish passage and providing additional refuge for salmonid predators.

NMFS has evaluated the effects section in the BA and additional submitted information, and after our independent, science-based evaluation, determined that the additional information and analysis provided below is needed to complete our effects on species analysis.

Work Area Isolation and Fish Salvage. Work area isolation will include installation of a

turbidity curtain, installation of a cofferdam within the turbidity curtain, fish salvage within the cofferdam conducted using NMFS electrofishing guidelines (NMFS 2000), and dewatering of the cofferdam. The turbidity curtain will be removed once the cofferdam is installed. Installation of the coffer dam, and associated installation and removal of one turbidity curtain, will occur April-May 2026, or during the December 1, 2026-March 31, 2027, in-water work window. NMFS estimates that up to 4,100 square feet of the Columbia River will be isolated, salvaged, and dewatered. We expect that the in-water disturbance associated with installation of the turbidity curtain and cofferdam will result in avoidance and/or fleeing of the area by all adult and most juvenile salmon and steelhead. Juvenile salmon and steelhead that do not flee the area may become trapped in the cofferdam, necessitating fish salvage. Fish salvage, including electrofishing, netting, capture, and handling can injure fish and can increase stress, resulting in harm or death to some individuals. We expect that a small number of juvenile salmon and steelhead will be trapped in the cofferdam, and most to be captured and released unharmed during fish salvage. However, we also expect that a very small number of the fish captured will be injured or killed; and a very small number of fish may not be captured and could end up stranded and killed during dewatering. We expect the injured and dead fish to be distributed across multiple populations, MPGs, ESUs, and DPSs. Therefore, NMFS expects a very small number of juvenile salmon and steelhead from all ESUs and DPSs covered in this opinion will be injured or killed during fish salvage and dewatering of the in-water work area.

Water Quality, Turbidity. The proposed action will affect water quality during installation and removal of turbidity curtains, movement of the tug and barge, and blasting of upland rock by temporarily increasing sediment delivery to the Columbia River and turbidity in the water column. Increased fine sediment can be detrimental to juvenile salmon and steelhead in several ways including avoidance of the area, abandonment of cover, stress, and reduced growth rates (Newcombe and Jensen 1996). Turbidity from increased fine sediment may disrupt steelhead feeding and territorial behavior, and may displace fish from preferred feeding and resting areas. It can also delay adult migration to spawning habitat. Direct mortality can occur at very high concentrations or extended exposure to suspended solids. The severity of effect of suspended sediment increases as a function of the sediment concentration and exposure time (Bash et al. 2001; Newcombe and Jensen 1996).

Erosion control and stormwater containment BMPs will be installed and monitored daily to minimize project construction effects. Turbidity curtains will be installed to isolate and contain construction-related increases in turbidity, including: (1) around the cofferdam being installed, isolating 4,100 square feet, for 60 days; (2) around the cofferdam when being removed, isolating 4,100 square feet, for 30 days; and (3) around the existing pump station removal area, isolating 893 square feet, for 30 days. All other construction for the new pump station below the OHWM will occur in the dry within the dewatered cofferdam. Heavy machinery will be operated from a barge anchored in the Columbia River or from the streambank to construct the new, and to remove the old, pump stations.

We expect adults and most juveniles holding or rearing nearby will be disturbed by installation of the turbidity curtains and flee the area. However, we do expect that a very small number of juvenile salmon and steelhead will be trapped inside the turbidity curtains based on the area isolated, size and life history of salmon and steelhead in the action area, use of the Columbia

River in the action area for rearing and migration, and the timing of curtain installation. Installation of two of the three turbidity curtains will occur during the in-water work window, which is outside of peak migration periods for adults and juveniles of all species covered by this opinion (Table 1). However, installation of one turbidity curtain may occur April-May 2026, during peak juvenile downstream migration. Adults and larger juveniles are generally better at avoiding disturbance. However, a few smaller fish, which are less likely to avoid construction activities, may be trapped in turbidity curtains. Juvenile salmon and steelhead trapped in turbidity curtains are likely to experience physical and behavioral effects from reduced water quality caused by increased turbidity, including: reduced feeding, growth, and fitness; and they may also be injured or killed. We expect there will only be a very small number of fish trapped. We also expect the injured and dead fish to be distributed across multiple populations, MPGs, ESUs, and DPSs. Therefore, we expect a very small number of juvenile fish from all ESUs and DPSs covered in this opinion may experience reduced feeding, growth, and fitness; or be injured or killed from being trapped in up to 4,100 square feet of turbidity curtain for 60 days during installation of the cofferdam, 4,100 square feet for 30 days during removal of the cofferdam, and in up to 893 square feet for 30 days during removal of the existing pump station.

The channel substrate in the action area is primarily bedrock with a thin silt/mud layer on top. Therefore, we also expect that each installation and removal of turbidity curtains will intermittently result in resuspension of sediment and turbidity plumes that will last for several minutes to a few hours and extend up to 300 feet downstream. We also expect that upland blasting, which will occur November-March approximately 15 feet from the OHWM, will result in ground vibrations large enough to shake loose dirt and rock particles from the streambank, leading to increased turbidity up to 300 feet downstream for several minutes to a few hours. We expect adults will flee the area and avoid the turbidity plumes, which will not result in harm. We also expect that most juveniles will flee the area of higher turbidity, which will result in predation of a small number of salmon and steelhead distributed across multiple populations, MPGs, ESUs, and DPSs because: (1) installation of one turbidity curtain may occur during peak juvenile downstream migration, (2) the action area lacks suitable cover for juvenile salmon and steelhead, and (3) the large number of piscivorous fish in McNary Reservoir. Juveniles that do not flee may exhibit reduced feeding for a few hours. This is not expected to reduce their fitness over the long-term.

The contractor will use a barge mounted crane, anchored 125 feet or less from shore, for installation and removal of the cofferdam, and possibly for pump station construction. If the contractor elects to use a barge mounted crane for project construction, the barge would be on site for up to 18-months. Delivery and removal of the barge to the project construction site will occur using a tug, that will not remain on site. We expect intermittent tug and barge movements will suspend sediment and create small turbidity plumes in the Columbia River. We expect the turbidity plumes to last several minutes to a few hours and be carried 300 feet downstream. Therefore, we expect that the pulses of turbidity generated during tug and barge movements will cause short term (several minutes to a few hours) behavioral changes to a small number of adult and juveniles from all ESUs and DPSs within 300 feet downstream, for up to 18 months. We expect adults and some juveniles will flee the area of higher turbidity, which will increase juvenile predation (Berg and Northcote 1985). We expect juvenile predation to be distributed across multiple populations, MPGs, ESUs, and DPSs. Therefore, we expect predation of a very

small number of juvenile fish from all ESUs and DPSs covered in this opinion. Juveniles that do not flee may exhibit reduced feeding for a few hours. This is not expected to reduce their fitness over the long-term. We expect adults to continue their migration and not be harmed or killed by increased turbidity.

Chemical Contamination. Additional impairment of water quality may result from accidental releases of fuel, oil, and other contaminants that can injure or kill aquatic organisms. Petroleum-based contaminants, such as fuel, oil, and some hydraulic fluids, contain polycyclic aromatic hydrocarbons (PAHs), which can kill salmon at high levels of exposure, and can cause sublethal, adverse effects at lower concentrations (Meador et al. 2006). Therefore, spills that make their way into the Columbia River could harm fish. The operation of equipment and heavy machinery will occur from the streambank and a barge. NMFS anticipates that only very small quantities (ounces) of PAHs are likely with each accidental release or spill. In addition, BMPs will be implemented to prevent or contain any spill that may occur (e.g., staging and fueling equipment in a protected location, using bio-degradable hydraulic fluid, and emergency spill response kit available onsite). These should minimize the risk of a spill and opportunity for contaminants to enter the waterway and affect salmon and steelhead. If a spill does occur, we expect containment will occur quickly with emergency spill kits located on site, and conservation measures will minimize its dispersal, limiting exposure and related impacts on adult and juvenile salmon and steelhead. For these reasons, NMFS does not expect any fish to be injured or killed by exposure to accidental releases of fuel, oil, and other contaminants caused by this action.

Blasting. Blasting will be required for upland rock excavation in the parking area and the access road to the pump station, an area of approximately 21,168 square feet (Figure B of Corps 2025b). Blasting will only be permitted between November and March and will occur approximately 15 feet from the Columbia River. Explosives detonated near water produce shock waves that may be lethal or damaging to fish, fish eggs, or other aquatic organisms. Outside of the zone of lethal or harmful shock waves, the vibrations caused by blasting have the potential to disturb fish, causing stress or altering their behavior (Wright and Hopkey 1998; Aimone-Martin and Kolden 2019).

A blasting plan will be developed by the construction contractor for review and approval by the Environmental Protection Agency, Oregon Department of Environmental Quality, and the COU. As previously mentioned, blasting will occur above, and 15 feet or more from, the OHWM. Therefore, NMFS does not believe that blasting will result in instantaneous injury or death of juvenile or adult salmon or steelhead. However, the blasting may cause vibrations that disturb fish, causing stress or altering behavior. Blasting will occur outside peak migration periods for adults and juveniles of all species covered by this opinion. However, juveniles of all species covered in this opinion may be rearing in the action area, and adults of all species may be holding or migrating through the action area, during blasting. Therefore, NMFS believes blasting will cause a very small number of adult and juvenile salmon and steelhead to alter their behavior and flee the area of blasting. We do not expect fleeing will harm adults. We do, however, expect fleeing to result in predation of a very small number of juveniles distributed across multiple populations, MPGs, ESUs, and DPSs, because of the lack of available cover and the large number of piscivorous predators in McKay Reservoir. Therefore, we expect blasting to result in predation of a very small number of juvenile fish from all ESUs and DPSs covered in this

opinion.

Overwater and In-water Structures and Predation. The contractor will use a 7,500 square foot barge, anchored 125 feet or less from shore, for project construction. A stationary barge moored in shallow water can act much like a dock in blocking light and providing a haven for predatory fish such as smallmouth bass and northern pikeminnow, which prey on juvenile salmonids in the Columbia River system (Vigg et al. 1991; Tabor et al. 2004; Zimmerman and Ward 1999; Fritts and Pearsons 2004). The shaded area can increase a predator's capture efficiency of prey. In general, predation on juvenile salmonids increases as light intensity decreases (Petersen and Gadomski 1994; Tabor et al. 1998). The barge will be located in an area used by juvenile salmon and steelhead for feeding, resting, and growth during rearing and downstream migration (Mains and Smith 1964; Dauble et al. 1989; Beeman and Maule 2006; Chapman 2007; Timko et al. 2011). The barge and associated shade may be on site for up to 18 months, and overlap with peak downstream migration of juvenile fish from all species covered by this opinion. Therefore, we expect a large number of juvenile salmon and steelhead will experience behavior modifications (e.g., altered migration, avoidance) from presence of the 7,500 square foot barge for 18 months, that may cause injury or death to a small number of juveniles from predation. We expect juvenile predation to be distributed across multiple populations, MPGs, ESUs, and DPSs.

The presence of turbidity curtains and the cofferdam will alter migratory behavior, with juveniles and adults swimming around these artificial structures. We do not expect the presence of turbidity curtains or the cofferdam to delay or prevent upstream or downstream migration. However, we expect swimming around the cofferdam and the turbidity curtains around the cofferdam will increase juvenile predation, because of: (1) the use of shoreline habitat by migratory salmon and steelhead, (2) the lack of suitable cover for juvenile salmon and steelhead, (3) the presence of the barge within 20 feet of the cofferdam, (4) the use of barges as cover by predatory fish, and (5) the large number of piscivorous fish in McNary Reservoir. Therefore, we expect a very large number of juvenile salmon and steelhead will alter their migration from presence of turbidity curtains and the cofferdam for 18 months, that will result in predation of a small number of juveniles. We expect juvenile predation to be distributed across multiple populations, MPGs, ESUs, and DPSs. Therefore, we expect predation of a small number of juvenile fish from all ESUs and DPSs covered in this opinion from the presence of overwater and in-water structures for up to 18 months.

Intake Impingement During Project Operation. The potential for injury or mortality to juvenile salmonids from impingement at the fish screens associated with the water intake structures depends on multiple factors. These include: (1) the species and life stages of fish present, (2) the number of fish present in the intake vicinity, (3) the location and depth of the intake and screen structures within the river, (4) water velocities approaching and sweeping over the screens, (5) the design and orientation of the screens, and (6) maintenance features to keep the screen openings clear of debris.

The new pump station will include a brush-cleaned, retrievable, cylindrical screen system intake. The fish exclusion screen system will consist of two complete screen, track, and control systems, and one track for future installation of a third screen. A third screen will be installed when the water withdrawals exceed the 25.23 cfs capacity of the first two screens. Each screen will be

approximately 36 inches in diameter and 48 inches in length, and located about 11 feet below the OHWM (6 feet below the normal minimum water level). The screens will meet NMFS guidelines (NMFS 2023), and the COU will conduct weekly visual inspections of the pump station and screens, and regular maintenance. Screens that are designed, operated, and maintained in a manner that is consistent with the NMFS guidelines (NMFS 2023) are expected to minimize the potential to impinge juvenile fish.

Shallow-water habitat along shorelines is important to juvenile salmonid survival and for resting and foraging during their migration to the ocean. Juvenile salmon and steelhead of different sizes have different behavior and different distribution in McNary Reservoir and are present in considerable numbers over the entire width and depth of the reservoir. In studies conducted by Mains and Smith (1956), Dauble and Watson (1990), and Marshall et al. (2000) most subyearling (fall and spring) Chinook salmon in McNary Reservoir and the lower Snake River were documented within 100 feet of shore in water 19 feet deep, or less. Yearling Chinook salmon and sockeye salmon primarily used deeper water, though 7 and 3 percent, respectively, were caught within 100 feet of shore in water 19 feet deep, or less (Dauble and Watson 1990).

Although the screens will meet NMFS guidelines, the screens will be located near the shoreline in shallow water where adult and juvenile salmonid holding, rearing, and migration occur. We expect adult salmonids and most juvenile salmonids in the vicinity of the intake screens will volitionally swim away from the area and avoid injury or death from impingement. However, we expect some smaller juvenile fish, which are more vulnerable to impingement at the fish screens, may be injured or killed annually. Therefore, we expect a very small number of juvenile salmonids, distributed across multiple populations, MPGs, ESUs, and DPSs to be injured or killed annually by impingement on the intake screens. Therefore, we expect impingement of a small number of juvenile fish from all ESUs and DPSs covered in this opinion annually.

Water Withdrawal. The Corps' permit will allow the additional reduction of Columbia River flow by up to 23 cfs daily, the amount allocated to the COU (Permit S-4111). We reviewed daily average discharge of Columbia River flows at McNary Dam from 2015 through 2024 (Columbia Basin data access in real time, Columbia Basin Research: https://www.cbr.washington.edu/dart/query/river_graph_text), Columbia River DART – 9/24/2025). The average annual inflow was 163.87 thousand cubic feet per second (kcfs). The lowest daily average during this period was 77.94 kcfs. An additional withdrawal of 23 cfs would reduce daily average annual flow by .014 percent, and the daily average low flow by .0295 percent. It is unlikely that flows in McKay Reservoir and below McKay Dam will be meaningfully affected by withdrawal of 23 cfs. Therefore, we believe that this small change in flow will not be meaningfully detected by the juvenile and adult salmonids migrating through or rearing in this reach of the Columbia River.

Effects on Critical Habitat

The potential negative effects to PBFs of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead critical habitat identified by the Corps are:

1. **Water Quality, Turbidity –** Short-term, localized increases in background turbidity as a result of installation and removal of the temporary cofferdam, movement of the barge, and removal of the intake screens associated with the existing pump station.

2. **Water Quality, Chemical Contamination** - Accidental spills of construction materials or petroleum products could adversely affect water quality.

3. **Substrate** - Minor degradation of approximately 1,188 square feet (0.027 acre) of substrate below the OHWM, the footprint of the new pump station.

4. **Safe Passage** - The presence of a barge for up to 18 months may indirectly affect juvenile ESA-listed fish species by increasing the area of over-water structure, and providing additional refuge for salmonid predators, resulting in potential impact to fish passage.

NMFS has evaluated the effects section in the BA and additional submitted information, and after our independent, science-based evaluation, determined that the additional information and analysis provided below is needed to complete our effects on critical habitat analysis.

Water Quality. NMFS expects minor leaks and spills of petroleum-based fluids from operation of equipment in and adjacent to the Columbia River for up to 24 months, that will be contained on site due to the implementation of the proposed BMPs (Section 1.7 of Corps 2025a; Corps 2025b). The proposed action will also have short-term negative effects on water quality by increasing suspended sediment and turbidity during installation and removal of the turbidity curtains, tug and barge movements, and blasting. Increases in turbidity are expected to last a few minutes to a few hours and disperse up to 300 feet downstream. Therefore, NMFS expects a small, negative effect to the water quality PBF during project construction.

Water Quantity. The Corps' permit will allow the additional reduction of Columbia River flow by up to 23 cfs daily. An additional withdrawal of 23 cfs would reduce daily average annual flow of 163.87 kcfs by .014 percent, and the daily average low flow of 77.94 kcf by .0295 percent. Therefore, we expect a minimal effect to the water quantity PBF.

Substrate. The new pump station will encompass approximately 1,188 square feet (0.027 acre) below the OHWM (Figure 10 in Corps 2025 C). Construction of the new pump house also requires the removal of 221 cubic yards of rock and soil material along the shoreline. Therefore, NMFS expects a very small permanent negative effect to the substrate PBF. NMFS also expects a very small (4,100 square feet) temporary impact to the substrate PBF from installation of the cofferdam, and dewatering the in-water work area within the cofferdam. Once construction of the new pump station is complete, the cofferdam will be removed.

NMFS expects a very small permanent benefit to the substrate PBF from decommissioning of the existing pump station, through removing intake pipes and screens in approximately 216 square feet, and from removing approximately 16 cubic yards of concrete and soil fill below the OHWM.

Forage. NMFS expects a small, temporary negative effect on the forage PBF in 4,100 square feet from installation of the cofferdam, and dewatering in the cofferdam. Terrestrial

macroinvertebrate inputs and invertebrate drift will continue to contribute to salmonid forage, and will also recolonize disturbed substrate once project construction is complete. We expect recolonization to occur within a few days to a few months after removal of the cofferdam (Fowler 2004; Griffith and Andrews 1981; Yount and Nemi 1990). The cofferdam will be installed for 18 months. Given the small area of temporary impacts, and the supply of forage from terrestrial inputs and invertebrate drift, NMFS expects this project to have a small, short-term (18 months) negative effect on the forage PBF from installation of the cofferdam, and dewatering within the cofferdam.

NMFS also expects the proposed action will have a permanent negative effect on the forage PBF through construction of the new pump station concrete foundation within 1,188 square feet of the streambed. However, NMFS expects a very small permanent benefit to the forage PBF from decommissioning of the existing pump station, through removing intake pipes and screens in approximately 216 square feet, and from removing approximately 16 cubic yards of concrete and soil fill below the OHWM.

