

BID AND CONTRACT DOCUMENTS

VOLUME I

BIDDING AND AGREEMENT FORMS

for

**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

February 2024

- Volume I Bidding and Agreement Forms
- Volume II Technical Specifications (Divisions 1-16)
- Volume III Plans



Engineers

J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d'Alene, Idaho 83815
(208) 762-8787



Owner

City of Post Falls
408 N. Spokane St.
Post Falls, Idaho 83854
(208) 773-3511

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

Table of Contents

VOLUME 1 – BIDDING AND AGREEMENT FORMS

SECTION 1-A – BID FORMS

Document 00030 – Advertisement for Bids
Document 00040 – Bidder’s Checklist
Document 00200 – Instructions to Bidders
Document 00410 – Bid Form
Document 00415 – Contractor’s Non-Collusion Affidavit
Document 00420 – Anti-Discrimination Affidavit
Document 00430 – Bid Bond – Penal Sum Form
Document 00440 – Naming of Subcontractors Form

SECTION 1-B – CONTRACT FORMS

Document 00500 – Successful Bidder’s Checklist
Document 00510 – Notice of Award
Document 00520 – Agreement between Owner and Contractor for Construction Contract
Document 00550 – Notice to Proceed
Document 00610 – Performance Bond
Document 00615 – Payment Bond
Document 00620 – Contractor’s Application for Payment
WH-5 Public Works Contract Report
Document 00625 – Certificate of Substantial Completion
Document 00940 – Work Change Directive
Document 00941 – Change Order
Document 00942 – Field Order
Document 00950 – Contractor’s Affidavit Concerning Taxes

SECTION 2 – GENERAL CONDITIONS

ISPWC Division 100 – Standard General Conditions to the Construction Contract

SECTION 3 – SUPPLEMENTARY CONDITIONS

VOLUME 2 – TECHNICAL SPECIFICATIONS (Divisions 1-16)

Division 1 – General Requirements

Section 01010 – Summary of Work
Section 01014 – Work Sequence
Section 01019 – Contract Considerations
Section 01025 – Measurement and Payment
Section 01039 – Coordination and Meetings
Section 01063 – Health and Safety
Section 01300 – Submittals
Section 01310 – CPM Construction Schedule
Section 01400 – Quality Assurance and Quality Control
Section 01500 – Construction Facilities and Temporary Controls
Section 01560 – Environmental Controls
Section 01600 – Materials and Equipment
Section 01625 – Pre-Procured Equipment Coordination
 Appendix A – Pre-Procured Equipment Agreements (and Information)
Section 01650 – Starting of Systems
Section 01700 – Contract Closeout
Section 01730 – Installation, Operation, and Maintenance Manuals

Division 2 – Site Work

NA

Division 3 – Concrete

NA

Division 4 – Masonry

Section 04010 – Maintenance of Masonry
Section 04100 – Mortar and Grout
Section 04300 – Reinforced Unit Masonry

Division 5 – Metals

Section 05041 – Hot-Dip Galvanizing
Section 05120 – Structural Steel
Section 05500 – Metal Fabrications

Division 6 – Wood and Plastics

NA

Division 7 – Thermal and Moisture Protection

NA

Division 8 – Windows and Doors

NA

Division 9 – Finishes

Section 09900 – High-Performance Coatings

Division 10 – Specialties

NA

Division 11 – Equipment

Section 11000 – General Requirements for Equipment

Division 12 – Furnishings

NA

Division 13 – Special Construction

NA

Division 14 – Conveying Systems

NA

Division 15 – Mechanical

Pipe and Fittings (*Specified on Plans*)

Section 15850 – Removeable Insulation for Equipment

Division 16 – Electrical

Section 16012 – Electrical General

Section 16119 – Conductors and Cables

Section 16126 – Grounding and Bonding

Section 16129 – Hangers and Supports

Section 16133 – Raceways and Boxes

Section 16153 – Identification for Electrical Systems

Section 16430 – Enclosed Switches and Circuit Breakers

Section 16670 – Electrical Testing

Section 16858 – Heat Trace

Section 16926 – Control System

Appendix A – LCP-SL Drawings

VOLUME 3 – PLANS:

See Drawing Index

Section 1-A

Bid Forms

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

ADVERTISEMENT FOR BIDS

PROJECT TITLE: **City of Post Falls WRF Biosolids Hopper Modifications**

Separate sealed BIDS for the **WRF Biosolids Hopper Modifications** located at Post Falls, Idaho and other related work as set forth in the Contract documents for the WRF Biosolids Hopper Modifications will be received by the City of Post Falls at the City Clerk's office, 408 N. Spokane St, Post Falls, Idaho 83854, until **2:00 p.m. local time on April 2, 2024** and then in the Basement Conference Room, publicly opened and read aloud.

The project is an upgrade to an existing wastewater reclamation facility (WRF), generally including the following:

1. Addition of actuated gate valves, and associated piping to the four live bottom screw conveyors for the biosolids storage hopper.
2. Relocation of the biosolids loadout screw conveyor, collection hopper and associated structural and architectural modifications to the building.
3. Associated electrical system improvements.
4. Other ancillary system improvements.

It is the intent of these documents to describe the work required to complete this project in sufficient detail to secure comparable bids. All parts or work not specifically mentioned which are necessary in order to provide a complete installation shall be included in the bid and shall conform to all Local, State and Federal requirements.

The PROJECT MANUAL, DRAWINGS and EXHIBITS may be examined at the following location(s):

- City of Post Falls City Hall, 408 N. Spokane St, Post Falls, ID 83854
- Post Falls WRF, 2002 W. Seltice Way, Post Falls, ID 83854
- J-U-B ENGINEERS, Inc., 7825 Meadowlark Way, Coeur d'Alene, ID 83815

Electronic copies of the Contract Documents shall be obtained from:

- Michael Conn, P.E. at J-U-B ENGINEERS, Inc. at 7825 Meadowlark Way, Coeur d'Alene, ID 83815; phone (208) 762-8787; fax (208) 762-9797; email mconn@jub.com. The standard set of Bidding Documents is electronic .pdf files.

A pre-Bid conference will be held on March 21, 2024 at 11:00 a.m. local time at the Water Reclamation Facility Administration Building 2 Conference Room: City of Post Falls, 2002 W Seltice Way, Post Falls, ID 83854. Bidders are encouraged to attend and participate in the conference.

In determining the lowest responsive bid, the Owner will consider all acceptable bids on a basis consistent with the bid package.

All bids must be signed and accompanied by evidence of authority to sign.

Bids must be accompanied by Bid Security in the form of a bid bond, certified check, cashier's check or cash in the amount of five percent of the amount of the bid proposal. Said bid security shall be forfeited to the City of Post Falls should the successful bidder fail to enter into contract in accordance with their proposal as specified in the Instructions to Bidders.

The City of Post Falls reserves the right to reject any or all proposals, waive any nonmaterial irregularities in the bids received, and to accept the lowest responsive bid.

Questions during bidding should be directed to Scott Krallman, P.E. at J-U-B ENGINEERS, Inc. at 7825 Meadowlark Way, Coeur d'Alene, ID 83815; phone (208) 762-8787; fax (208) 762-9797; email skrallman@jub.com.

Date

John Beacham, Public Works Director,
City of Post Falls

Dates Advertised: N/A – Bids Solicited under IDAPA 67-2805 "Semi-Formal" Bidding Procedures.

**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

BIDDER'S CHECKLIST

The Bidder's Checklist is offered to assist the prospective bidder in checking his/her Bid. This checklist does not relieve the bidder from properly completing his/her Bid.

Check off when completed:

1. _____ Bid Form (Document 00410)
 - a. Are all blank spaces filled out on Bid Form?
 - b. Have questions arising from the bidding, contract, specifications or plans been submitted to the proper authority and resolved in the proper manner?
 - c. Are Bid amounts shown correctly as well as extensions and totals? Recheck for errors or omissions. Prices must be shown in words and figures.
 - d. Are authorized signatures properly affixed to the Bid form, giving also title, and Idaho Public Works Contractor license number, evidence of authority to sign, etc.?
 - e. Has Bidder performed examinations in accordance with the Instructions to Bidders?
 - f. Have all Addenda been received and acknowledged with the proper signature on the Bid Form?