Free of Artificial Obstruction and Safe Passage. The proposed action will have a very small effect on the free of artificial obstruction PBF for up to 24 months, through installation of turbidity curtains and the cofferdam to isolate 4,933 square feet of in-water work area.

The proposed action will result in installation of a fish exclusion screen system consisting of three screen, track, and control systems approximately 11 feet below the OHWM. Salmon and steelhead migrate through the area as adults and juveniles. The new structures will alter the quality of the migratory habitat in the nearshore for all salmon and steelhead that use this area for rearing, foraging, or migrating. However, adults and most juveniles will be able to swim over and around the screen assemblies and the effects on the free of artificial obstruction PBF are expected to be small.

Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future federal actions that are unrelated to the proposed action is not considered in this section because they require separate consultation pursuant to section 7 of the ESA. NMFS is not aware of any future non-Federal activities within the action area that could adversely affect UCR spring-run Chinook salmon, SR spring/summer Chinook, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, MCR steelhead, or their critical habitat. Therefore, NMFS expects the cumulative effects of future state and private activities will continue to have a negative effect on ESA-listed salmon and steelhead and their critical habitat subject to this opinion.

Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action to the environmental baseline and the cumulative effects, taking into

account the status of the species and critical habitat, to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

The Corps proposes to permit the COU to replace the existing CTUIR pump station and facilities with a larger pump station and associated water conveyance infrastructure and facilities. The action area includes the upstream extent of the turbidity curtain at the existing CTUIR pump station, which will be decommissioned, to 300 feet downstream of the turbidity curtain at the construction site of the new pump station, and out approximately 125 feet to the construction barge, the expected extent of turbidity plumes.

The action area is in an impounded section of the Columbia River, with altered habitat and flow regimes caused by Columbia River hydrosystem development. The altered habitat and flow regimes create more favorable habitat conditions for invasive, non-native species that may compete with or prey upon juvenile salmonids. NMFS expects the cumulative effects of future state and private activities will continue to have a negative effect on ESA-listed salmon and steelhead and their critical habitat subject to this opinion.

Species

Adults and juveniles from all populations of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, and SRB steelhead; all populations of the Yakima River MPG of MCR steelhead; and the Walla Walla population of the Umatilla/Walla Walla MPG of MCR steelhead use the action area as a migration corridor. Juveniles of these populations also rear in the action area, and adult steelhead may over-winter in the action area.

NMFS recently reaffirmed that UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead have not achieved viable status and are at a continuing risk of extinction. Major threats include, but are not limited to, regulation of the Columbia River and impairment of tributary habitat. Upper Columbia River spring-run Chinook salmon and SR sockeye salmon are listed as endangered, and SR spring/summer Chinook salmon, SR fall-run Chinook salmon, UCR steelhead, SRB steelhead, and MCR steelhead are listed as threatened under the ESA. All populations of UCR spring-run Chinook salmon, SR sockeye salmon, and UCR steelhead remain at high risk. While some populations of the other four species are viable, most populations within these ESUs and DPSs remain at moderate or high risk (Ford 2022).

The proposed action is expected to result in harm, harassment, injury, or death of juveniles from all populations of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, and SRB steelhead; all populations of the Yakima River MPG of MCR steelhead; and the Walla Walla population of the Umatilla/Walla Walla MPG of MCR steelhead within the action area from:

1. Injury, and death of a very small number of juvenile salmon and steelhead through fish salvage and dewatering in the cofferdam (4,100 square feet). The injured and dead fish will be distributed across multiple populations, MPGs, ESUs, and DPSs.

2. Reduced feeding, growth, and fitness; injury; and death of a very small number of juvenile salmon and steelhead through being trapped in turbidity curtains in up to 4,100 square feet for 60 days during installation of the cofferdam, in 4,100 square feet for 30 days during removal of the cofferdam, and in up to 893 square feet for 30 days during removal of the existing pump station. The injured and dead fish will be distributed across multiple populations, MPGs, ESUs, and DPSs.

3. Intermittent changes of behavior and fleeing of a small number of juvenile salmon and steelhead within 300 feet of installation and removal of turbidity curtains, tug and barge movements, and blasting due to intermittent and short-term (several minutes to a few hours) increases in turbidity, resulting in predation of a small number of juveniles. The injured and dead fish will be distributed across multiple populations, MPGs, ESUs, and DPSs.

4. Intermittent changes of behavior and fleeing of a very small number of juvenile salmon and steelhead during upland blasting, which will result in predation of a very small number of juveniles distributed across multiple populations, MPGs, ESUs, and DPSs.

5. Behavior modifications (e.g., altered migration, avoidance) and predation of a small number of juvenile salmon and steelhead through the presence of overwater (barge) and in-water (turbidity curtains and cofferdam) structures. The injured and dead fish will be distributed across multiple populations, MPGs, ESUs, and DPSs.

6. Injury and death of a very small number of juvenile salmonids annually through impingement on the screens. The injured and dead fish will be distributed across multiple populations, MPGs, ESUs, and DPSs.

NMFS has determined that the loss of a small number of juvenile salmon and steelhead during project construction and removal, and a very small number annually through impingement on the intake screens, is not substantial enough to appreciably alter the abundance, productivity, spatial structure, or diversity of any populations of the ESA-listed species subject to this opinion. Because the viable salmonid population criteria for all population will be maintained, we do not expect a change in the status of any MPGs as a consequence of the proposed action. Thus, it is NMFS' opinion that when the effects of the action and cumulative effects are added to the environmental baseline, and in light of the status of the species, the effects of the action will not cause reductions in reproduction, numbers, or distribution that would reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead.

Critical Habitat

Critical habitat in the action area is degraded due to the Columbia River System dams and reservoirs that have altered habitat and flow regimes, and create more favorable habitat conditions for invasive, non-native species that may compete with or prey upon juvenile salmonids.

The proposed action will reduce the function of critical habitat PBFs in the action area for:

1. Water quality through intermittent and short-term (several minutes to a few hours) increases in turbidity through installation and removal of turbidity curtains, tug and barge movements, and blasting.

2. Water quality through chemical contamination from minor leaks and spills of petroleum-based fluids (not more than ounces) from operation of heavy equipment for up to 24 months, that will be contained on site due to the implementation of the proposed BMPs.

3. Water quantity through the reduction of Columbia River flow by up to 23 cfs. The withdrawal of 23 cfs would reduce daily average annual flow by .014 percent, and the daily average low flow by .0295 percent.

4. Temporary loss of 4,100 square feet of substrate from installation, and dewatering within, the cofferdam.

5. Permanent loss of approximately 1,188 square feet (0.027 acre) of substrate below the OHWM, the footprint of the new pump station.

6. Forage in 4,100 square feet through installation of the cofferdam, and dewatering in the cofferdam, for approximately 18 months. We expect recolonization within a few months after removal of the cofferdam.

7. Permanent loss of forage in 1,188 square feet through construction of the new pump station's concrete foundation.

8. Temporary (up to 24 months) impact to free of artificial obstruction from installation of three turbidity curtains and the cofferdam to isolate 4,993 square feet of in-water work area.

9. Permanent impact to free of artificial obstruction from installation of three intake pipes and screens.

The proposed action will provide long-term benefits to the function of critical habitat PBFs in the action area for:

1. Substrate and forage through removing intake pipes and screens in approximately 216 square feet at the existing pump station and removing approximately 16 cubic yards of concrete and soil fill below the OHWM.

Based on our analysis that considers the current status of PBFs, adverse effects from the proposed action will cause intermittent, temporary, and localized declines in the quality and function of the water quality, water quantity, substrate, forage, and free of artificial obstruction PBFs. We also expect the proposed action to result in permanent improvements to the substrate and forage PBFs. Because of the small scale and extent of the effects to PBFs, we do not expect a reduction in the conservation value of critical habitat in the action area. As we scale up from the action area to the designation area of critical habitat for UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead, the proposed action is not expected to appreciably reduce the conservation value of the designated critical habitat.

Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead, or destroy or adversely modify their designated critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Harass" is further defined by guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this incidental take statement (ITS).

Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take of juveniles from all populations of UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, and SRB steelhead; all populations of the Yakima River MPG of MCR steelhead; and the Walla Walla population of the Umatilla/Walla Walla MPG of MCR steelhead is reasonably certain to occur as follows:

Incidental Take due to Work Area Isolation and Fish Salvage

NMFS anticipates the proposed action will result in capture, injury, or death of juveniles from all these populations as a result of fish salvage and dewatering within the 4,100 square foot isolated work area. It is not possible to determine the number of fish injured and killed by fish salvage and dewatering because of the range of responses that individual fish will have, and because the numbers of fish present at any time is highly variable. Therefore, NMFS uses a surrogate for incidental take caused by fish salvage. The surrogate is the areal extent of fish salvage. The surrogate is causally linked to the take pathways because the scale of the effect is related to the area of fish salvage. Thus, the extent of take will be exceeded if fish salvage and dewatering occur in more than 4,100 square feet. While this surrogate is coextensive with the proposed action, it functions as an effective reinitiation trigger because the area of fish salvage and dewatering can easily be monitored, and the Corps is obligated to notify NMFS and stop all activities if the extent of take is exceeded.

Incidental Take Due to Being Trapped in Turbidity Curtains

NMFS anticipates the proposed action will injure or kill juvenile salmon and steelhead from all these populations by trapping them in floating turbidity curtains for up to 60 days. Injury will be manifested in physical and behavioral effects, including reduced feeding, growth, and fitness. It is not possible to determine the number of fish injured or killed by being trapped in turbidity curtains. Therefore, NMFS uses a surrogate for incidental take caused by being trapped in turbidity curtains. The surrogate is the duration turbidity curtains are installed. The surrogate is causally linked to the take pathways because the scale of the effect is related to the duration fish are trapped. Thus, the extent of take will be exceeded if any turbidity curtain is installed for more than 60 days.

Incidental Take due to Turbidity

NMFS anticipates the proposed action will result in injury or death of juvenile salmon and steelhead from all these populations by increasing turbidity through installation and removal of three turbidity curtains, tug and barge movements, and blasting. Injury caused by the temporary increases in turbidity will be manifested in altered behaviors, including avoidance of the area, and increased risk of predation. Death will occur from predation. We expect turbidity plumes to occur no further than 300 feet downstream, and persist for no more than several minutes to a few hours. It is not possible to determine the number of fish injured or killed by the turbidity plumes because of the range of responses that individual fish will have, and because the numbers of fish present at any time is highly variable. Therefore, NMFS uses a surrogate for incidental take caused by the turbidity. The surrogate is the areal extent of the turbidity plume. The surrogate is causally linked to the take pathways because the scale of the effect is related to the size of the turbidity plume. Thus, the extent of take will be exceeded if turbidity plumes occur further than 300 feet downstream from the location of turbidity curtain installation and removal, barge movements, and blasting. While this surrogate is coextensive with the proposed action, it functions as an effective reinitiation trigger because turbidity plumes will be monitored and reported daily, and the Corps is obligated to notify NMFS and stop all activities if the extent of

take is exceeded.

Incidental Take Due to Upland Blasting

NMFS expects the proposed action will result in injury or death of juvenile salmon and steelhead from all these populations through upland blasting. Injury will be manifested in altered behaviors including avoidance of the area, abandonment of cover, and increased risk of predation. Death will occur from predation. We expect blasting to occur November-March, 15 feet or more from the Columbia River. It is not possible to determine the number of fish injured or killed by the blasting because of the range of responses that individual fish will have, and because the numbers of fish present at any time is highly variable. Therefore, NMFS uses a surrogate for incidental take caused by the blasting. The surrogates are the dates and locations of blasting. The surrogates are causally linked to the take pathways because the scale of the effect is related to the date blasting occurs relative to peak migration timeframes, and the location of the blast relative to where fish are holding, rearing, and migrating. The closer to peak migration timeframes and the closer to the Columbia River the greater the opportunity for negative effects. Thus, the extent of take will be exceeded if blasting occurs outside November-March, and if blasting occurs closer than 15 feet to the Columbia River.

Incidental Take from Increased Predation through the Presence of Overwater and In-water Structures

NMFS expects the proposed action will result in injury or death to juvenile salmon and steelhead from all these populations through the presence of temporary overwater (barge) and in-water (turbidity curtains and the cofferdam) structures. Injury will be manifested in altered behavior and an increased risk of predation. Death will occur from predation. It is not possible to determine the number of fish injured or killed by the presence of temporary overwater and in-water structures. Therefore, NMFS uses surrogates for incidental take. The surrogates are causally linked to the take pathways because, for in-water and over-water structures, the risk of predation increases with the amount/size of in-water and overwater structures and the duration of structure presence. Larger structures are expected to harbor more predators and the longer the structures are present and harboring predators, the more opportunity there is for interaction of juvenile salmon and steelhead with the predators.

The best available indicators to measure the extent of incidental take caused by increased predation are:

- The amount and duration of temporary in-water structures.
- The amount and duration of temporary overwater structures.

The extent of take will be exceeded if:

- More than three turbidity curtains are installed for project construction and removal;
- More than 4,100 square feet of the Columbia River is isolated at any one time by turbidity curtains;
- If any of the three turbidity curtains is present in the Columbia River for more than 60 days;

- More than 7,500 square feet of temporary overwater structure is present in the Columbia River; and
- If the barge is present in Columbia River for more than 18 months.

Incidental Take Due to Impingement on Intake Screens

NMFS expects the proposed action will result in injury and death to juvenile salmon and steelhead from all these populations through impingement on the intake screens. Although the screens will be designed, operated, and maintained in a manner that is consistent with the NMFS guidelines (NMFS 2023), we expect injury and death of juvenile salmonids due to the location of the screens along the shoreline in shallow water, where rearing and migration of juvenile salmon and steelhead occurs. It is not possible to determine the number of fish injured and killed through impingement on intake screens because of the difficulty observing and accurately documenting project-induced mortalities. Fish injured or killed through impingement are expected to either be swept downstream or consumed by piscivorous predators. Therefore, NMFS uses a surrogate for incidental take. The surrogate is the amount of water withdrawal. This surrogate is causally linked to the take pathways because, for intake screens, the risk of injury and death increases with the amount of water withdrawn. Thus, the extent of take will be exceeded if more than 31.57 cfs is withdrawn at the new pump station.

If at any time the level or method of take exempted from take prohibitions and quantified in this opinion is exceeded, reinitiation of consultation may be required.

Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to UCR spring-run Chinook salmon, SR spring/summer Chinook salmon, SR fall-run Chinook salmon, SR sockeye salmon, UCR steelhead, SRB steelhead, and MCR steelhead, or destruction or adverse modification of their critical habitat.

Reasonable and Prudent Measures

“Reasonable and prudent measures” (RPM) refer to those actions the Director considers necessary or appropriate to minimize the impact of the incidental take on the species (50 CFR 402.02).

The Corps shall:

1. Minimize effects to ESA-listed salmon and steelhead caused by upland blasting.
2. Track, monitor, and report on the proposed action to ensure that the project is implemented as proposed, and the amount and extent of take is not exceeded.

NMFS believes that full application of conservation measures included as part of the proposed action, together with the use of the RPMs and terms and conditions described below, are

necessary and appropriate to minimize the likelihood of incidental take of listed species due to completion of the proposed action.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The Corps or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement RPM 1.

    a. Provide the Blasting Plan to NMFS at least 1 week prior to blasting.
    b. Along with the blasting plan, submit a comprehensive monitoring plan that includes provisions for fish protection, and provides evidence that all limits adopted for the project will be met by the proposed blast designs.
    c. The maximum allowable charge for blasting will be calculated to prevent harmful pressure waves from reaching the Columbia River.
    d. Visually monitor the action area for injured or dead salmon and steelhead.
    e. If injured or dead salmon and steelhead are observed, modify blasting methods and/or techniques, if safe to do so, to limit blast-related air overpressure and ground vibrations to non-injurious levels.

2. The following terms and conditions implement RPM 2.

    a. Track and monitor project construction to ensure that the conservation measures are meeting the objective of minimizing take.
    b. Conduct turbidity monitoring as follows:
        i. Daily, every 4 hours during daylight hours, while in-water work is conducted.
        ii. Observations shall occur daily before, during, and after commencement of in-water work and compared to observable sediment load upstream of the action area.
        iii. Measure or observe background turbidity levels at an undisturbed site approximately 100 feet upstream of the project area.
        iv. Measure or observe turbidity levels approximately 300 feet from any in-water work activities, or within any visible turbidity plume.
    c. Submit a completion of project report to NMFS no later than two months after project completion. The completion report shall include, at a minimum, the following:
        i. Starting and ending dates for work completed, with in-water work period specified.
        ii. Dimensions of the cofferdam.
        iii. Summary and details of turbidity monitoring.

iv. Any daily observed sediment plume within 300 feet of turbidity generating activities.
v. A summary of pollution and erosion control inspection results, including results of implementing required conservation measures, and including a description of any erosion control failure, contaminant release, and efforts to correct such incidences.
vi. Start and end dates, locations, areal extent, and methodology of work area isolations.
vii. Dates, locations, size/area, and methodology of fish salvages.
viii. Number of juvenile salmon and steelhead captured and released without injury during fish salvage.
ix. Location and condition of juvenile salmon and steelhead released.
x. Any incidence of injury or mortality of salmon and steelhead.
xi. Dates the tug and barge are on site.
xii. Number, species, and area of seeding and riparian plantings.
xiii. Dates and hours blasting was conducted.
xiv. Results of visual monitoring for injured or dead salmon and steelhead from blasting.
xv. Results of cultural resource monitoring during blasting.
xvi. Measured ground accelerations during blasting.
xvii. Reference to NMFS consultation number WCRO-2025-00422.

d. All reports will be sent to: crbo.consultationrequest.wcr@noaa.gov
e. If the amount or extent of take is exceeded, stop project activities, and notify NMFS immediately.

Conservation Recommendations

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02). The following conservation recommendation is consistent with this obligation and therefore should be carried out by the Corps: ensure that all authorized or permitted water diversions in the Columbia River drainage are in compliance with the NOAA Fisheries West Coast Region Anadromous Salmonid Design Manual (NMFS 2023, or the most recent version).

Reinitiation of Consultation

Under 50 CFR 402.16(a): “Reinitiation of consultation is required and shall be requested by the federal agency where discretionary federal involvement or control over the action has been retained or is authorized by law and: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written

concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

ESSENTIAL FISH HABITAT RESPONSE

Thank you also for your request for essential fish habitat (EFH) consultation. NMFS reviewed the proposed action for potential effects on EFH pursuant to section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act (MSA), implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. We have concluded that the action would adversely affect EFH designated for Pacific Coast Salmon (PFMC 2014).

MAGNUSON–STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity", and includes the associated physical, chemical, and biological properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects may result from actions occurring within EFH or outside of it and may include direct, indirect, site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH (50 CFR 600.905(b)).

The proposed project occurs within EFH for Pacific Salmon (PFMC 2014). NMFS determined the proposed action would adversely affect EFH as follows:

1. Short-term (several minutes to a few hours) decrease in water quality due to the elevation of turbidity during three turbidity curtain installations and removals, tug and barge movements for 18 months, and upland blasting occurring between November and March.
2. Short-term (18 months) negative effects on forage in 4,100 square feet through installation of the cofferdam, and dewatering in the cofferdam. We expect recolonization of forage prey within a few months after removal of the cofferdam and rewatering.
3. Permanent loss of forage habitat in 1,188 square feet from installation of the concrete pad for the new pump station.
4. Temporary, negative effect on 4,100 square feet of substrate through installation of the cofferdam, and dewatering within the coffer dam, for 18 months.
5. Permanent, negative effect on 1,188 square feet of substrate below the OHWM from installation of the concrete pad for the new pump station.

NMFS determined that conservation measures included in Section 1.7 of the BA (Corps 2025a) and decommissioning of the existing pump station are sufficient to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH. Therefore, NMFS has no additional EFH conservation recommendations to provide at this time. This concludes the EFH consultation.

The Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations (50 CFR 600. 920(l)).

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The biological opinion will be available through NOAA Institutional Repository https://repository.library.noaa.gov/welcome. A complete record of this consultation is on file at NMFS' Interior Columbia Basin Office.

Please direct questions regarding this letter to Colleen Fagan, at 541-962-8512 or colleen.fagan@noaa.gov.

Sincerely,

Nancy L Munn

Nancy L. Munn, Ph.D.
Assistant Regional Administrator
Interior Columbia Basin Office

cc: Austen Whelan, Corps, austen.p.whalen@usace.army.mil
Jeremiah Bonifer, CTUIR, JerimiahBonifer@ctuir.org
Taylor McCroskey, ODFW, Taylor.MCCROSKEY@odfw.oregon.gov

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United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE

Washington Ecological Services
1009 College St. SE, Ste. 215
Lacey, Washington 98503

In Reply Refer to:
FWS/R1/2025-0065482

Michael Erickson
Chief, Environmental Compliance Section
U.S. Army Corps of Engineers
201 North 3rd Avenue
Walla Walla, WA 99326

Re: Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project

Dear Mr. Erickson:

This letter responds to the U.S. Army Corps of Engineers (USACE) request for consultation on the proposed Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project (Project) located in Umatilla County, Oregon. The U.S. Fish and Wildlife Service (Service) received your request for consultation and biological assessment (Assessment; USACE 2025a) on February 19, 2025, and replied with additional Project information on June 4, 2025 (USACE 2025b). USACE has requested concurrence with an effects determination of "may affect, not likely to adversely affect" for bull trout (*Salvelinus confluentus*) and it designated critical habitat. This consultation has been conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA).

USACE has also made a determination of "no effect" for gray wolf (*Canus lupus*), monarch butterfly (*Danaus plexippus)*, and Suckley's cuckoo bumble bee (*Bombus suckleyi*). There is no requirement under the ESA for the Service to concur with "no effect" determinations; therefore, the determination rests with the action agency and our office does not provide this documentation. We recommend that you retain a copy of your agency's "no effect" determination with the administrative records for the Project.

PROJECT DESCRIPTION

Under sections 401 and 404 of the Clean Water Act and section 10 of the Rivers and Harbors Act, USACE proposes to issue permits to the City of Umatilla (City) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) to replace an existing, CTUIR-owned and operated pump station, its connected pipelines, and supporting facilities. USACE will also issue an easement to the City authorizing use of USACE lands to meet Project needs. The current pump station is located along the Columbia River approximately 3 miles upstream of McNary Dam. It contains two 150-horsepower pumps that draw up to 7,200 gallons per minute of water from April to October under CTUIR's two water rights identified as Certificate Numbers 90790 and 90765. A 1,200-foot (ft)-long partially buried pipeline moves water up and over the south bank of the river to a 4,400-ft-long unlined earthen ditch that routes water to the Wanaket Wildlife Area (WWA), which is managed by CTUIR.

The proposed action is described in the Assessment (USACE 2025a) and clarified through additional information provided to the Service (USACE 2025b) and National Marine Fisheries Service (NMFS; USACE 2025c) during the consultation process. Under the proposed action, the City will construct a new pump station near the existing pump station that will pump water from the Columbia River through a 3,460-ft buried pipeline to a new City-owned water treatment facility. From there, a 4,550-ft buried pipeline will deliver 8.57 cubic ft per second (cfs) water to the WWA, and a connector will be added to the facility to deliver up to 23 cfs water to the CTUIR Wanapa Industrial Site and other City customers as demand arises. The new pipelines will improve water delivery efficiency, but there will be no increase in water withdrawal (USACE 2025a, p. 1-8; USACE 2025c, p. 9). The existing pipeline will be removed and disposed of properly, which will require a temporary (i.e., up to one year) pipeline to transport water while the new pipelines are constructed. The existing earthen ditch will be backfilled, using fill from the Project site or from established commercial sites. Existing overhead and underground utilities will be removed and co-located in the new pipeline ditch.

The new 48-ft by 50-ft pump station will include a 33-ft by 38-ft concrete masonry building, an operating deck 17 ft above the Ordinary High Water Mark (OHWM), and a concrete wet well structure extending approximately 5 ft below OHWM with three pump bays, two of which will be operational upon Project completion. A third screened intake may be added in the future, but water withdrawal will remain within the current water rights. Brush-cleaned, retrievable, cylindrical screens that meet NMFS screening criteria will be added to the water intakes to avoid fish entrainment. The screens will be sized for a maximum approach velocity of 0.4 ft per second to avoid fish impingement with a maximum slot size of 1.75 millimeters and will be constructed on separate tracks so they can be removed separately for inspection, maintenance, or storage.

Pump station construction will require approximately 0.027 acres of in-water work area isolation using a temporary cofferdam and will occur during the Oregon Department of Fish and Wildlife (ODFW) in-water work window of December 1 through March 31. Prior to constructing the cofferdam, fish will be herded from the coffered area by deploying a turbidity curtain from the shoreline outward into the channel (USACE 2025b, p. 4), enclosing an area approximately 0.10 acres. Working from a barge in the river and/or from a crane on shore (USACE 2025a, pp. 1-6), steel sheet piles will be placed in-water and held in place by steel piles that will be bolted to large riverbed rocks for stability. There will be no pile driving (USACE 2025b, p. 2). The gaps between the sheets and rock will be sealed with concrete-filled bags, and approximately 359,000 gallons of water will be removed from the coffered area and pumped to a settling pond where the water will be tested before being allowed to return to the river. The curtain will remain up to 60 days and will be removed when the cofferdam is completed (USACE 2025c, p. 15).

Within the coffered area, approximately 221 cubic yards of material will be excavated, the area will be graded, and a concrete slab with rock anchors will be poured across the extent of the isolation area and allowed to cure before the pump station is constructed. Construction of the pump station is expected to take between 18 and 24 months to complete, beginning in December 2025, and the barge is expected to remain anchored in the Project area for approximately 15 months. After the pump station is completed during the ODFW in-water work window, a turbidity curtain will again be installed from the shore into the channel to herd fish from the area (USACE 2025c, p. 15). Additionally, the cofferdam will be removed by cutting the pile bolts at rock level, removing sheets and piles, and disposing of the material in an approved location. The turbidity curtain will then be removed, after remaining in place approximately 30 days.

The existing pump station will be removed during the in-water work window. Prior to removal, a turbidity curtain will be deployed around the pump station, working from shore into the channel to exclude fish. It will be left in place approximately 30 days to control turbidity within a 0.02-acre exclusion zone. The pump station will be removed in sequence so that structures and fill behind the existing retaining wall, which is the only structure that occurs below OHWM, are removed prior to removing the retaining wall and erosion control device will be installed to capture sedimentation. Material will be removed using heavy equipment and disposed of in an approved location, and an excavator will remove the retaining wall with assistance from a diver, who will capture smaller pieces of material and load them into the excavator bucket. Once the pump station is removed, the upland site will be contoured to existing grade, stabilized, and seeded with native seed.

Supporting upland activities include realigning the existing access road and expanding an existing parking area adjacent the new pump station. The parking area will include approximately 300 square ft (ft^2) of concrete pads for an emergency electrical generator and fuel storage, creating an additional 0.97 acres of impervious surface. Construction will require blasting approximately 21,168 ft^2 of bedrock, which will occur between November and March. The blast site will be wetted to control dust and the blast area covered with steel mats to prevent material from becoming airborne. In addition, an access road gutter and parking lot swale will be

constructed as part of stormwater management. Erosion control devices will be placed along the entire access road (USACE 2025a, Appendix A, Figure 4) to minimize or avoid sedimentation to the river throughout Project implementation. Materials storage and staging for the Project will require four temporary, upland landings, totaling approximately 8.1 acres, that will require vegetation removal and grading. Upon Project completion, the temporary landings will be removed, disturbed areas restored and revegetated with native grass mix.

The Project includes operation and maintenance of the pump station and associated structures that will include visual inspections and repairs as needed. All pump station repairs will be isolated from the river. Withdrawals will be reduced when screens are inspected to ensure intake velocities remain within NMFS criteria that avoids fish impingement, and the isolation gate will be closed if screens are moved, to prevent unscreened water from entering the pump station. When inspecting portions of the pump station below OHWM, the wet well station will be closed, and the area dewatered. Uplands maintenance is expected to include debris and sediment removal, and herbicides treatments to remove invasives that co-occur with new plantings will occur under CTUIR's existing Integrated Weed Management Plan (IWMP; CTUIR 2018, p. 3-17).

EFFECTS TO BULL TROUT

The Project will occur within the mid-Columbia River, part of the Mid-Columbia Recovery Unit for bull trout, outside of any Core area or local population, but within designated foraging, migrating, and overwintering (FMO) critical habitat. The action area is considered a shared FMO area that supports bull trout from several local populations originating in tributaries to the Columbia and Snake Rivers, bull trout occur at low density in the mid-Columbia River. Bull trout may occur in or near the Project area at any time, but the Project area lacks suitable habitat as evidenced by the predominantly bedrock substate, lack of complex structure or cover, and poor riparian habitat (USACE 2025b, pp. 4-7). We do not expect bull trout to use the Project area for overwintering or forage, as the Project area does not contain suitable habitat for the salmonid forage fish that bull trout have evolved to prey upon (USACE 2025b, p. 6), and in-water work will be implemented when migrant salmonids are least likely to occur. Based on the available information, we expect very few, if any, bull trout to occur within the action area during implementation, though one or more individuals may attempt to move through the area.

Most activities occurring in the upland portion of the action area will have no effect on bull trout due to the distance to the river. These include removing upland pipelines and filling the unlined earthen ditch, installing the pipelines in the upland area, relocating utilities, revegetating disturbed areas, and upland operations and maintenance of the pump station, pumps, pipelines. Stressors that may affect bull trout include fish capture and handling, herding, impingement, disturbances associated with in-water human presence, introduction of non-native material or invasive aquatic species, underwater noise/vibration, sediment/turbidity, exposure to chemical contaminants, increased predation risk, and loss of shoreline habitat. However, we expect effects to bull trout will be discountable or insignificant due to the infrequent and transient presence of

bull trout in the action area, small and localized scale of the Project, and because of Project timing, design criteria and conservation measures identified in the Assessment and supplemental information (USACE 2025a, pp. 1-9 to 1-12; USACE 2025b, entire) that are intended to avoid significant effects to bull trout.

We expect several stressors will have discountable effects to bull trout. Turbidity generated during installation and removal of the cofferdam, removal of the existing pump station, and construction of the new pump station will not reach bull trout because the proponents will set turbidity curtains along the shoreline and extend them outward into the channel to herd fish from these areas. Based on the lack of complex habitat and age and transitory behavior of bull trout in the action area, we expect bull trout either will not occur or will be successfully herded from the curtained areas. Exposure to machinery contaminants is unlikely because all equipment will be kept clean and free of contaminants, visually inspected daily, and maintained to prevent leaks and spills; the barge will be secured and maintained to avoid contaminant releases and will be inspected to assure it is free of invasive species prior to arrival (USACE 2025c, p. 14). The parking lot expansion will not increase traffic volume or speed (USACE 2025b, p. 5) and will be constructed with a stormwater swale and designed to direct water to the bioretention basin. The National Pollutant Discharge Elimination System permit, Stormwater Pollution Prevention Plan, and Post-Construction Stormwater Management Plan minimize risk of exposure to stormwater contaminants. Sedimentation and introduction of non-native material to the river from blasting is unlikely because the blast area will be wetted and covered with steel mats during discharge. Finally, the water intakes will be screened and designed with a minimal approach velocity, which are expected to prevent bull trout entrainment and impingement, also discountable effects.

The Project may affect bull trout through herding during installation of turbidity curtains, disturbances associated with in-water divers, or the release of anthropogenic material to the waterway. However, herding is passive, and we do not expect direct contact with bull trout, and any expulsion from habitat will have insignificant behavioral effects due to their transient use and poor habitat within the action area. Likewise, we expect bull trout will be able to avoid divers without significant effects, and because divers will assist equipment operators to assure most deconstructed materials are removed from the waterway. Any residual pieces of material that may remain will be so small as to have insignificant effects on bull trout and their habitat use patterns. As previously described, a blasting mat will be used to prevent blasting debris from entering the waterway or damaging riparian habitat.

Bull trout may be exposed to underwater noise and vibration during installation and removal of the cofferdam, barge use, removal of the existing pump station, and blasting in the adjacent uplands. Although the Assessment (USACE 2025a, p. 1-11) describes the use of vibratory pile driving, the subsequent supplemental information (USACE 2025b, p. 2) indicates no pile driving will occur. Neither in-water noise nor upland blasting is expected to exceed behavioral effects or harmful thresholds (WSDOT 2020, p. 7.43). Blasting will take place between 10 and 50 ft elevation above OHWM, blasting mats will reduce the blast energy below harmful levels (WSDOT 2020, p. 7.17) and, where blasting occurs nearest the river, bull trout will be excluded

by the coffered area (USACE 2025c, p. 2). We expect bull trout will be able to move away from any Project-related noise and vibrations without significant effects due to their transient use of the action area.

Effects of sediment transport from Project-related activities adjacent to the river include access road use, parking lot expansion, removing the old pump station, and installing the new pipeline from the pump station. Effects of in-water sediment and turbidity during in-water work include installation and removal of the cofferdam and anchoring the barge. These effects will be insignificant due to Project design criteria and conservation measures that will minimize sediment transport and bull trout exposure by using turbidity curtains around in-water work, dust abatement during road work and blasting, cover mats during blasting, pumping water from the coffered area to settling tanks followed by testing that it meets water quality criteria (Whelan, in litt. 2025), and the use of sediment control devices along the access road and shoreline during Project implementation. Any sediment and turbidity that does occur in the action area is expected to be minimal and will settle quickly, and we expect bull trout will be able to avoid any plumes due to the width and depth of the river.

Chemical contaminants in the form of concrete constituents or as part of herbicide application associated with upland maintenance will have insignificant effects to bull trout because cofferdam construction will occur behind the turbidity and exclusion curtain and because concrete used to fill bags or as anchoring will be added using the “Tremie” piping method that minimizes concrete exposure to surrounding water by pumping concrete into a bag. Any water within the coffered area will be pumped out to sediment settling tanks, and residual contaminants will be rapidly diluted by the surrounding water. Similarly, upland herbicide applications will only occur in the uplands to treat invasives in planted areas and will follow the existing CTUIR’s IWMP that is protective of water quality (USACE 2025b, p. 2; CTUIR 2018, p. 3-17). Due to the use of streamside buffers and other protective measures, we expect any residual herbicide that enters the river will be infrequent and at a low concentration that will dissolve quickly due to the large volume of the river. Bull trout exposure is further reduced because of their low density in the Columbia River and transient use of the action area; thus, we expect any herbicide exposure will be infrequent and low duration, quickly ameliorated, and unlikely to exceed harmful levels.

Bull trout may also experience increased predation risk due to the use of a barge that provides overhead cover for ambush predators, or from temporary and permanent loss of shoreline. However, we expect insignificant effects because bull trout are benthic fish that generally utilize deep-water habitats and can easily avoid the overhead barge due to its size compared to the size of the river, and because any habitat lost along the shoreline will be small in scale and is already unsuitable for bull trout forage, migration, and/or overwintering, which will not change during or following Project implementation.

EFFECTS TO BULL TROUT CRITICAL HABITAT

As previously described, the Project area is located in shared FMO critical habitat. Primary constituent elements (PCEs) within the project area include PCE2 - migration habitat, PCE3 - forage base, PCE4 - instream habitat, PCE5 - water temperature, PCE7 - natural hydrograph, PCE8 - water quality and quantity, and PCE9 - minimal nonnative species, but most are functioning at risk or not functioning appropriately. There is no indication that PCE1 (seeps and springs) occur in the Project area, and the Project area does not support spawning and rearing; therefore, spawning substrate (PCE6) is not present and will not be affected. Also, the Project will have no effect on PCE 7 (natural hydrograph). The Project is expected to have insignificant effects on PCEs 2 through 5 and 8 through 9 in the action area due to the small footprint of the Project relative to the size of the Columbia River and Project design criteria and conservation measures that assure habitat impacts are small, localized, and/or temporary.

Upland stressors are not expected to significantly affect PCEs due to the distance from shoreline or because of Project conservation measures. The Project area may serve as a potential migratory corridor for bull trout (PCE2), but we expect insignificant effects to the function of PCE2 due to the Project timing that avoids peak migration during in-water work, the small and localized scale of impediments, and ability of bull trout to migrate elsewhere in the channel (Barrows et al. 2026, p. 188). As previously stated, the Project area lacks any complex cover that may contribute to migratory habitat. The temporary physical barrier of the cofferdam, 36 linear ft of shoreline extending 33 ft into the channel, within which the permanent pump station will be built is an easily avoided footprint that will be somewhat offset by the removal of the existing pump station. The riparian system currently does not contribute to PCE 2 in the action area; thus, any alterations, including the small permanent increase in imperious surface, are not expected to worsen or improve its function. Project conservation measures ensure sedimentation and chemical contamination in the action area will be minimal or will not occur and are not expected to impede movement. In light of these considerations, we expect the Project will have insignificant effects to PCE2.

The ambush habitat created by the overhead cover of the barge may contribute to an immeasurable reduction in the number of juvenile forage fishes but is not expected to translate to a significant decline in PCE3 (forage fish availability). There may be some loss of juvenile or rearing forage fishes that remain trapped in the curtained area following herding attempts, as a result of fish salvage and handling, but we expect few will be directly killed and we do not expect adult salmonids to become trapped in the curtained areas. Conservation measures that minimize sedimentation and chemical contamination will minimize effects to forage fish. The lack of complex habitat for bull trout also precludes suitable habitat for other salmonids (USACE 2025c, pp. 22 -23), so we do not expect significant loss of forage availability from temporary or permanent in-water modifications. In light of these considerations, we expect the Project will have an insignificant effect on the function of PCE3 (forage base).