2. _____ Has the Non-Collusion Affidavit been enclosed? (Document 00415)

3. _____ Has the Anti-Discrimination Affidavit been enclosed? (Document 00420)

4. _____ Has the Bid Security been enclosed? (Document 00430)

5. _____ Have all plumbing, heating, air conditioning and electrical subcontractors to whom work will be awarded been listed, as well as their Idaho Public Works Contractor license number?
(Document 00440)

6. _____ In order for a Bid to be considered, the Bid Form, Bid Security, Naming of Subcontractors Form, and other required attachments must be placed in a properly addressed sealed envelope and delivered to the specified authority prior to the time designated for the bid opening.

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

| | Page |
|--|-------------|
| Article 1 – Defined Terms | 1 |
| Article 2 – Copies of Bidding Documents | 1 |
| Article 3 – Qualifications of Bidders | 1 |
| Article 4 – Examination of Bidding Documents, Other Related Data, and Site | 2 |
| Article 5 – Pre-Bid Conference | 4 |
| Article 6 – Site and Other Areas | 4 |
| Article 7 – Interpretations and Addenda | 5 |
| Article 8 – Bid Security | 6 |
| Article 9 – Contract Times | 6 |
| Article 10 – Liquidated Damages..... | 6 |
| Article 11 – Substitute and “Or-Equal” Items | 6 |
| Article 12 – Subcontractors, Suppliers and Others..... | 7 |
| Article 13 – Preparation of Bid | 7 |
| Article 14 – Basis of Bid; Comparison of Bids..... | 8 |
| Article 15 – Submittal of Bid | 8 |
| Article 16 – Modification and Withdrawal of Bid | 8 |
| Article 17 – Opening of Bids | 9 |
| Article 18 – Bids to Remain Subject to Acceptance | 9 |
| Article 19 – Evaluation of Bids and Award of Contract | 9 |
| Article 20 – Contract Security and Insurance..... | 10 |
| Article 21 – Signing of Agreement..... | 10 |
| Article 22 – Sales and Use Taxes | 10 |
| Article 23 – Retainage..... | 10 |
| Article 24 – Contracts to be Assigned | 10 |
| Article 25 – Prevailing wage rates | 10 |
| Article 26 – Funding Agency Requirements..... | 10 |

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ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

- A. *Bidder* – One who submits a Bid directly to the Owner, as distinct from a Sub-Bidder, who submits a Bid to a Bidder.
- B. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. The Issuing Office for this project is:

J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d’Alene, Idaho 83815

Copies of the Bidding Documents shall be obtained as noted in the Advertisement for Bids.

- C. *Owner* – The individual or entity with whom the Contractor has entered into the Agreement and for whom the Work is to be performed. The Owner for this project is:

City of Post Falls
408 N. Spokane Street
Post Falls, Idaho 83854

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bid may be obtained as noted in the Advertisement for Bid. The deposit for the Bidding Documents is **not** refundable.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder’s qualifications to perform the Work, within five days of Owner’s request, Bidder shall submit written evidence as may be called for below.
 - A. See Article 3.03
 - B. See Article 13.11

- 3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.
- 3.03 Idaho Code 54-1902 requires Bidder and subcontractors to have the appropriate Public Works Contractor's License to submit a Bid or proposal for this project. If this project is financed in whole or in part with federal aid funds, a Public Works Contractor License is not required to Bid or propose, but will be required prior to award.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

- A. The Supplementary Conditions identify:
1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.
 2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request at the cost of reproduction. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 *Underground Facilities*

- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

- A. The Supplementary Conditions identify any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.
- B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request at the cost of reproduction. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

- 4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible

changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 4.06 of the General Conditions.

- 4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.
- 4.06 A. Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.
- B. Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.
- 4.07 It is the responsibility of each Bidder before submitting a Bid to:
- A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;
- B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable "technical data," and (2)-reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Paragraph 4.06 of the Supplementary Conditions as containing reliable "technical data";
- E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;

- F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
- H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;
- I. acknowledge that Owner does not warrant that the Contract Documents or plans will be free from defect or error and Bidder is responsible for verifying viability of any plans and specifications for accuracy and completeness, and if a defect or error is discovered, the Bidder is obligated to inform the Owner; and
- J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 A pre-Bid conference will be held at the time and location indicated in the Advertisement for Bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer 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.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.
- 7.03 Where discrepancies occur in the Contract Documents, the most stringent requirements shall dictate.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent of Bidder's maximum Bid price and in the form of cash, a certified check, cashier's check, or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within the timeframe noted in the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.
- 9.02 The submission of a Bid is a representation by the Bidder that Bidder will commence construction work and will complete construction during the time specified in the Contract Documents.