The Project area currently lacks complex in-water habitat (PCE4), a condition that will remain unchanged by the Project. Any small pieces of material that remain in the river following demolition of the existing pump station retaining wall would have an insignificant effect on the condition of PCE4, as they wouldn't be useful as bull trout habitat. Temporary loss of access to habitat behind turbidity curtains will be insignificant because of the relatively small (i.e., compared to the size of the Columbia River) area and because bull trout will have immediate access to habitat of equal or greater value nearby. The new pump station will not provide bull trout habitat, nor will its construction result in any loss of complex habitat. Therefore, we expect an insignificant effect to PCE4.

The current condition of the streambanks and lack of riparian vegetation contribute negligibly to PCE5 (temperature) and, due to the small footprint of the Project area relative to the Columbia River, the temporary streambank disturbance and the permanent removal of riparian grasses and forbs to construct the new pump station will have no significant effect on PCE5.

We anticipate insignificant effects to PCE 8 (water quality and quantity) because any sediment entering the Columbia River will be minimized by Project conservation measures such as erosion control and other mechanisms described in the preceding section and because chemical contamination is either not likely to enter the system or will be infrequent and of low concentration that will be rapidly diluted by the volume of the Columbia River. The Project will have no effect on water quantity.

Finally, the long-term placement of the barge, up to 15 months, will have an insignificant effect on PCE9 (non-native predators) because of its size (150 ft by 50 ft) relative to the size of Columbia River as it is not expected to result in any measurable change in predator numbers or density. Based on the insignificant and/or discountable effect of each stressor on each of the PCEs 2 to 5 and 8 to 9, we have determined the Project will have an insignificant effect to bull trout critical habitat.

CONCLUSION

Based on the information provided, best available science, and complete and successful implementation of agreed-upon conservation measures, we concur with your determination that the effects of the proposed action "may affect, but is not likely to adversely affect" bull trout or its designated critical habitat.

This concludes consultation pursuant to the regulations implementing the ESA. Our review and concurrence with your effects determinations is based on the implementation of the action as described. It is the responsibility of the federal action agency to ensure that the actions they authorize or carry out are in compliance with the regulatory permit and the ESA. If the federal action agency deviates from the measures outlined in a project description, the federal action agency has an obligation to reinitiate consultation and comply with section 7(d).

This action should be re-analyzed and re-initiation may be necessary if 1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not considered in this consultation, 2) if the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this consultation, and/or 3) a new species is listed or critical habitat is designated that may be affected by this action.

This letter constitutes a complete response by the Service to your request for consultation. A complete record of this consultation is on file at the Washington Fish and Wildlife Office, in Spokane Valley, Washington. If you have any questions about this letter or our shared responsibilities under the ESA, please contact Kat Sarensen at (509) 795-4776 or katherine_sarensen@fws.gov.

Sincerely,

TARA CALLAWAY

Digitally signed by TARA CALLAWAY
Date: 2025.08.13 09:34:35 -07'00'

For Brad Thompson, State Supervisor
Washington Fish and Wildlife Office

References:

Barrows, M.G., D.R. Anglin, P.M. Sankovich, J.M. Hudson, R.C. Koch, J.J. Skalicky, D.A. Wills and B.P. Silver. 2016. Use of the Mainstem Columbia and Lower Snake Rivers by Migratory Bull Trout. Data Synthesis and Analyses. Final Report. U.S. Fish and Wildlife Service, Columbia River Fisheries Program Office, Vancouver, WA.

Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 2018. Integrated Weed Management Plan. Pendleton, Oregon. 90 pp.

U.S. Army Corps of Engineers (USACE). 2025a. Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project. Biological Assessment. Prepared by Kleinschmidt Associates. 151 pp.

USACE. 2025b. Additional Information Request, CTUIR and City of Umatilla Joint Pump and Pipeline Project. 9 pp.

USACE 2025c. (Draft) Section 7 ESA Consultation Documentation. Confederated Tribes of the Umatilla Indian Reservation and the City of Umatilla Joint Pump and Pipeline Project.

WSDOT. 2020. Biological Assessment Preparation Advanced Training Manual. Chapter 7 Construction Noise Impact Assessment. 95 pp.

In Litteris:

Whelan, Austin. 2025. Biologist U.S. Army Corps of Engineers, Coeur d'Alene, Idaho. Email to Kat Sarensen, Fish and Wildlife biologist, Washington Fish and Wildlife Office, U.S. Fish and Wildlife Service, Spokane, Washington. Topic: June 13, 2025, email including additional information on the City of Umatilla and Confederated Tribes of the Umatilla Indian Reservation Pump Station and Pipeline Project, Umatilla, Oregon.

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OR 97208-2946

CENWP-ODG 5 February 2026

MEMORANDUM FOR RECORD

SUBJECT: U.S. Army Corps of Engineers (Corps) Approved Jurisdictional Determination in accordance with the "Revised Definition of 'Waters of the United States'"; 88 FR 3004 (18 January 2023) as amended by the "Revised Definition of 'Waters of the United States'; Conforming" 88 FR 61964 (8 September 2023) ,[1] NWP-2022-00494-1 (MFR #1 of #1).[2]

BACKGROUND. An Approved Jurisdictional Determination (AJD) is a Corps document stating the presence or absence of waters of the United States on a parcel or a written statement and map identifying the limits of waters of the United States on a parcel. AJDs are clearly designated appealable actions and will include a basis of JD with the document.[3] AJDs are case-specific and are typically made in response to a request. AJDs are valid for a period of five years unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.[4]

On 18 January 2023, the Environmental Protection Agency (EPA) and the Department of the Army ("the agencies") published the "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (18 January 2023) ("2023 Rule"). On 8 September 2023 the agencies published the "Revised Definition of 'Waters of the United States'; Conforming", 88 FR 61964 (8 September 2023) which amended the 2023 Rule to conform to the 2023 Supreme Court decision in *Sackett v. EPA*, 598 U.S. 651, 143 S. Ct. 1322 (2023) ("*Sackett*").

This Memorandum for Record (MFR) constitutes the basis of jurisdiction for a Corps AJD as defined in 33 CFR § 331.2. For the purposes of this AJD, we have relied on Section 10 of the Rivers and Harbors Act of 1899 (RHA),[5] the 2023 Rule as amended,

[1] While the Revised Definition of "Waters of the United States"; Conforming had no effect on some categories of waters covered under the CWA, and no effect on any waters covered under RHA, all categories are included in this Memorandum for Record for efficiency.
[2] When documenting aquatic resources within the review area that are jurisdictional under the Clean Water Act (CWA), use an additional MFR and group the aquatic resources on each MFR based on the TNW, the territorial seas, or interstate water that they are connected to. Be sure to provide an identifier to indicate when there are multiple MFRs associated with a single AJD request (i.e., number them 1, 2, 3, etc.).
[3] 33 CFR § 331.2.
[4] Regulatory Guidance Letter 05-02.
[5] USACE has authority under both Section 9 and Section 10 of the Rivers and Harbors Act of 1899 but for convenience, in this MFR, jurisdiction under RHA will be referred to as Section 10.

as well as other applicable guidance, relevant case law, and longstanding practice in evaluating jurisdiction.

1. SUMMARY OF CONCLUSIONS.

    a. Provide a list of each individual feature within the Review Area and the jurisdictional status of each one (i.e., identify whether each feature is/is not a water of the United States and/or a navigable water of the United States).

        i. Columbia River, jurisdictional, Sections 10 and 404

        ii. Ditch, non-jurisdictional

        iii. Wetland, non-jurisdictional

2. REFERENCES.

    a. "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (18 January 2023) ("2023 Rule")

    b. "Revised Definition of 'Waters of the United States'; Conforming" 88 FR 61964 (8 September 2023)

    c. *Sackett v. EPA*, 598 U.S. 651, 143 S. Ct. 1322 (2023)

    d. "Memorandum To The Field Between The U.S. Department Of The Army, U.S. Army Corps Of Engineers And The U.S. Environmental Protection Agency Concerning The Proper Implementation Of 'Continuous Surface Connection' Under The Definition Of "Waters Of The United States" Under The Clean Water Act" (March 12, 2025)

3. REVIEW AREA. The Review Arewa (RA) is located north of Highway 730, approximately 3 miles upstream of the McNary Dam along the Columbia River at approximately river mile (RM) 296, and approximately 5 miles east of Umatilla, Oregon. The RA encompasses 23.33-acres. The RA contains portions of the following tax lots:

    • 5N28000000100
    • 5N29000000800
    • 5N29000001000

The area surrounding the RA is developed (i.e., existing data centers, parking lots, roads and utility infrastructure, industrial facilities, and the Two Rivers Correctional Institution). A large portion of the RA is currently undeveloped and consists of grasslands. The location of the RA is former ranch land and has been altered by a combination of livestock grazing and conversion of natural grassland to hay production and crops. A partially buried irrigation pipeline currently begins at the pump station in the Columbia River (located at the northern edge of the RA). The pipeline discharges into an open Ditch that runs adjacent to and southwest of the RA. Further south, water from the Ditch is delivered to wetlands in the Wanaket Wildlife Management Area (WWMA). The irrigation Ditch system and Wetland are part of the WWMA and were constructed entirely in uplands.

Previous AJDs within the RA include NWP-2022-00416 dated 13 December 2022, and NWP-2017-387 dated 2 October 2017.

4. NEAREST TRADITIONAL NAVIGABLE WATER (TNW), THE TERRITORIAL SEAS, OR INTERSTATE WATER TO WHICH THE AQUATIC RESOURCE IS CONNECTED. The nearest TNW is the Columbia River, RM 296, located within the RA. The Columbia River is recognized as a TNW to RM 309 per the October 1993 Corps of Engineers, Portland District Navigable Riverways within the State of Oregon list.[6]

5. FLOWPATH FROM THE SUBJECT AQUATIC RESOURCES TO A TNW, THE TERRITORIAL SEAS, OR INTERSTATE WATER. There is no flowpath from the Ditch or Weland to a TNW. Flow from the Columbia River TNW is pumped inland to the Ditch and Wetland. The Columbia River is a TNW within the RA.

6. SECTION 10 JURISDICTIONAL WATERS[7]: Describe aquatic resources or other features within the Review Area determined to be jurisdictional in accordance with Section 10 of the Rivers and Harbors Act of 1899. Include the size of each aquatic

[6] This MFR should not be used to complete a new stand-alone TNW determination. A stand-alone TNW determination for a water that is not subject to Section 9 or 10 of the Rivers and Harbors Act of 1899 (RHA) is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established.
[7] 33 CFR § 329.9(a) A waterbody which was navigable in its natural or improved state, or which was susceptible of reasonable improvement (as discussed in § 329.8(b) of this part) retains its character as "navigable in law" even though it is not presently used for commerce, or is presently incapable of such use because of changed conditions or the presence of obstructions.

resource or other feature within the Review Area and how it was determined to be jurisdictional in accordance with Section 10.[8]

Columbia River: The RA includes 0.03-acre of the Columbia River, which has been determined a TNW per the October 1993 Corps of Engineers, Portland District Navigable Riverways within the State of Oregon list. Therefore, the Corps has determined the Columbia River is an navigable water pursuant to 33 CFR § 329.4 and a waters of the U.S. pursuant to 33 CFR § 328.3(a)(1).

7. SECTION 404 JURISDICTIONAL WATERS: Describe the aquatic resources within the Review Area that were found to meet the definition of waters of the United States in accordance with the 2023 Rule as amended at 33 CFR § 328.3(a)(1) through (a)(5), consistent with the Supreme Court's decision in *Sackett*. List each aquatic resource separately, by name, consistent with the naming convention used in section 1, above. Include a rationale for each aquatic resource, supporting that the aquatic resource meets the relevant category of "waters of the United States" in the 2023 Rule as amended. The rationale should also include a written description of, or reference to a map in the administrative record that shows, the lateral limits of jurisdiction for each aquatic resource, including how that limit was determined, and incorporate relevant references used. Include the size of each aquatic resource in acres or linear feet and attach and reference related figures as needed.

   a. Traditional Navigable Waters (TNWs) (a)(1)(i): The Columbia River is a TNW within the RA and therefore is an (a)(1)(i) waters of the U.S.

8. NON-JURISDICTIONAL AQUATIC RESOURCES AND FEATURES

   a. Describe aquatic resources and other features within the Review Area identified in the 2023 Rule as amended as not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5). Include the type of excluded aquatic resource or feature, the size of the aquatic resource or feature within the Review Area and describe how it was determined to meet one of the exclusions listed in 33 CFR 328.3(b).[9]

      Ditch: Hydrology of Ditch is provided by water that is pumped inland from the Columbia River. Water is pumped approximately 0.5-mile through the partially buried water pipeline which extends up and over the south bank of the Columbia

[8] This MFR is not to be used to make a report of findings to support a determination that the water is a navigable water of the United States. The district must follow the procedures outlined in 33 CFR § 329.14 to make a determination that a water is a navigable water of the United States subject to Section 10 of the RHA.
[9] 88 FR 3004 (18 January 2023)

River and briefly across the top of the bluff before flows discharge into an open, unlined Ditch which conveys the water to the WWMA. Flows that enter the WWA do not flow beyond that wetland complex. Ditch was artificially created in upland and drains only uplands. Therefore, the Corps has determined Ditch to be a (b)(3) excluded feature and is not a waters of the U.S.

Wetland: A narrow 2-foot-wide buffer on either side of the Ditch was delineated as a wetland due to the presence of hydrophytic vegetation, assumed hydric soils, and the presence of wetland hydrology. The hydrology for the wetlands within the RA are associated with seepage from the Ditch. No groundwater table was identified during the delineation. The water that is pumped from the Columbia River through the Ditch does not carry flow directly or indirectly to a TNW as documented in a previous AJD (NWP-2022-00416). A review of Oregon Department of Geology and Mineral Industries (DOGAMI) Light Detection and Ranging (LiDAR) imagery accessed through the Corps' National Regulatory Viewer (NRV) identifies that Wetland does not have topographic features that would allow surficial flow to a TNW. The Corps has determined Wetland is a (b)(3) excluded feature and is not a waters of the U.S.

9. DATA SOURCES. List sources of data/information used in making determination. Include titles and dates of sources used and ensure that information referenced is available in the administrative record.

   a. Wetlands and Waters Delineation Report dated September 2023, prepared for the City of Umatilla by Kleinschmidt Associates

   b. Portland District Corps of Engineers AJDs NWP-2022-00416, dated 13 December 2022, and NWP-2017-387 dated 2 October 2017, accessed on 28 January 2026.

   c. Oregon DOGAMI LiDAR imagery accessed through the Corps' NRV on 28 January 2026.

   d. U.S. Geological Survey National Hydrography Dataset and U.S. Fish and Wildlife Service National Wetlands Inventory data layers accessed through the NRV on 28 January 2026.

   e. October 1993 Corps of Engineers, Portland District Navigable Riverways within the State of Oregon list accessed 28 January 2026 at https://www.nwp.usace.army.mil/Portals/24/docs/regulatory/jurisdiction/Navigable_US_Waters_Oregon_1993.pdf.

10. OTHER SUPPORTING INFORMATION. N/A

11. NOTE: The structure and format of this MFR were developed in coordination with the EPA and Department of the Army. The MFR's structure and format may be subject to future modification or may be rescinded as needed to implement additional guidance from the agencies; however, the approved jurisdictional determination described herein is a final agency action.

U.S. Army Corps of Engineers (USACE)

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

For use of this form, see Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act; the proponent agency is CECW-COR.

Form Approved -
OMB No. 0710-0003
Expires 2027-10-31

DATA REQUIRED BY THE PRIVACY ACT OF 1974

Authority The authorities for requesting this information are Sections 9, 10, 13, and 14, Rivers and Harbors Act of March 3, 1899; Section 404, Clean Water Act; and Section 103 Marine Protection Research and Sanctuaries Act of 1972.

Principal Purpose This information serves as notification to affected parties regarding the USACE administrative appeal options and process, as well as to facilitate requests for appeal of USACE decisions with which they disagree.

Routine Uses Routine uses will include: (a) To serve as notification to affected parties of the Corps administrative appeal options and process and to facilitate requests for appeal of Corps decisions with which they disagree. (b) Records may be referred to the Department of Justice for possible criminal prosecution. (c) Records may be referred to other Federal, State, and local agencies for evaluation and enforcement purposes.

Disclosure Disclosure of this information is voluntary on your part. However, failure of individual to provide requested information could result in inability to determine all pertinent information regarding a Department of the Army permit matter.

The Agency Disclosure Notice (ADN)

The Public reporting burden for this collection of information, 0710-0003, is estimated to average 1 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PURPOSE: This form is used to facilitate the initiation of the administrative appeals process. The appeals process allows an affected party to pursue an administrative appeal of certain Corps of Engineers decisions with which they disagree.

Upon release, this form will also be available on the Corps website https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/

Applicant: City of Umatilla	File Number: NWP-2022-00467-1	Date: 2026-02-05

Documents Attached (*select all that apply*):		Form Reference Section:
☐	INITIAL PROFFERED PERMIT (*Standard Permit or Letter of Permission*)	A
☐	PROFFERED PERMIT (*Standard Permit or Letter of Permission*)	B
☐	PERMIT DENIAL WITHOUT PREJUDICE	C
☐	PERMIT DENIAL WITH PREJUDICE	D
☒	APPROVED JURISDICTIONAL DETERMINATION	E
☐	PRELIMINARY JURISDICTIONAL DETERMINATION	F

SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: *You may accept or object to the permit*

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: *You may accept or appeal the permit*

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: *Not appealable*

You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: *You may appeal the permit denial*

You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: *You may accept or appeal the approved JD or provide new information for reconsideration*

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: *Not appealable*

You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision you may contact:		If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:	
Name:	William D. Abadie, Chief Regulatory Branch	Name:	Melinda Larsen, Regulatory Appeals Review Officer
Street Address, City, State:	U.S. Army Corps of Engineers, Portland District P.O. Box 2946 Portland, OR 97208-2946	Street Address, City, State:	U.S. Army Corps of Engineers, Northwestern Division 1201 NE Lloyd Blvd, Suite 400 Portland, OR 97232
Phone:	503-808-4373	Phone:	503-726-6194
Email:	william.d.abadie@usace.army.mil	Email:	melinda.m.larsen@usace.army.mil

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (*Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.*)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations.

Email address of appellant and/or agent	Telephone number
Signature of appellant or agent	Date

U.S. Army Corps of Engineers (USACE)

CERTIFICATION OF COMPLIANCE WITH DEPARTMENT OF THE ARMY PERMIT

For use of this form, see Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection, Research, and Sanctuaries Act; the proponent agency is CECW-COR.

Form Approved -
OMB No. 0710-0003
Expires 2027-10-31

The Agency Disclosure Notice (ADN)

The Public reporting burden for this collection of information, 0710-0003, is estimated to average 10 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PURPOSE: This form is used by recipients of U.S. Army Corps of Engineer Regulatory permits to certify compliance with the permit terms and conditions.

Your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with this permit, you are subject to permit suspension, modification, or revocation.

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the U.S. Army Corps of Engineers, Portland District, Regulatory Office.

The certification can be submitted by email at cenwp.notify@usace.army.mil or by mail at the below address:

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the U.S. Army Corps of Engineers, Portland District, Regulatory Office.