ARTICLE 10 – LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by the Contractor and consideration by the Engineer is set forth in the General Conditions, Owners Supplementary Conditions, and/or individual Technical Specifications.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

- 12.01 Contractor shall identify certain Subcontractors, Suppliers, individuals, or entities as required in the Bidding Documents at the times indicated.
- 12.02 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.
- 12.03 Per Idaho Code 67-2310, Bidder shall include in his Bid the name, or names and address, or addresses, and Idaho Public Works Contractor License numbers of the Subcontractors who shall, in the event the Bidder secures the Contract, subcontract the plumbing, heating and air-conditioning work, and electrical work under the general Contract. Failure to name Subcontractors as required by this section shall render any Bid submitted by the Bidder unresponsive and void. Use Naming of Subcontractors Form 00440.

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form is included with the Bidding Documents.
- 13.02 All blanks on the Bid Form shall be completed in ink and the Bid Form signed. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein.
- 13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- 13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.
- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown. Include evidence of authority to sign.
- 13.08 All names shall be printed or typed in ink below the signatures.

- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in Idaho. If the project is federally funded, signing the Bid Form constitutes a covenant to obtain such qualification prior to award of the Contract. Bidder's Idaho Public Works Contractor License Number shall also be shown on the Bid form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 Unit Price

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule, including Additive Alternates.
- B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

ARTICLE 15 – SUBMITTAL OF BID

- 15.01 With each copy of the Bidding Documents, a Bidder is furnished the Bid Bond Form. Bid Form is to be completed and submitted with all the attachments outlined in Article 7 of the Bid Form.
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement to Bid. A mailed Bid shall be addressed to **Owner at the address in Article 1.01 of the Bid Form.**

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- 16.02 Relief from Bids. (a) If an awarding authority for the public entity determines that a Bidder is entitled to relief from a Bid because of mistake, the authority shall prepare a report in writing to document the

facts establishing the existence of each element required in Section 54-1904C, Idaho Code. The report shall be available for inspection as a public record and shall be filed with the public entity soliciting bids. (b) A Bidder claiming a mistake satisfying all the conditions of Section 54-1904C, Idaho Code, shall be entitled to relief from the Bid and have any Bid Security returned by the public entity. Bidders not satisfying the conditions found in Section 54-1904C, Idaho Code, shall forfeit any Bid Security. Bidders failing to execute a Contract and not satisfying the conditions of a mistake shall also forfeit any Bid Security.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 Not Used.

19.05 Not Used.

19.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder submitting the lowest responsive bid who has also complied with the statutory and administrative requirements of the bid process and who holds the requisite licenses.

19.07 Not Used.

19.08 Determination of the lowest Bid price shall be based on the Total Bid – Schedule A.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner’s requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within the timeframe noted in the Notice of Award, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within the timeframe noted in the Notice of Award, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 22 – SALES AND USE TAXES

22.01 Refer to Article 6 of the General Conditions for tax requirements.

ARTICLE 23 – RETAINAGE

23.01 Provisions for retainage are as established in Article 6 of the Agreement.

ARTICLE 24 – CONTRACTS TO BE ASSIGNED

24.01 Not Applicable

ARTICLE 25 – PREVAILING WAGE RATES

25.01 Not Applicable

ARTICLE 26 – FUNDING AGENCY REQUIREMENTS

26.01 Not Applicable

**BID FORM FOR
CONSTRUCTION CONTRACTS**

Modified from

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

For The

**CITY OF POST FALLS
WRF BIOSOLIDS HOPPER MODIFICATIONS**

BID FORM FOR CONSTRUCTION CONTRACTS

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

BID FORM

for

CITY OF POST FALLS

WRF BIOSOLIDS HOPPER MODIFICATIONS

TABLE OF CONTENTS

| | Page |
|---|-------------|
| Article 1 – Bid Recipient..... | 1 |
| Article 2 – Bidder’s Acknowledgements | 1 |
| Article 3 – Bidder’s Representations | 1 |
| Article 4 – Bidder’s Certification..... | 2 |
| Article 5 – Basis of Bid..... | 3 |
| Article 6 – Time of Completion..... | 5 |
| Article 7 – Attachments to This Bid | 5 |
| Article 8 – Defined Terms | 5 |
| Article 9 – Bid Submittal | 6 |

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

City of Post Falls
408 N. Spokane Street
Post Falls, Idaho 83854

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER’S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER’S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged:

| <u>Addendum No.</u> | <u>Addendum Date</u> |
|---------------------|----------------------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in SC-4.02 as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in SC-4.06 as containing reliable "technical data."