U.S. Army Corps of Engineers
Portland District Office
Street Address: P.O. Box 2946
City: Portland State: OR Zip Code: 97208-2946

COMPLETED BY THE CORPS

Corps Action Number: NWP-2022-00467-1
Permit Type: General Permit
General Permit Number and Name (*if applicable*): NWP 58 Utility Line Activities for Water & Other Sub
Name of Permittee: City of Umatilla
Project Name: City of Umatilla-Columbia River-Intake Expansion
Project Location (*physical address*): North of Highway 730, 3 miles upstream of McNary Dam, Umatilla, Umatilla County, Oregon.
Lat/Long: 45.92756932, -119.23408134

PERMITTEE'S CERTIFICATION

Date Work Started: _____
Date Work Completed: _____

Enclose photographs showing the completed project (*if available*).

I Enter FName LName hereby certify that the work authorized by the above referenced permit has been completed in accordance with all of the permit terms and conditions, and that any required compensatory mitigation has been completed in accordance with the permit conditions.

Name	Date	Signature

3A) State of Oregon Department of State Lands Removal-Fill Permit

Oregon
Tina Kotek, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl
State Land Board

Tina Kotek
Governor

Tobias Read
Secretary of State

Elizabeth Steiner
State Treasurer

BEFORE THE DIRECTOR OF THE DEPARTMENT OF STATE LANDS OF THE STATE OF OREGON

In the Matter of Removal-Fill Permit Application 64462 By City Of Umatilla) Proposed Permit Decision and Order;) Notice of Right to a Hearing

Short and Plain Statement of the Permitting Decision: The permit application is approved because the Department of State Lands (DSL or the Department) has determined that, when carried out in compliance with all terms and conditions outlined in the permit, the proposed removal-fill activity is consistent with the protection, conservation, and best use of the water resources of this state and will not unreasonably interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing, and recreation. *See* ORS 196.825.

I. **Applicable Law:**

a. ORS Chapter 196 governs removal fill permits in Oregon. The Department administers Oregon's Removal-Fill Law, Oregon Revised Statutes (ORS) 196.795 to ORS 196.990, which protects the state's wetlands and waterways. *See* ORS 196.805. Unless an exception applies, a person may not remove material from waters of this state or fill waters of this state without a permit from DSL. ORS 196.810. Waters of this state include the all-natural waterways, tidal and non-tidal bays, intermittent streams, constantly flowing streams, lakes, wetlands, the Pacific Ocean that is in the boundaries of this state, and other water bodies. ORS 196.800; Oregon Administrative Rule (OAR) 141-085-0515; OAR 141-093-0100.

b. Specifically, the statutes that govern removal-fill permits in Oregon, including the permit application at issue in this case, generally include the following:

ORS 196.795 (Administration of State Removal or Fill Permits; General Permits);
ORS 196.800 (Definitions);
ORS 196.805 (Policy);
ORS 196.810 (Removal from Bed or Banks of Waters; Permits; Exceptions);
ORS 196.812 (Removal of Large Woody Debris);
ORS 196.815 (Permit Applications; Fees);
ORS 196.816 (Removal of Materials for Purpose of Maintaining Drainage and Protecting Agricultural Land);
ORS 196.817 (Removal or Fill General Permits);
ORS 196.818 (Wetland Delineation Reports; Fees);
ORS 196.820 (Smith Lake, Bybee Lake Prohibition);
ORS 196.825 (Permit Criteria; Consultation with Other Agencies);
ORS 196.830 (Estuarine Resource Replacement; Other Permit Conditions);
ORS 196.835 (Issuance of Permits; Procedure);
ORS 196.845(Investigations and Surveys of Location); and
ORS 196.850 (Waiver of Permit Requirement; Notice; Review).

The full text of these statutes may be viewed online at:
https://www.oregonlegislature.gov/bills_laws/ors/ors196.html.

The full text of these statutes may also be inspected in person during normal business hours at:
Oregon Department of State Lands
775 Summer St NE STE 100
Salem, OR 97301.

c. OAR Chapter 141, Division 85 implements the above statutory scheme and govern removal-fill permits in Oregon. The rules that govern removal-fill permits in Oregon, including the permit application at issue in this case, generally include the following:

Div. 85 Removal-Fill Authorizations:
OAR 141-085-0500 (General);
OAR 141-085-0506 (Policy);
OAR 141-085-0510 (Definitions);
OAR 141-085-0515 (Removal-Fill Jurisdiction by Type of Water);
OAR 141-085-0520 (Removal-Fill Jurisdiction by Volume of Material);
OAR 141-085-0525 (Measuring and Calculating Volume of Removal and Fill);
OAR 141-085-0530 (Exemptions for Certain Activities and Structures);
OAR 141-085-0534 (Exemptions for Certain Voluntary Habitat Restoration Activities):
OAR 141-085-0535 (Exemptions Specific to Agricultural Activities);
OAR 141-085-0540 (Types of Authorizations);
OAR 141-085-0545 (Fees; Amounts and Disposition);
OAR 141-085-0550 (Application Requirements for Individual Permits);
OAR 141-085-0555 (Individual Removal-Fill Permit Application Review Process);
OAR 141-085-0560 (Public Review Process for Individual Removal - Fill Permit Applications);
OAR 141-085-0565 (Department Determinations and Considerations in Evaluating Individual Permit Applications);
OAR 141-085-0575 (Permit Appeals);
OAR 141-085-0580 (Discovery in Contested Cases);
OAR 141-085-0585 (Permit Conditions, Permit Expiration Dates and Permit Transfer);
OAR 141-085-0590 (Renewal and Extension of Individual Removal-Fill Permits);
OAR 141-085-0595 (Permit Requirements and Interagency Coordination for Department of Environmental Quality Approved Remedial Action, Corrections Facilities, Solid Waste Land Fills and Energy Facilities);
OAR 141-085-0665 (Expedited Process for Industrial or Traded Sector Sites);
OAR 141-085-0676 (Emergency Authorizations);
OAR 141-085-0680 (Compensatory Mitigation (CM); Applicability and Principal Objectives);
OAR 141-085-0685 (Functions and Values Assessment);
OAR 141-085-0690 (Eligibility Requirements for CM);
OAR 141-085-0692 (Mitigation Accounting);
OAR 141-085-0694 (Special Requirement for CM);
OAR 141-085-0695 (Administrative Protection of CM Sites);
OAR 141-085-0700 (Financial Security for CM Sites);
OAR 141-085-0705 (Requirements for CM Plans);
OAR 141-085-0710 (Monitoring Requirements for CWM);
OAR 141-085-0715 (Mitigation for Temporary Impacts);
OAR 141-085-0720 (Mitigation Banking Purpose, Applicability and Policies);

OAR 141-085-0725 (Process for Establishing Mitigation Banks);
OAR 141-085-0730 (Establishment of Mitigation Credits);
OAR 141-085-0735 (Release, Use and Sale of Mitigation Credits);
OAR 141-085-0740 (Authorization for Mitigation Banks);
OAR 141-085-0745 (In-Lieu Fee Mitigation);
OAR 141-085-0750 (Payments to and Expenditures from the Oregon Removal-Fill Mitigation Fund);
OAR 141-085-0755 (Advance Mitigation); and
OAR 141-085-0768 (Advance Aquatic Resource Plans).

The full text of these rules may be viewed online at:
https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=15700.

The full text of these rules may also be inspected in person during normal business hours at:
Oregon Department of State Lands
775 Summer St NE STE 100
Salem, OR 97301.

II. **Findings of Fact and Findings of Ultimate Fact**:

1. The Department received a complete, written application from applicant on November 11, 2024, for the proposed removal-fill activity consisting of approximately 213 cubic yards of removal and 250 cubic yards of fill in wetlands and 226 cubic yards of removal and 513 cy of fill in the Columbia River to eliminate a jurisdictional ditch and wetlands and replace a pump station.
2. The Department circulated the complete application for 30-day public comment period December 13, 2024, to January 11, 2025, to parties including, affected local, state and federal agencies, affected tribal governments, adjacent landowners, and other parties requesting notification.
3. There were no comments that required a response to the Department.
4. Based on all the information in the agency file in this matter, including the complete application, comments received, applicant response to comments, and the agency's own investigations, the Department concludes as to the determinations in ORS 196.825(1) and (4), OAR 141-085-0565(3), and OAR 141-093-0115:

    a. The project described in the permit application and as conditioned in the proposed permit, is consistent with the protection, conservation, and best use of the water resources of this state as specified in ORS 196.600 to 196.905;

    b. The project described in the permit application and as conditioned in the proposed permit would not interfere with the paramount policy of this state to preserve the use of its waters for navigation, fishing, and public recreation.

5. Based on all the information in the agency file in this matter, including the complete application, comments received, applicant response to comments, and the agency's own investigations, the Department concludes, as to the considerations in ORS 196.825(3), OAR 141-085-0565(4), OAR 141-093-0115.

    a. The applicant is a public body and the Department has relied upon the public body's findings as to local public need and local public benefit.

b. There is not an identified economic cost to the public if the proposed fill or removal is not accomplished.

c. The application describes four alternatives to the project for which the fill or removal is proposed. There are no practicable alternatives with lesser impact to waters of this state.

d. The application describes four alternative sites for the proposed removal or fill. There are no practicable alternative sites with lesser impact to waters of this state.

e. The proposed project conforms to sound policies of conservation because adverse effects to the aquatic resources have been reduced to the extent practicable and the proposed permit contains operating conditions for best management practices to further minimize adverse effects. No interference with public health and safety was identified in the application evaluation and public review processes.

f. There is not a conflict with existing public uses of the affected waters or adjacent land uses identified in the application evaluation and public review processes.

g. The proposed fill or removal is compatible with the governing comprehensive plan and land use regulations as described in the Land Use Compatibility Statement

h. The proposed fill and removal is for streambank protection.

i. The application describes compensatory mitigation in the form of Payment In-Lieu Mitigation in the amount of $30,924.77. The mitigation is sufficient to offset anticipated spatial and function attribute losses resulting from the proposed fill or removal.

III. Conclusions of Law:

Based on the factors laid out in ORS Chapter 196 and OAR Chapter 141, Division 85, including ORS 196.825, OAR 141-085-0565, and OAR 141-093-0115, DSL should approve the permit application as conditioned in the proposed permit.

IV. Proposed Order:

The Department proposes approving the permit application with conditions and based on the factors laid out in ORS Chapter 196 and OAR Chapter 141, Division 85, including ORS 196.825, OAR 141-085-0565 and OAR 141-093-0130.

As described below, you have the right to request a hearing within 21 days. Prior to the expiration of the 21-day period, this proposed permit decision is not the final agency order on the matter, and the permittee should be aware that the decision could be changed prior to the expiration of the 21-day appeal period—either because the permittee requests a contested case hearing, or as otherwise allowed under the removal fill law. A permittee who begins work under a permit prior to issuance of a final order does so with acceptance of this risk.

V. **Hearing:**

You are entitled to request a hearing based on this Proposed Order as provided by the Oregon Administrative Procedures Act (ORS chapter 183) and the administrative rules implementing the Administrative Procedures Act, OAR Chapter 137, Division 3. *See* ORS 196.825(7); OAR 141-001-0005; OAR 141-001-0010; OAR 141-085-0575; OAR 141-093-0130.

If you want a hearing, you must file a written request for a hearing with the Department no later than 21 calendar days from the date of the permit decision. *See* ORS 196.825(7); OAR 141-085-0575; OAR 141-093-0130. If you are a corporation, partnership, limited liability company, unincorporated association, trust, or government body, you must either have an attorney licensed to practice law in Oregon submit a request for a contested case hearing on your behalf or ratify your hearing request within 28 days. See OAR 137-003-0550.

The Department has determined that due to the complexity of removal-fill permitting, a general denial of the matters or a general objection to all permit conditions in the request for a contested case proceeding does not provide sufficient information for a fair and efficient contested case and a more specific request is warranted. OAR 141-085-0575. All requests for a contested case proceeding under this section shall include a specific list of issues for the contested case proceeding. OAR 141-085-0575. The requester may amend their request to include additional issues or clarify existing issues within 15 days of the date that the case is referred to the Office of Administrative Hearings. OAR 141-085-0575.

You may mail a request for a hearing to:

Department of State Lands
Aquatic Resource Management Program
775 Summer Street NE STE 100
Salem, OR 97301.

If you request a hearing, you will be notified of the time and the place of the hearing. *See* OAR 137-003-0525. You may be represented by legal counsel at the hearing. ORS 183.417; OAR 137-003-0550. Corporations, partnerships, limited liability companies, unincorporated associations, trusts and government bodies must be represented by an attorney except as provided in OAR 137-003-0555 or as otherwise authorized by law. OAR 137-003-0550. Legal aid organizations may be able to represent you if you have limited financial resources. You will be given information on the procedures, right of representation, and other rights of parties relating to the substance and conduct of the hearing before commencement of the hearing. *See* ORS 183.413.

VI. **Jurisdiction and Authority to Hold a Hearing:**

The Department has jurisdiction over the issuance of removal-fill permits pursuant to ORS Chapter 196, and specifically, ORS 196.810. A permit decision constitutes an order in a contested case. *See* ORS 183.310(2)(a); ORS 196.825(7). If timely requested, a hearing is held as laid out in ORS 183.411 to ORS 183. 471, OAR Chapter 137, Division 3, ORS Chapter 196, and OAR Chapter 141, Division 85. ORS 196.825(7).

VII. **Final Order and Defaults**:

If a request for a hearing is not received by the Department within this 21-day period, your right to a hearing shall be waived and this Proposed Order shall become the Final Order by default. *See* ORS 196.825(7); OAR 141-085-0575; OAR 141-093-0130.

If you request a hearing and then either withdraw your hearing request, notify the Department or administrative law judge that you will not appear, or fail to appear at a scheduled hearing, the Department may issue a final order by default. *See* ORS 183.417.

If the Department issues a final order by default, it designates its file on this matter, including any materials submitted by you that relate to this matter, as the record for purposes of supporting its decision.

If you proceed to a contested case hearing, a Final Order will not be issued until after the hearing concludes. *See* ORS 183.464; OAR 141-085-0575; OAR 141-093-0130.

VIII. **Federal Servicemembers Civil Relief Act**:

Active duty servicemembers have a right to stay contested case proceedings under the federal Servicemembers Civil Relief Act. *See generally* 50 USC 3901 *et seq.* For more information, contact the Oregon State Bar (800-452-8260), the Oregon Military Department (503-584-3571), or the nearest United States Armed Forces Legal Assistance Office (http://legalassistance.law.af.mil). The Oregon Military Department does not have a toll-free telephone number.

Department of State Lands
775 Summer Street, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	**64462-RF**
Permit Type:	**Removal/Fill**
Waters:	**Columbia River and wetlands**
County:	**Umatilla**
Expiration Date:	**February 25, 2026**

City of Umatilla

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder must obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director must be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee must defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the permittee must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Melinda Butterfield, Operations Manager
Aquatic Resource Management
Oregon Department of State Lands

Melinda Butterfield Digitally signed by Melinda Butterfield
Date: 2025.02.25 13:13:44 -08'00'

Authorized Signature

ATTACHMENT A

Permit Holder: City of Umatilla

Project Name: CTUIR/COU Joint Pump and Pipeline Project

Special Conditions for Removal/Fill Permit No. 64462-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. A copy of this permit must be available at the work site whenever authorized operations are being conducted.

1. **Responsible Party:** By signature on the application, David Stockdale is acting as the representative of City of Umatilla (Permittee). By proceeding under this permit, Permittee agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL. In the event information in the application conflicts with these permit conditions, the permit conditions prevail.

2. **Authorization to Conduct Removal and/or Fill:** This permit authorizes 0.17 acres of wetland and 292 linear feet of waterway impact(s) with associated removal and fill of material in Tax Lot(s) 5N28000000100, 5N28000001900, 5N29000000800, 5N29000001000, 5N29000001100, 5N29000001101, in Umatilla County, as referenced in the application, map and drawings (See Attachment B for project location(s)), dated November 11, 2024.

3. **Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of Columbia River must be conducted between December 1 and March 31, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.

4. **Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation or operating conditions to comply with conditions imposed by other permits resulting in removal-fill activity must be approved by DSL prior to implementation.

5. **DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.

6. **DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

Pre-Construction

7. **Stormwater Management Approval Required Before Beginning Work:** Prior to the start of construction, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permit from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.

8. **Pre-construction Resource Area Fencing or Flagging:** Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.

General Construction Conditions

9. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.

10. **Erosion Control Methods:** The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state.

    a. All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation.
    b. Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands.
    c. To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours.
    d. Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed.
    e. Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting.
    f. Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands.
    g. Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized.
    h. All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.

11. **Fuels, Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, material treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminates from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

12. **Archaeological Resources:** If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.

13. **Construction Corridor:** There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Project Site Plan).

14. **Hazards to Recreation, Navigation or Fishing:** The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.

15. **Operation of Equipment in the Water:** Heavy equipment may not be positioned on or traverse areas below ordinary high water or highest measured tide at any time unless the equipment is operating from a barge as described in the application. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.

16. **Work Area Isolation:** The work area must be isolated from the water during construction by using a coffer dam in accordance with the work area isolation plan in the application. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.

17. **Fish Salvage Required:** Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or Fish.Research@state.or.us.

18. **Fish Passage Required:** The project must meet Oregon Department of Fish and Wildlife requirements for fish passage, as required in ORS 509.585. Contact the local ODFW District Fish Biologist (Taylor McCroskey, taylor.mccroskey@odfw.oregon.gov, 541-318-7969 x87969) to ensure your project meets the state's fish passage requirements.

19. **Raising or Redirecting Water:** The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.

Rectification of Temporary Impacts

20. **Site Rectification Required for Temporary Wetland Impacts:** Site rectification for temporary impacts to 0.15 acres of wetland must be conducted according to the rehabilitation plan in the application, sections 4(C), 9(A), and 9(B). Failure to rectify the site may result in additional compensatory mitigation.

21. **Pre-construction Elevations Must Be Restored Within the Same Construction Season:** Construction activities within areas identified as temporary impact must not exceed two construction seasons and rectification of temporary impacts must be completed within 24 months of the initiation of impacts. However, if the temporary impact only requires one construction season, re-establishment of pre-construction contours must be completed within that same construction season, before the onset of fall rains.

Compensatory Mitigation

Bank Credits, Payment-in-Lieu or In-Lieu Fee.

22. **Payment-in-Lieu Mitigation:** Wetland mitigation for the unavoidable loss of 0.021 acres of riverine, PEM wetland and 36 linear feet of stream impact has been accomplished via payment to DSL's Removal-Fill Mitigation Fund in the amount of $30,924.77. Once the authorized fill has commenced, the payment is non-refundable.

Monitoring and Reporting Requirements

23. **Post-Construction Report Required:** A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL within 90 days of revegetation, which shall occur during the fall, winter, or spring immediately following the completion of grading within the required planting areas. The post-construction report must include:

    a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following:
        i. Finished contours of the site.
        ii. Current tax lot and right-of-way boundaries.
        iii. Photo point locations.
        iv. Permanently and temporarily impacted wetland and waterway boundaries identified separately, with square foot listed.
    b. Photos from fixed photo points. This should clearly show the site conditions.
    c. A narrative that describes any deviation from the approved plan.

24. **Annual Monitoring Reports Required:** Monitoring of rectification of temporary impacts is required until DSL has officially released the site from further monitoring. The permittee must monitor the site to determine whether the site is meeting performance standards for a minimum period of 3 growing seasons after completion of all the initial plantings. Annual monitoring reports are required and are due by November 1. Failure to submit the required monitoring report by the due date may result in an extension of the monitoring period and/or enforcement action.

25. **Extension of the Monitoring Period:** The monitoring period may be extended, at the discretion of DSL, for failure of the site to meet performance standards for the final two consecutive years without corrective or remedial actions (such as irrigation, significant weed/invasive plants treatment or replanting) or when needed to evaluate corrective or remedial actions.

26. **Contents of the Annual Monitoring Report:** The annual monitoring report must include the following information:

    a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards.
    b. Site location map(s) that clearly shows the impact site and rectification site boundaries.
    c. Site Plan that clearly shows at least the following:
        i. The area seeded, with the square foot area listed.
        ii. Current tax lot and right-of-way boundaries.
        iii. Permanent monitoring plot locations that correspond to the data collected and fixed photo-points. These points should be overlaid on the as-built map.
        iv. PEM wetlands and waterways, clearly identified separately and the area (square foot or acreage) of each noted.
    d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site.
    e. Data collected to support the conclusions related to the status of the site relative to the performance standards listed in this permit (include summary/analysis in the report and raw data in the appendix). Data should be submitted using the DSL Mitigation Monitoring Vegetation Spreadsheet or presented in a similar format as described in DSL's Routine Monitoring Guidance for Vegetation.
    f. Photos from fixed photo points (include in the appendix).
    g. Other information necessary or required to document compliance with the performance standards listed in this permit.

27. **Corrective Action May Be Required:** DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.

Performance Standards

To be deemed successful, the temporary impact areas must meet the following performance standards, as determined by DSL:

28. **Establishment of Permanent Monitoring Locations Required:** Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.

Herbaceous Wetlands

29. **Native Species Cover:** The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.

30. **Invasive Species Cover:** The cover of invasive species is no more than 10%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list, plus known problem species including *Phalaris arundinacea, Mentha pulegium, Holcus lanatus, Anthoxanthum odoratum,* and the last crop plant if it is non-native. Non-native plants should be labeled as such if they are listed as non-native on the USDA Plants Database. Beginning in Year 2 of monitoring, DSL will consider a non-native plant species invasive if it comprises more than 15% cover in 10% or more of the sample plots in any habitat class and increases in cover or frequency from the previous monitoring period. Plants that meet this definition will be considered invasive for all successive years of monitoring.

31. **Bare Substrate Cover:** Bare substrate represents no more than 20% cover.

32. **Species Diversity:** By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class and occur in at least 10% of the plots sampled.

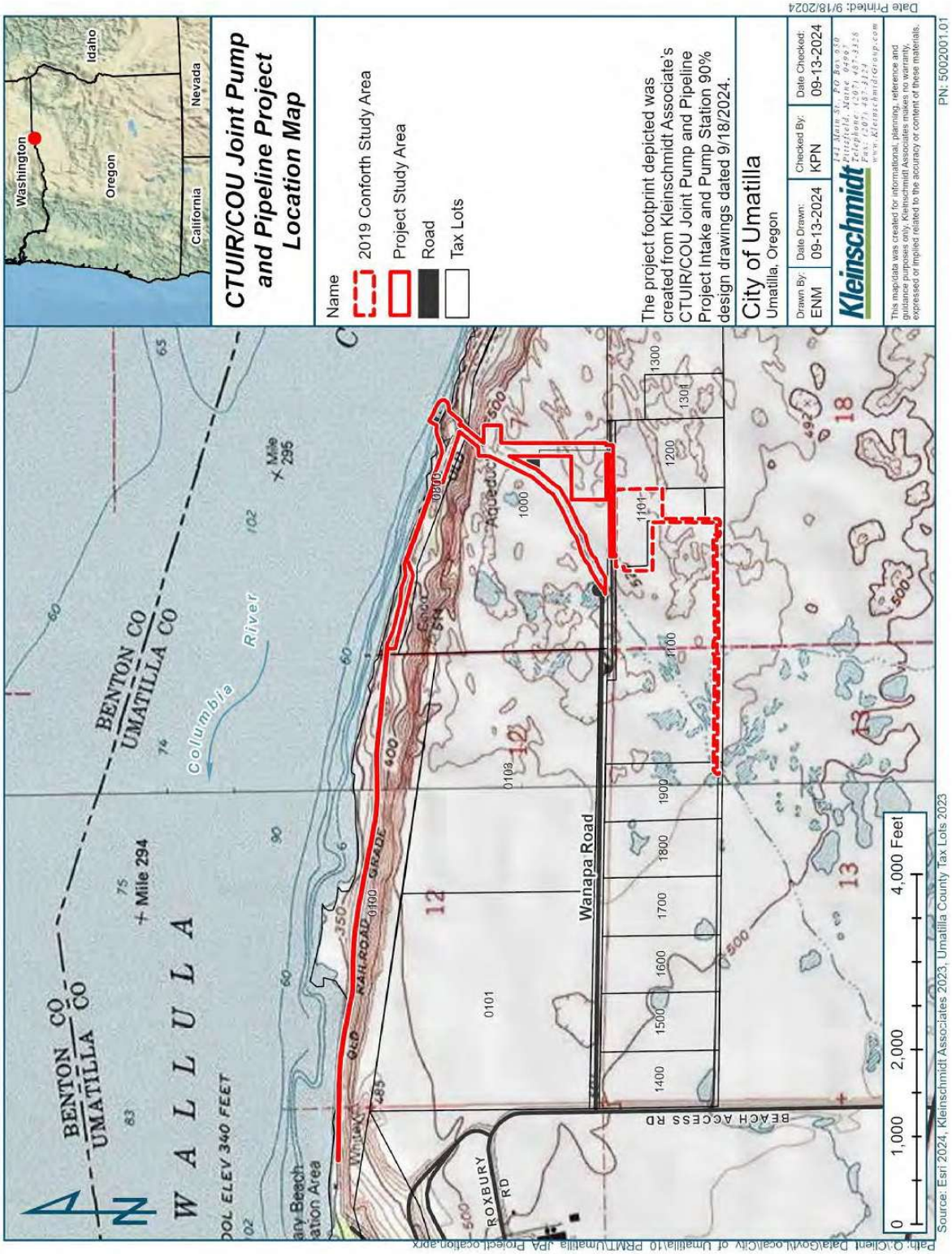
33. **Moisture Prevalence Index:** Prevalence Index is <3.0.

ATTACHMENT B

Permit Holder: City of Umatilla

Project Name: CTUIR/COU Joint Pump and Pipeline Project

Maps and Drawings for Removal/Fill Permit No. 64462-RF



Location Map



Project Site Plan

3B) State of Oregon Department of State Lands Removal-Fill Permit Renewal

Department of State Lands
775 Summer Street, Suite 100
Salem, OR 97301-1279
☎ 503-986-5200

Permit No.:	**64462-RF Renewal**
Permit Type:	**Removal/Fill**
Waters:	**Columbia River and wetlands**
County:	**Umatilla**
Expiration Date:	**February 25, 2027**

City of Umatilla

IS AUTHORIZED IN ACCORDANCE WITH ORS 196.800 TO 196.990 TO PERFORM THE OPERATIONS DESCRIBED IN THE REFERENCED APPLICATION, SUBJECT TO THE SPECIAL CONDITIONS LISTED ON ATTACHMENT A AND TO THE FOLLOWING GENERAL CONDITIONS:

1. This permit does not authorize trespass on the lands of others. The permit holder must obtain all necessary access permits or rights-of-way before entering lands owned by another.
2. This permit does not authorize any work that is not in compliance with local zoning or other local, state, or federal regulation pertaining to the operations authorized by this permit. The permit holder is responsible for obtaining the necessary approvals and permits before proceeding under this permit.
3. All work done under this permit must comply with Oregon Administrative Rules, Chapter 340; Standards of Quality for Public Waters of Oregon. Specific water quality provisions for this project are set forth on Attachment A.
4. Violations of the terms and conditions of this permit are subject to administrative and/or legal action, which may result in revocation of the permit or damages. The permit holder is responsible for the activities of all contractors or other operators involved in work done at the site or under this permit.
5. Employees of the Department of State Lands (DSL) and all duly authorized representatives of the Director must be permitted access to the project area at all reasonable times for the purpose of inspecting work performed under this permit.
6. Any permit holder who objects to the conditions of this permit may request a hearing from the Director, in writing, within twenty-one (21) calendar days of the date this permit was issued.
7. In issuing this permit, DSL makes no representation regarding the quality or adequacy of the permitted project design, materials, construction, or maintenance, except to approve the project's design and materials, as set forth in the permit application, as satisfying the resource protection, scenic, safety, recreation, and public access requirements of ORS Chapters 196, 390, and related administrative rules.
8. Permittee must defend and hold harmless the State of Oregon, and its officers, agents and employees from any claim, suit, or action for property damage or personal injury or death arising out of the design, material, construction, or maintenance of the permitted improvements.
9. Authorization from the U.S. Army Corps of Engineers may also be required.

NOTICE: If removal is from state-owned submerged and submersible land, the permittee must comply with leasing and royalty provisions of ORS 274.530. If the project involves creation of new lands by filling on state-owned submerged or submersible lands, you must comply with ORS 274.905 to 274.940 if you want a transfer of title; public rights to such filled lands are not extinguished by issuance of this permit. This permit does not relieve the permittee of an obligation to secure appropriate leases from DSL, to conduct activities on state-owned submerged or submersible lands. Failure to comply with these requirements may result in civil or criminal liability. For more information about these requirements, please contact Department of State Lands, 503-986-5200.

Richard Fitzgerald, Aquatic Resource Coordinator
Aquatic Resource Management
Oregon Department of State Lands

Richard Fitzgerald 4/28/2026

Authorized Signature

ATTACHMENT A

Permit Holder: City of Umatilla

Project Name: CTUIR/COU Joint Pump and Pipeline Project

Special Conditions for Removal/Fill Permit No. 64462-RF

READ AND BECOME FAMILIAR WITH CONDITIONS OF YOUR PERMIT.

The project site may be inspected by the Department of State Lands (DSL) as part of our monitoring program. A copy of this permit must be available at the work site whenever authorized operations are being conducted.

1. **Responsible Party:** By signature on the application, David Stockdale is acting as the representative of City of Umatilla (Permittee). By proceeding under this permit, Permittee agrees to comply with and fulfill all terms and conditions of this permit, unless the permit is officially transferred to another party as approved by DSL. In the event information in the application conflicts with these permit conditions, the permit conditions prevail.

2. **Authorization to Conduct Removal and/or Fill:** This permit authorizes 0.17 acres of wetland and 292 linear feet of waterway impact(s) with associated removal and fill of material in Tax Lot(s) 5N28000000100, 5N28000001900, 5N29000000800, 5N29000001000, 5N29000001100, 5N29000001101, in Umatilla County, as referenced in the application, map and drawings (See Attachment B for project location(s)), dated April 9, 2026.

3. **Work Period in Jurisdictional Areas:** Fill or removal activities below the ordinary high water elevation of Columbia River must be conducted between December 1 and March 31, unless otherwise coordinated with Oregon Department of Fish and Wildlife and approved in writing by DSL. If fish eggs are observed within the project area, work must cease, and DSL contacted immediately.

4. **Changes to the Project or Inconsistent Requirements from Other Permits:** It is the permittee's responsibility to ensure that all state, federal and local permits are consistent and compatible with the final approved project plans and the project as executed. Any changes made in project design, implementation or operating conditions to comply with conditions imposed by other permits resulting in removal-fill activity must be approved by DSL prior to implementation.

5. **DSL May Halt or Modify:** DSL retains the authority to temporarily halt or modify the project or require rectification in case of unforeseen adverse effects to aquatic resources or permit non-compliance.

6. **DSL May Modify Conditions Upon Permit Renewal:** DSL retains the authority to modify conditions upon renewal, as appropriate, pursuant to the applicable rules in effect at the time of the request for renewal or to protect waters of this state.

Pre-Construction

7. **Stormwater Management Approval Required Before Beginning Work:** Prior to the start of construction of any portion of the project, the permittee must obtain a National Pollution Discharge Elimination System (NPDES) permits for that portion of the project from the Oregon Department of Environmental Quality (DEQ), if one is required by DEQ.

8. **Pre-construction Resource Area Fencing or Flagging:** Prior to any site grading, the boundaries of the avoided wetlands, waterways, and riparian areas adjacent to the project site must be surrounded by noticeable construction fencing or flagging. The marked areas must be maintained during construction of the project and be removed immediately upon project completion.

General Construction Conditions

9. **Water Quality Certification:** The Department of Environmental Quality (DEQ) may evaluate this project for a Clean Water Act Section 401 Water Quality Certification (WQC). If the evaluation results in issuance of a Section 401 WQC, that turbidity condition will govern any allowable turbidity exceedance and monitoring requirements.

10. **Erosion Control Methods:** The following erosion control measures (and others as appropriate) must be installed prior to construction and maintained during and after construction as appropriate, to prevent erosion and minimize movement of soil into waters of this state.

    a. All exposed soils must be stabilized during and after construction to prevent erosion and sedimentation.
    b. Filter bags, sediment fences, sediment traps or catch basins, leave strips or berms, or other measures must be used to prevent movement of soil into waterways and wetlands.
    c. To prevent erosion, use of compost berms, impervious materials or other equally effective methods, must be used to protect soil stockpiled during rain events or when the stockpile site is not moved or reshaped for more than 48 hours.
    d. Unless part of the authorized permanent fill, all construction access points through, and staging areas in, riparian and wetland areas must use removable pads or mats to prevent soil compaction. However, in some wetland areas under dry summer conditions, this requirement may be waived upon approval by DSL. At project completion, disturbed areas with soil exposed by construction activities must be stabilized by mulching and native vegetative plantings/seeding. Sterile grass may be used instead of native vegetation for temporary sediment control. If soils are to remain exposed more than seven days after completion of the work, they must be covered with erosion control pads, mats or similar erosion control devices until vegetative stabilization is installed.
    e. Where vegetation is used for erosion control on slopes steeper than 2:1, a tackified seed mulch must be used so the seed does not wash away before germination and rooting.
    f. Dredged or other excavated material must be placed on upland areas having stable slopes and must be prevented from eroding back into waterways and wetlands.
    g. Erosion control measures must be inspected and maintained as necessary to ensure their continued effectiveness until soils become stabilized.
    h. All erosion control structures must be removed when the project is complete, and soils are stabilized and vegetated.

11. **Fuels, Hazardous, Toxic, and Waste Material Handling:** Petroleum products, chemicals, fresh cement, sandblasted material and chipped paint, material treated with leachable preservatives or other deleterious waste materials must not be allowed to enter waters of this state. Machinery and equipment staging, cleaning, maintenance, refueling, and fuel storage must be at least 150 feet from OHW or HMT and wetlands to prevent contaminates from entering waters of the state. Refueling is to be confined to a designated area to prevent spillage into waters of this state. Barges must have containment system to effectively prevent petroleum products or other deleterious material from entering waters of this state. Project-related spills into waters of this state or onto land with a potential to enter waters of this state must be reported to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

12. **Archaeological Resources:** If any archaeological resources, artifacts or human remains are encountered during construction, all construction activity must immediately cease. The State Historic Preservation Office must be contacted at 503-986-0674. You may be contacted by a Tribal representative if it is determined by an affected Tribe that the project could affect Tribal cultural or archeological resources.

13. **Construction Corridor:** There must be no removal of vegetation or heavy equipment operating or traversing outside the designated construction corridor or footprint (Project Site Plan).

14. **Hazards to Recreation, Navigation or Fishing:** The activity must be timed so as not to unreasonably interfere with or create a hazard to recreational or commercial navigation or fishing.

15. **Operation of Equipment in the Water:** Heavy equipment may not be positioned on or traverse areas below ordinary high water or highest measured tide at any time unless the equipment is operating from a barge as described in the application. All machinery operated below ordinary high water (OHW) or highest measured tide (HMT) elevation must use vegetable-based hydraulic fluids, be steam cleaned and inspected for leaks prior to each use, and be diapered to prevent leakage of fuels, oils, or other fluids below OHW or HMT elevation. Any equipment found to be leaking fluids must be immediately removed from and kept out of OHW or HMT until repaired.

16. **Work Area Isolation:** The work area must be isolated from the water during construction by using a coffer dam in accordance with the work area isolation plan in the application. All structures and materials used to isolate the work area must be removed immediately following construction and water flow returned to pre-construction conditions.

17. **Fish Salvage Required:** Fish must be salvaged from the isolation area. Permits from NOAA Fisheries and Oregon Department of Fish and Wildlife, Fish Research are required to salvage fish. Fish salvage permit information may be obtained by contacting ODFW Fish Research at 503-947-6254 or Fish.Research@state.or.us.

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19. **Raising or Redirecting Water:** The project must not cause water to rise or be redirected and result in damage to structures or property on the project site as well as adjacent, nearby, upstream, and downstream of the project site.

Rectification of Temporary Impacts

20. **Site Rectification Required for Temporary Wetland Impacts:** Site rectification for temporary impacts to 0.15 acres of wetland must be conducted according to the rehabilitation plan in the application, sections 4(C), 9(A), and 9(B). Failure to rectify the site may result in additional compensatory mitigation.

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Compensatory Mitigation

Bank Credits, Payment-in-Lieu or In-Lieu Fee.

22. **Payment-in-Lieu Mitigation:** Wetland mitigation for the unavoidable loss of 0.021 acres of riverine, PEM wetland and 36 linear feet of stream impact has been accomplished via payment to DSL's Removal-Fill Mitigation Fund in the amount of $30,924.77. Once the authorized fill has commenced, the payment is non-refundable.

Monitoring and Reporting Requirements

23. **Post-Construction Report Required:** A post-construction report demonstrating as-built conditions and discussing any variation from the approved plan must be provided to DSL within 90 days of revegetation, which shall occur during the fall, winter, or spring immediately following the completion of grading within the required planting areas. The post-construction report must include:

    a. A scaled drawing, accurate to 1-foot elevation, clearly showing the following:
        i. Finished contours of the site.
        ii. Current tax lot and right-of-way boundaries.
        iii. Photo point locations.
        iv. Permanently and temporarily impacted wetland and waterway boundaries identified separately, with square foot listed.
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    c. A narrative that describes any deviation from the approved plan.

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26. **Contents of the Annual Monitoring Report:** The annual monitoring report must include the following information:

    a. Completed Monitoring Report Cover Sheet, which includes permit number, permit holder name, monitoring date, report year, performance standards, and a determination of whether the site is meeting performance standards.
    b. Site location map(s) that clearly shows the impact site and rectification site boundaries.
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    d. A brief narrative that describes maintenance activities and recommendations to meet success criteria. This includes when irrigation occurred and when the above ground portion of the irrigation system was or will be removed from the site.
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    f. Photos from fixed photo points (include in the appendix).
    g. Other information necessary or required to document compliance with the performance standards listed in this permit.

27. **Corrective Action May Be Required:** DSL retains the authority require corrective action in the event the performance standards are not accomplished at any time within the monitoring period.

Performance Standards

To be deemed successful, the temporary impact areas must meet the following performance standards, as determined by DSL:

28. **Establishment of Permanent Monitoring Locations Required:** Permanent plot locations must be established during the first annual monitoring in sufficient number and locations to be representative of the site. The permanent plot locations must be clearly marked on the ground.

Herbaceous Wetlands

29. **Native Species Cover:** The cover of native species, as defined in the USDA Plants Database, in the herbaceous stratum is at least 60%.

30. **Invasive Species Cover:** The cover of invasive species is no more than 10%. A plant species should automatically be labeled as invasive if it appears on the current Oregon Department of Agriculture noxious weed list, plus known problem species including *Phalaris arundinacea, Mentha pulegium, Holcus lanatus, Anthoxanthum odoratum,* and the last crop plant if it is non-native. Non-native plants should be labeled as such if they are listed as non-native on the USDA Plants Database. Beginning in Year 2 of monitoring, DSL will consider a non-native plant species invasive if it comprises more than 15% cover in 10% or more of the sample plots in any habitat class and increases in cover or frequency from the previous monitoring period. Plants that meet this definition will be considered invasive for all successive years of monitoring.

31. **Bare Substrate Cover:** Bare substrate represents no more than 20% cover.

32. **Species Diversity:** By Year 3 and thereafter, there are at least 6 different native species. To qualify, a species must have at least 5% average cover in the habitat class and occur in at least 10% of the plots sampled.

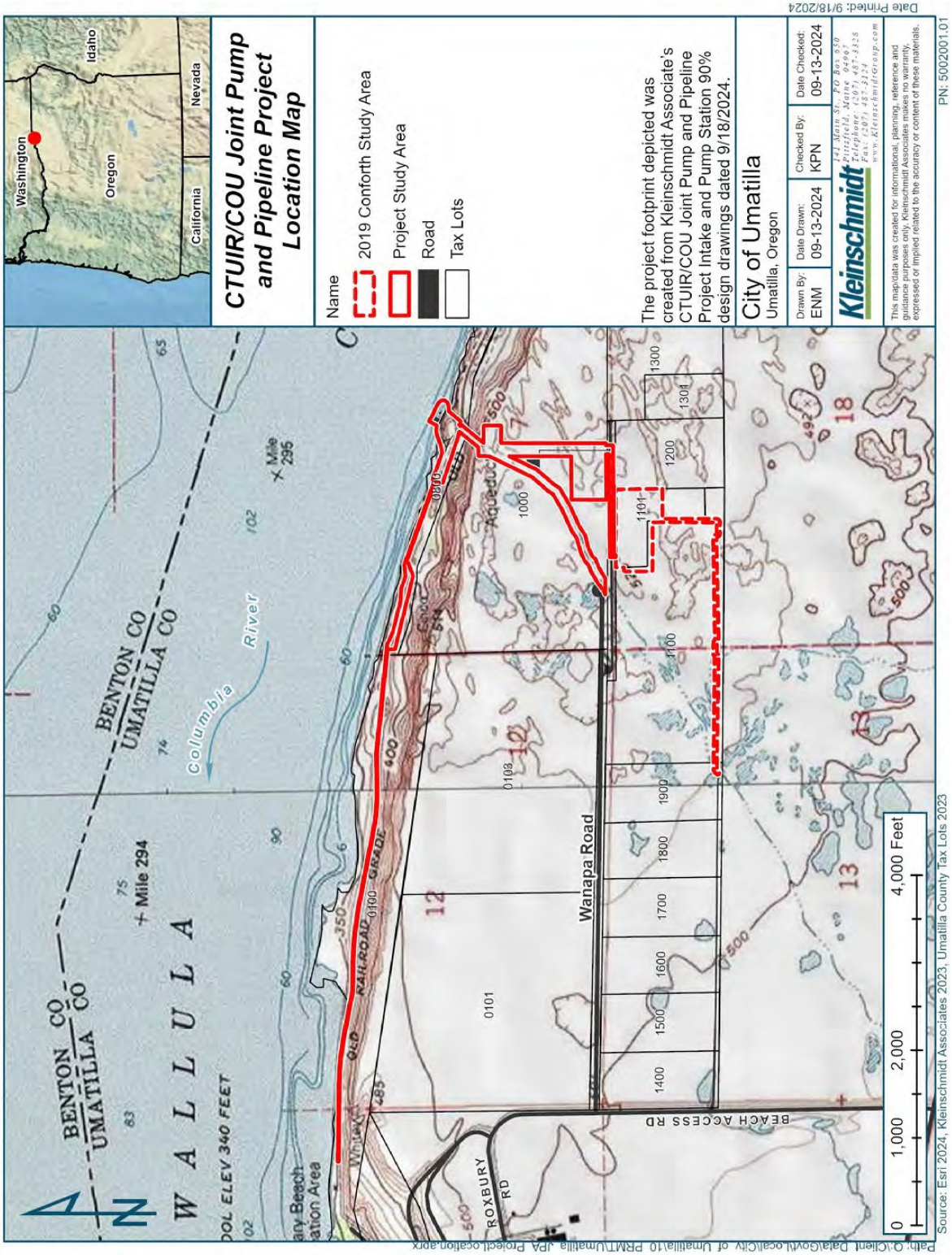
33. **Moisture Prevalence Index:** Prevalence Index is <3.0.

ATTACHMENT B

Permit Holder: City of Umatilla

Project Name: CTUIR/COU Joint Pump and Pipeline Project

Maps and Drawings for Removal/Fill Permit No. 64462-RF



Location Map



Project Site Plan

4) State of Oregon Department of Environmental Quality 401 Water Quality Certification

Oregon
Tina Kotek, Governor

Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5263
FAX (503) 229-6945
TTY 711

March 27, 2025

David Stockdale
City of Umatilla
P.O. Box 130
Umatilla, OR 97882

RE: 401 Water Quality Certification Approval for 2022-467-1, CTUIR/COU Joint Pump and Pipeline Project

The US Army Corps of Engineers (USACE) has determined that your project will be authorized under Nationwide Permit (NWP) category #58. As described in the application package received and reviewed by the Oregon Department of Environmental Quality (DEQ), the project qualifies for the expedited 401 Water Quality Certification (WQC), subject to the conditions outlined below. If you cannot meet all conditions of this 401 WQC, you may apply for a standard individual certification. A standard individual certification will require additional information, a public notice, and a higher review fee.

Certification Decision: Based on information provided by the USACE and the Applicant, DEQ has determined that implementation eligible activities under the proposed NWP will be consistent with water quality requirements including applicable provisions of Sections 301, 302, 303, 306, and 307 of the federal Clean Water Act, state water quality standards set forth in Oregon Administrative Rules Chapter 340 Division 41, and other appropriate requirements of state law, provided the following conditions are incorporated into the federal permit and strictly adhered to by the Applicant.

Duration of Certificate: This 401 WQC for impacts to waters, including dredge and fill activities, is valid for the duration of the USACE Section 404 permit. A new 401 WQC must be requested with any modification of the USACE 404 permit.

In addition to all USACE national and regional permit conditions, the following 401 WQC conditions apply to all NWP categories that qualify for the Nationwide 401 WQC.

401 GENERAL CERTIFICATION CONDITIONS

1) **Responsible parties:** This 401 WQC applies to the Applicant. The Applicant is responsible for the work of its contractors and sub-contractors, as well as any other entity that performs work related to this WQC.
Rule: *40 CFR 121, OAR 340-048-0015*
Justification: *DEQ must be aware of responsible parties to ensure compliance.*

2) **Work Authorized:** Work authorized by this 401 WQC is limited to the work described in the Permit Application and additional application materials (hereafter “the permit application

materials"), unless otherwise authorized by DEQ. If the project is operated in a manner not consistent with the project description contained in the permit application materials, the Applicant is not in compliance with this 401 WQC and may be subject to enforcement.
Rule: *OAR 340-048-0015*
Justification: *To ensure the project will comply with water quality standards, DEQ must understand all work involved in the construction and operation of the project.*

3) **401 WQC on Site:** A copy of this 401 WQC must be kept on the job site and readily available for reference by the Applicant and its contractors and subcontractors, as well as by DEQ, USACE, National Marine Fisheries Service (NMFS), Oregon Department of Fish and Wildlife (ODFW), and other state and local government inspectors.
Rule: *OAR 340-012*
Justification: *All parties must be aware of and comply with the 401 WQC, including on-site contractors.*

4) **Project Changes:** DEQ may modify or revoke this 401 WQC, in accordance with OAR 340-048-0050, if the project changes or project activities are having an adverse impact on state water quality or beneficial uses, or if the Applicant is otherwise in violation of the conditions of this certification.
Rule: *OAR 340-048-0050*
Justification: *To ensure the project will comply with water quality standards, DEQ must understand all work involved in the construction and operation of the project.*

5) **Land Use Compatibility Statement:** In accordance with OAR 340-048-0020(2) (i), each Applicant must submit findings prepared by the local land use jurisdiction that demonstrates the activity's compliance with the local comprehensive plan. Such findings can be submitted using Section 11 of the Joint Permit Application, signed by the appropriate local official and indicating:

   a. "This project is consistent with the comprehensive plan and land use regulations;" or,

   b. "This project will be consistent with the comprehensive plan and land use regulations when the following local approvals are obtained," accompanied by the obtained local approvals.

   c. Rarely, such as for federal projects on federal land, "this project is not regulated by the comprehensive plan" will be acceptable.

In lieu of submitting the appropriate section of the USACE & Department of State Lands (DSL) Joint Permit Application, the Applicant may use DEQ's Land Use Compatibility Statement form found at: http://www.oregon.gov/deq/FilterDocs/lucs.pdf
Rule: *OAR 340-048-0020(2) (i), OAR 340-018*
Justification: *DEQ must ensure compliance with water quality land use laws at the local level.*

6) **Access:** The Applicant and its contractors must allow DEQ access to the project site with or without prior notice, including staging areas, and mitigation sites to monitor compliance with these 401 WQC conditions, including:

   a. Access to any records, logs, and reports that must be kept under the conditions of this 401 WQC;

   b. To inspect best management practices (BMPs), monitoring or equipment or methods; and

c. To collect samples or monitor any discharge of pollutants.

Rule: *OAR 340-012*
Justification: *DEQ must inspect facilities for compliance with all state rules and laws.*

7) Failure of any person or entity to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce its terms.
Rule: *OAR 340-012*
Justification: *If the project is not being constructed or operated as proposed, it may not be consistent with water quality requirements.*

FOR PROJECTS THAT PROPOSE CONSTRUCTION, THE FOLLOWING GENERAL CONDITIONS APPLY

8) **Erosion and Sediment Control**: During construction, erosion control measures must be implemented to prevent or control movement of soil into waters of the state. The Applicant is required to develop and implement an effective erosion and sediment control plan. A project that disturbs more than one acre may be required to obtain a National Pollutant Discharge Elimination System (NPDES) 1200-C construction stormwater general permit. Contact the DEQ Stormwater Program for more information at: https://www.oregon.gov/deq/wq/wqpermits/Pages/Stormwater-Construction.aspx

In addition, the Applicant must:

a. Maintain an adequate supply of materials necessary to control erosion at the project construction site.

b. Prohibit erosion of stockpiles. Deploy compost berms, impervious materials, or other effective methods during rain events or when stockpiles are not moved or reshaped for more than 48 hours.

c. Inspect erosion control measures daily and maintain erosion control measures as often necessary to ensure the continued effectiveness of measures. Erosion control measures must remain in place until all exposed soil is stabilized;

i. If monitoring or inspection shows that the erosion and sediment controls are ineffective, Applicant must mobilize immediately to make repairs, install replacements, or install additional controls as necessary.

ii. If sediment has reached 1/3 of the exposed height of a sediment or erosion control, Applicant must remove the sediment to its original contour.

d. Use removable pads or mats to prevent soil compaction at all construction access points through, and staging areas in, riparian or wetland areas to prevent soil compaction, unless otherwise authorized by DEQ.

e. Flag or fence off wetlands not specifically authorized to be impacted to protect from disturbance and/or erosion.

f. Place dredged or other excavated material on upland areas with stable slopes to prevent materials from eroding back into waterways or wetlands.

g. Place clean aggregate at all construction entrances, and utilize other BMPs, including, but not limited to as truck or wheel washes, when earth moving equipment is leaving the site and traveling on paved surfaces. The tracking of sediment off site by vehicles is prohibited.

Rule: *OAR 340-041-0007(8), ORS 468B.050, CWA Section 402, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

9) **Deleterious Waste Materials:** The Applicant is prohibited from placing biologically harmful materials and construction debris where they could enter waters of the state, including wetlands (wetlands are waters of the state). This includes, but is not limited to: petroleum products; chemicals; cement cured less than 24 hours; welding slag and grindings; concrete saw cutting by-products; sandblasted materials; chipped paint; tires; wire; steel posts; asphalt; and waste concrete.

The following specific requirements apply:

a. Cure concrete, cement, or grout for at least 24 hours before any contact with flowing waters;

b. Use only clean fill, free of waste and polluted substances;

c. Employ all practicable controls to prevent discharges of spills of harmful materials to surface or groundwater;

d. Maintain at the project construction site, and deploy as necessary, an adequate supply of materials needed to contain deleterious materials during a weather event;

e. Remove all foreign materials, refuse, and waste from the project area

Rule: *OAR 340-041-0007(8), ORS 468B.050, CWA Section 402*
Justification: *DEQ must ensure that pollution does not enter waterways.*

10) **Spill Prevention:** The Applicant must fuel, operate, maintain and store vehicles, and must store construction materials, in areas that will not disturb habitat directly or result in potential discharges.
Rule: *ORS 468B.025(1)(a)*
Justification: *DEQ must ensure that pollution does not enter waterways.*

11) **Spill & Incident Reporting:**

a. In the event that deleterious materials are discharged into state waters, or onto land with a potential to enter state waters, the discharge must be promptly reported to the Oregon Emergency Response Service (OERS, 1-800-452-0311) within 24 hours. Containment and cleanup must begin immediately and be completed as soon as possible.

b. If the project operations cause a water quality problem that results in distressed or dying fish, the operator must immediately: cease operations; take appropriate corrective measures to prevent further environmental damage; collect fish specimens and water samples; and notify DEQ, ODFW, NMFS, and US Fish and Wildlife Service (USFW).

Rule: *ORS 466.645(1); OAR 340-142-0030(1)(b)(B), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways and must be protective of beneficial uses, including fish.*

12) **Vegetation Protection and Site Restoration:**

a. The Applicant must protect riparian, wetland, and shoreline vegetation in the authorized project area from disturbance through one or more of the following:

   i. Minimization of project and impact footprint;

   ii. Designation of staging areas and access points in open, upland areas;

   iii. Fencing and other barriers demarking construction areas; and

   iv. Use of alternative equipment (e.g., spider hoe or crane).

b. If authorized work results in vegetative disturbance and the disturbance has not been accounted for in planned mitigation actions, the Applicant must successfully reestablish vegetation to a degree of function equivalent or better than before the disturbance.

c. Pesticides (including herbicides) and fertilizers must be applied per manufacturer's instructions by a professionally licensed applicator. If chemical treatment is necessary, the Applicant is responsible for ensuring that pesticide application laws, including with the NPDES System 2300-A general permit, are met. Please review the information on the following website for more information: https://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx

   i. For pesticide application within stormwater treatment facilities or within 150 feet of waters of the state, the Applicant must adopt an Integrated Pest Management (IPM) plan that describes pest prevention, monitoring and control techniques with a focus on prevention of inputs to waters of the state, or coverage under an NPDES permit, if required.

   ii. Pesticide application should be applied during the dry season and avoid direct water application;

   iii. Unless otherwise approved in writing by DEQ, applying surface fertilizer within stormwater treatment facilities or within 50 feet of any stream channel is prohibited.

Rule: *OAR 340-041, OAR 340-012, OAR 340-041-0033*
Justification: *Riparian, wetland, and shoreline vegetation help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

13) **Buffers:** The Applicant shall avoid and protect from harm, all wetlands and provide a 50 foot buffer to waters of the state, unless proposed, necessary, and approved as part of the project. If a local jurisdiction has a more stringent buffer requirement, that requirement will take the place of this certification requirement.
Rule: *OAR 340-041, OAR 340-012*
Justification: *Riparian, wetland, and shoreline buffers help ensure excess sediment does not enter a waterway, and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

14) **Previously Contaminated Soil and Groundwater:** If any contaminated soil or groundwater is encountered, it must be handled and disposed of in accordance with the soil and groundwater management plan for the site, as well as local, state and federal regulations. The Applicant must notify the Environmental Cleanup Section of DEQ at 1-800-452-4011.
Rule: *OAR 340-041, OAR 340-012, OAR 340-122, OAR 340-040*
Justification: *DEQ must ensure that pollution does not enter waterways. As sediments are disturbed, pollutants could become redistributed.*

FOR PROJECTS THAT PROPOSE IN-STREAM WORK IN JURISDICTIONAL WATERS

15) **Fish protection/ Oregon Department of Fish and Wildlife timing:** The Applicant must perform in-water work only within the ODFW preferred time window as specified in the *Oregon Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, or as authorized otherwise under a USACE permit and/or DSL removal/fill permit. Exceptions to the timing window must be recommended by ODFW, NMFS and/or the USFW as appropriate, and approved by DSL when applicable.
Rule: *OAR 340-041-0011*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

16) **Aquatic life movements:** Any activity that may disrupt the movement of aquatic life living in the water body, including those species that normally migrate through the area, is prohibited. The Applicant must provide unobstructed fish passage at all times during any authorized activity, unless otherwise approved in the approved application.
Rule: *OAR 340-041-0016; OAR 340-041-0028*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

17) **Isolation of in-water work areas:** The Applicant must isolate in-water work areas from the active flowing stream, unless otherwise authorized as part of the approved application, or authorized by DEQ.
Rule: *OAR 340-041, OAR 340-012, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

18) **Cessation of Work:** The Applicant must cease project operations under high-flow conditions that will result in inundation of the project area. Only efforts to avoid or minimize turbidity or other resource damage as a result of inundation of the exposed project area are allowed during high-flow conditions.
Rule: *OAR 340-041, OAR 340-012*
Justification: *DEQ must ensure that pollution does not enter waterways*.

19) **Turbidity**: The Applicant must implement BMPs to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidities is prohibited except as specifically provided below:

    a. **Monitoring**: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two-hour intervals each day when in-water work is being conducted. A properly calibrated turbidimeter is required **unless another monitoring method is proposed and authorized by DEQ**.

        i. **Representative Background Point**: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet up-current of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring down-current at the compliance point described below.

        ii. **Compliance Point:** The Applicant must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet down-current from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

b. **Compliance**: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances are allowed as followed:

MONITORING WITH A TURBIDIMETER *EVERY 2 HOURS*	
TURBIDITY LEVEL	***Restrictions to Duration of Activity***
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

c. **Reporting**:
   i. Record all turbidity monitoring required by subsections (a) and (b) above in daily logs which must include: calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; and location; date; time; and tidal stage (if applicable) for each reading.

   ii. A narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to regulatory agencies including DEQ, USACE, NMFS, USFWS, and ODFW upon request.

   iii. Keep records on file for the duration of the permit cycle.

d. **BMPs to Minimize In-stream Turbidity:** The Applicant must implement the following BMPs, unless accepted in writing by DEQ:

   i. Sequence/Phasing of work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances.

   ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;

   iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary at the least sensitive areas

and amend these crossing sites with clean gravel or other temporary methods as appropriate;

iv. Machinery may not be driven into the flowing channel, unless authorized in writing by DEQ; and

v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

vi. Containment measures such as silt curtains, geotextile fabric, and silt fences must be in place and properly maintained in order to minimize in-stream sediment suspension and resulting turbidity.

Rule: *OAR 340-041-0036, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

SPECIFIC CONDITIONS FOR POST-CONSTRUCTION STORMWATER MANAGEMENT

20) **Post Construction Stormwater Management:** For projects which propose new impervious surfaces or the redevelopment of existing surfaces, the Applicant must submit a post-construction stormwater management plan to DEQ. The plan must be reviewed and approved prior to construction to ensure compliance with water quality standards. The Applicant must implement BMPs as proposed in the stormwater management plan, including construction, operation, and maintenance. If proposed stormwater facilities change due to site conditions, the Applicant must notify DEQ in writing.

In lieu of a complete stormwater management plan, the Applicant may submit documentation of acceptance of the stormwater into a DEQ permitted NPDES Phase I Municipal Separate Storm Sewer System (MS4).
Rule: *ORS 468B.050, OAR 340-045, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

21) **Stormwater Management & System Maintenance:** The Applicant is required to implement effective operation and maintenance practices for the lifetime of the proposed facility. Long-term operation and maintenance of stormwater treatment facilities will be the responsibility of the applicant or the entity listed in the approved post-construction stormwater management plan.

Maintenance of stormwater treatment facilities subject to an MS4 permit is regulated by the permit.
Rule: *OAR 340-041, OAR 340-012, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways.*

22) **Corrective Action May Be Required:** DEQ retains the authority to require corrective action in the event the stormwater management facilities are not built or performing as described in the plan.
Rule: *OAR 340-041, OAR 340-012*
Justification: *DEQ must ensure that pollution does not enter waterways.*

CATEGORY SPECIFIC CONDITIONS

In addition to all national and regional conditions of the USACE permit and the 401 Water Quality Certification general conditions above, the following conditions apply to the noted specific categories of authorized activities.

NWP 7 – Outfall Structures and Associated Intake Structures:

7.1) The following actions are denied certification:

a. Discharge outfalls that are not subject to an NPDES permit; and

b. Outfalls that discharge stormwater without pollutant removal demonstrated to meet water-quality standards prior to discharge to waters of the state.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways. Untreated stormwater is considered pollution.*

7.2) If an Applicant cannot obtain an NPDES permit or submit an approvable stormwater management plan per DEQ's Guidelines found at: http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048, OAR 340-045*
Justification: *DEQ must ensure that pollution does not enter waterways. Untreated stormwater is considered pollution.*

NWP 13 – Bank Stabilization:

13.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

13.2) Projects that propose permanent fill in adjacent wetlands are denied certification.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Water adjacent wetlands provide water quality benefits.*

13.3) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

NWP 14 – Linear Transportation:

14.1) For projects that include bank stabilization, bioengineering must be a component of the project, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

14.2) To apply for certification for a project without bioengineering, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion upstream and downstream of the structure.*

NWP 16 - Return Water from Contained Upland Disposal Areas: Water-quality criteria and guidance values for toxics, per OAR 340-041-0033, are available in Tables 30, 31, and 40 at: https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=68746.

16.1) Discharge of return water from contaminated dredged material that exceeds a chronic or acute toxicity water quality standard is prohibited.
Rule: *OAR 340-041-0053(b)(A), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

16.2) Water removed with contaminated dredged material that could or does exceed chronic water-quality criteria must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration.
Rule: *OAR 340-041-0053(b)(A), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

16.3) If a Modified Elutriate Test (MET) is performed for the known contaminants of concern (CoCs) and CoC concentrations are below DEQ chronic water-quality criteria, return water discharge is not limited.

a. The MET must be performed before dredging.
a. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
b. DEQ must review the results and provide approval of discharge from return water, in writing, prior to dredging.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 20 – Response Operations for Oil and Hazardous Waste:

20.1) Coordination with DEQ's Emergency Response program is required. See: http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx.
Rule: *OAR 340-142-0130(3), OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 22 – Removal of Vessels:

22.1) Coordination with DEQ's Emergency Response program is required. See:

http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Emergency-Response.aspx.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Vessels may contain various fuels, lubricants, and other possible sources of pollution.*

NWP 31 – Maintenance of Existing Flood Control Facilities:

31.1) Projects in streams with temperature TMDLs which result in a net reduction of riparian shade are prohibited.
Rule: *OAR 340-041-0028, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 38 – Cleanup of Hazardous and Toxic Waste:

38.1) For removal of contaminated material from waters, dredging method is limited to diver assisted hydraulic suction, hydraulic suction, closed-lipped environmental bucket, or excavation in the dry, unless otherwise authorized by DEQ.

a. For in-water isolation measures, the Applicant is referred to Appendix D of DEQ's Oregon Erosion and Sediment Control Manual, April 2005 (or most current version), at: DEQ Erosion and Sediment Control Manual
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.2) Discharge to waters of the state resulting from dewatering during dredging or release of return water from an upland facility is prohibited except as provided below.

a. All water removed with sediment must be contained and disposed of at an appropriately sized and sealed upland facility by evaporation or infiltration; or,

b. A Modified Elutriate Test (MET) may be performed for the known Contaminants of Concern (CoCs) and if CoC concentrations are below DEQ chronic water-quality criteria; return water discharge is not limited.

i. The MET must be performed before dredging.
ii. DEQ must approve the list of CoCs and analytical method prior to the Applicant performing the MET.
iii. DEQ must review the results and provide approval of discharge from dewatering and return water in writing prior to dredging.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.3) Dredged material must be disposed of in compliance with DEQ Rules governing Hazardous Waste (see: http://www.oregon.gov/deq/Hazards-and-Cleanup/hw/Pages/default.aspx) or Solid Waste (see: http://www.oregon.gov/deq/mm/swpermits/Pages/Solid-Waste-Disposal-Sites-and-Landfill.aspx).
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

38.4) The new in-water surface must be managed to prevent exposure or mobilization of contaminants.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

NWP 41 - Reshaping Existing Drainage Ditches:

41.1) To the extent practicable, the Applicant must work from only one bank in order to minimize disturbance to existing vegetation, preferably the bank with the least existing vegetation;
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways.*

41.2) Following authorized work, the Applicant must establish in-stream and riparian vegetation on reshaped channels and side-channels using native plant species wherever practicable. Plantings must be targeted to address water-quality improvement (e.g., provide shade to water to reduce temperature or provide bank stability through root systems to limit sediment inputs). Planting options may include clustering or vegetating only one side of a channel, preferably the side which provides maximum shade.
Rule: *OAR 340-041-0004(5)(a)*
Justification: *Riparian, wetland, and shoreline buffers help ensure excess sediment does not enter a waterway and helps offset potential temperature impacts. DEQ must ensure that pollution does not enter waterways.*

NWP 42 – Recreational Facilities:

42.1) For facilities that include turf maintenance actions, the permittee must develop and implement an Integrated Pest Management Plan (IPM) that describes pest prevention, monitoring and control techniques with a focus on prevention of chemical and nutrient inputs to waters of the state, including maintenance of adequate buffers for pesticide application near salmonid streams, or coverage under an NPDES permit, if required (information is available at: http://www.oregon.gov/deq/wq/wqpermits/Pages/Pesticide.aspx).
Rule: *OAR 340-041-0033, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways, including excess pesticides and fertilizers.*

NWP 43 – Stormwater Management Facilities:

43.1) Projects that propose the following elements are denied expedited certification:
a. In-stream stormwater facilities;
b. Discharge outfalls not subject to an MS4 NPDES permit; and,
c. Proposals that do not demonstrate pollutant removal to meet water quality standards prior to discharge to waters of the state.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways; stormwater is considered a pollutant.*

43.2) To apply for certification for a project with in-stream stormwater facilities, without an NPDES permit, or without submittal of an approvable stormwater management plan per DEQ's Guidelines (at: http://www.oregon.gov/deq/FilterDocs/401wqcertPostCon.pdf), the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways; stormwater is considered a pollutant.*

NWP 44 – Mining Activities:

44.1) Projects that do not obtain an NPDES 700-PM or Individual permit are denied expedited certification.
Rule: *OAR 340-045-0033, OAR 340-041*
Justification: *DEQ must ensure that pollution does not enter waterways. Excess turbidity can be considered pollution.*

44.2) To apply for certification for a project without an NPDES permit, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways*.

44.3) The State of Oregon requires an In-Water Blasting Permit be obtained per OAR, 635-425-0000. Permittee is advised to contact the nearest ODFW office for further information at: https://www.dfw.state.or.us/lands/inwater/
Rule: *OAR 340-041-0011*
Justification: *DEQ must be protective of all water quality standards, including beneficial uses such as fish.*

NWP 51 – Land-Based Renewable Energy Generation Facilities:

51.1) For associated utility lines with directionally-bored stream or wetland crossings proposed, condition D.1 must be applied.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways*

NWP 53 – Removal of Low-Head Dams:

53.1) Projects that do *not* go through a PSET review if sediments are being dispersed are denied certification.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Sediments can be a carrier of contaminants.*

53.2) To apply for certification for a project without a PSET, the Applicant must submit complete project information and water quality impacts analysis directly to DEQ in order to undergo individual 401 WQC evaluation and fulfill public participation requirements.
Rule: *OAR 340-041-0059*
Justification: *DEQ must ensure that pollution does not enter waterways. Sediments can be a carrier of contaminants.*

NWP 54 – Living Shorelines:

54.1) Projects that do not include bioengineering are denied certification, unless a registered professional engineer provides a written statement that non-bioengineered solutions are the only means of protection.
Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways. Hard armoring can increase erosion in the system.*

NWP 58 – Utility Lines:

58.1) For proposals that include directionally-bored stream or wetland crossings:

a. All drilling equipment, drill recovery and recycling pits, and any waste or spoil produced, must be completely isolated, recovered, then recycled or disposed of to prevent entry into waters of the state. Recycling using a tank instead of drill recovery/recycling pits is preferable;

b. In the event that drilling fluids enter a water of the state, the equipment operator must stop work, immediately initiate containment measures and report the spill to the Oregon Emergency Response System (OERS) at 1-800-452-0311.

c. An adequate supply of materials needed to control erosion and to contain drilling fluids must be maintained at the project construction site and deployed as necessary.

d. The Applicant must have a contingency plan in place prior to construction for the inadvertent return of drilling lubricant.

Rule: *OAR 340-142-0030, OAR 340-142-0040(1)*
Justification: *Drilling equipment and fluids that enter a waterbody would likely cause contamination of that waterbody.*

58.2) For proposals that include utility lines through wetlands, include anti-seep collars or equivalent technology to prevent draining the wetlands.

Rule: *OAR 340-041, OAR 340-012, OAR 340-048*
Justification: *DEQ must ensure that pollution does not enter waterways*

If the Applicant is dissatisfied with the conditions contained in this certification, a hearing may be requested. Such request must be made in writing to DEQ's Office of Compliance and Enforcement at 700 NE Multnomah St, Suite 600, Portland Oregon 97232, within 20 days of the mailing of this certification.

The DEQ hereby certifies that this project complies with the Clean Water Act and state rules, with the above conditions. If you have any questions, please contact Delia Negru, at 503-593-2493, by email at delia.negru@deq.oregon.gov, or at the address on this letterhead.

Sincerely,



Theresa Burcsu,
Water Quality Manager
Northwest Region

ec: Danielle Erb, USACE
Richard Fitzgerald, DSL
Kai Steimle, Kleinschmidt Associates

State of Oregon
DEQ Department of Environmental Quality

401 Water Quality Certification Turbidity Monitoring Report

Project Name:	USACE Project #	DSL Project #

Name of Inspector(s):	Turbidimeter Model:	Calibration Standard Type (Circle One) Formazin Solution or Gelex	Calibration Standard Expiration Date:

Sampling Date:	Calibration Values:	*Upstream (Background) Point Location:	*Downstream (Compliance) Point Location:
	_____NTU (Standard) = _____NTU (Reading) _____NTU (Standard) = _____NTU (Reading) _____NTU (Standard) = _____NTU (Reading)	Latitude: Longitude:	Latitude: Longitude:

In-Water Work Start Time:	In-Water Work End Time:	Description of In-Water Work:

Upstream Sample		Downstream Sample		Change in Turbidity (NTU)	Observation of waterbody		NOTES (Describe any modifications made to BMPs)
Time	Turbidity (NTU)	Time	Turbidity (NTU)		Tidal Stage	Note any plume, sheen, floatables, color	

401 Water Quality Certification Turbidity Monitoring Report

** Include a figure with the turbidity sampling forms showing the sampling locations.*

Turbidity: The Applicant must implement appropriate Best Management Practices (BMPs) to minimize turbidity during in-water work. Any activity that causes turbidity to exceed 10% above natural stream turbidity is prohibited except as specifically provided below:

Monitoring: Turbidity monitoring must be conducted and recorded as described below. Monitoring must occur at two hour intervals each day during daylight hours when in-water work is being conducted, including while dewatering or work area isolation measures are in place. A properly calibrated turbidimeter is required unless another monitoring method is proposed and authorized by DEQ.

Representative Background Point: The Applicant must take and record a turbidity measurement every two hours during in-water work at an undisturbed area. A background location shall be established at a representative location approximately 100 feet upcurrent of the in water activity unless otherwise authorized by DEQ. The background turbidity, location, date, tidal stage (if applicable) and time must be recorded immediately prior to monitoring downcurrent at the compliance point described below.

Compliance Point: The must monitor every two hours. A compliance location shall be established at a representative location approximately 100 feet downcurrent from the disturbance at approximately mid-depth of the waterbody and within any visible plume. The turbidity, location, date, tidal stage (if applicable) and time must be recorded for each measurement.

MONITORING WITH A TURBIDIMETER *EVERY 2 HOURS*	
TURBIDITY LEVEL	***Restrictions to Duration of Activity***
0 to 4 NTU above background	No Restrictions
5 to 29 NTU above background	Work may continue maximum of 4 hours. If turbidity remains 5-29 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
30 to 49 NTU above background	Work may continue maximum of 2 hours. If turbidity remains 30-49 NTU above background, stop work and modify BMPs. Work may resume when NTU is 0-4 above background.
50 NTU or more above background	Stop work immediately and inform DEQ

Compliance: The Applicant must compare turbidity monitoring results from the compliance points to the representative background levels taken during each two – hour monitoring interval. Pursuant to OAR 340-041-0036, short term exceedances of the turbidity water quality standard are allowed as shown in the monitoring table shown here.

Reporting: The Applicant must record all turbidity monitoring required by subsections (a) and (b) above in daily logs, kept on file for the duration of the permit cycle. The daily logs must include calibration documentation; background NTUs; compliance point NTUs; comparison of the points in NTUs; location; date; time; and tidal stage (if applicable) for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions. Applicant must make available copies of daily logs for turbidity monitoring to DEQ, USACE, NMFS, USFWS, and ODFW upon request.

BMPs to Minimize In-stream Turbidity: The Applicant must implement the following BMPs, unless otherwise accepted by DEQ:

i. Sequence/Phasing of Work – The Applicant must schedule work activities so as to minimize in-water disturbance and duration of in-water disturbances;
ii. Bucket control - All in-stream digging passes by excavation machinery and placement of fill in-stream using a bucket must be completed so as to minimize turbidity. All practicable techniques such as employing an experienced equipment operator, not dumping partial or full buckets of material back into the wetted stream, adjusting the volume, speed, or both of the load, or using a closed-lipped environmental bucket must be implemented;
iii. The Applicant must limit the number and location of stream-crossing events. Establish temporary crossing sites as necessary in the least sensitive areas and amend these crossing sites with clean gravel or other temporary methods as appropriate;
iv. Machinery may not be driven into the flowing channel, unless authorized by DEQ; and
v. Excavated material must be placed so that it is isolated from the water edge or wetlands, and not placed where it could re-enter waters of the state uncontrolled.

5) State of Oregon Health Authority Construction Approval

Public Health Division
Drinking Water Services
Tina Kotek, Governor

January 9, 2026

Ali Leeds, PE
Carollo Engineers
1200 5th Avenue, Suite 900
Seattle, Washington 98101

Jason Kent, PE
Kleinschmidt Group
1500 NE Irving Street, Suite 550
Portland, Oregon 97232

Re: New Surface Water Intake and Pump Station, Plan Review #38-2024,
City of Umatilla, PWS ID #4100914
Preliminary Approval

Dear Ali and Jason:

Thank you for your submittal of plan review information to the Oregon Health Authority's Drinking Water Services (DWS). On April 1, 2025, the plan review fee of $825 was received. On October 15, 2025, a sanitary survey report of the watershed was received. On November 7, 2025, a final set of drawings for the pump station was received. On December 11, 2025, a summary of the water quality sampling was received. I note that the Land Use Compatibility Statement submitted for the proposed water treatment plant, plan review #16-2024, also covers this portion of the project. The project consists of constructing a new intake and pump station on the Columbia River. The plans have been reviewed and were found to meet the applicable provisions of OAR 333-061-0050(3). Preliminary approval is granted for the project.

I have the following comment:

- The city should work with the local Oregon Water Resources Department watermaster, Greg Silbernagel, to ensure all requirements associated with the water rights under Permit S55483 are met. His phone number is 541-278-5456.

Upon completion of the project, please verify in writing that the construction was completed according to the submitted plans. Until Final Approval is granted for the project, the new facilities are not approved for use.

If you have any questions or would like this in an alternate format, please feel free to call me at (541) 966-0900 or email at william.h.goss@oha.oregon.gov .

Sincerely,

William Goss, PE
Regional Engineer

c: Julie Wray, OHA–DWS
Scott Coleman, City of Umatilla (pdf copy only)
Leon Scheel, City of Umatilla (pdf copy only)
David Stockdale, City of Umatilla (pdf copy only)
Greg Silbernagel, Oregon Water Resources Department (pdf copy only)
Lisa Siefken, PE, J-U-B Engineers (pdf copy only)
Bill Cutting, PE, Kleinschmidt Group (pdf copy only)