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site;

the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

- F. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, test, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder safety precautions and programs incident thereto.
- G. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- H. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

SCHEDULE A – WRF BIOSOLIDS HOPPER MODIFICATIONS

| Item No. | Item Description | Estimated Quantity | Unit | Unit Price | Total Price |
|----------|--|--------------------|------|----------------------|-------------|
| 1 | WRF Biosolids Hopper Modifications (All Work Under Contract Documents) | 1 | LS | \$ | \$ |
| 2 | Use Tax on Owner Furnished Materials and Equipment (6% of \$65,574.19) | 1 | LS | \$ 3,934.45 | \$ 3,934.45 |
| | | | | TOTAL PRICE = | |

TOTAL PRICE:

(use words)

Bid prices listed shall include all applicable taxes and fees.

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

5.02 Major Equipment Items: Certain items of major equipment to be provided under this Contract are tabulated in the Schedule of Manufacturers and Suppliers of Major Equipment and Material Items. In connection with the tabulation of major items of equipment included in the lump sum base bid, the following shall apply:

- A. The lump sum bid shall include the installed prices from those manufacturers listed by the Owner as "Base Bid."
- B. Bidder may include prices for listed alternate manufacturers or add additional manufacturers with corresponding prices, but only the manufacturers listed by the Owner as "Base Bid" will be considered in determining the low bid. Listing of alternate equipment is optional and will not result in submitting a non-responsible bid if none is entered.

- C. The Owner may select the Base Bid equipment or items of equipment of any alternate manufacturer listed, at Owner’s discretion.
- D. After the Date of Agreement and prior to the selection of the major equipment items, the Contractor, if requested by the Engineer, shall provide information in sufficient detail to allow the Owner and the Engineer to determine whether or not the proposed alternate equipment is equivalent to that specified. The selection of any alternate equipment by the Owner does not relieve the Contractor of his/her responsibility to meet the requirements of the Contract Documents and Specifications.
- E. Items of equipment selected by the Owner shall be installed at a contract price equal to the Base Bid lump sum adjusted by the add or deduct shown for the items selected by the Owner if different from the Base Bid items. The Owner will select major equipment items within thirty (30) days after the date of the Notice to Proceed, provided Contractor has provided sufficient information to Owner/Engineer as noted above.
- F. The Bidder understands that equipment of a proposed alternate manufacturer must meet or exceed the requirements of the Contract Documents and Specifications, be of equal or better quality, and be of equal function to the base bid equipment.
- G. The price add/deduct for all items of equipment other than base bid items shall include the preparation and submission to the Owner of complete submittals, including detailed drawings showing all modifications, if any, necessary to accommodate such equipment.
- H. The price add/deduct for all items of equipment other than base bid items shall cover a complete operating installation, including any and all buildings, mechanical and electrical work, controls and accessories necessary to accommodate the selected equipment.
- I. The Bidder further understands that the Engineer will review said detailed Drawings or modifications and either approve them or indicate thereon changes necessary to comply with the project requirements in accordance with Article 6.05 of the General Conditions. Detailed drawings which are not approved will be revised and then resubmitted to the Engineer. The deduct and add amounts listed are “installed” prices and take into consideration and include any cost of the design or construction changes that may be required as a result of using the alternate equipment. Unless listed separately, the amount listed shall apply to the additive items also if they are awarded by the Owner.

**SCHEDULE OF MANUFACTURERS & SUPPLIERS OF
MAJOR EQUIPMENT & MATERIAL ITEMS IN SCHEDULE A.1**

| Item # | Item | Amount |
|--------|-------------------------|---|
| 1 | Section TBD – NA | |
| | a. TBD | Base Bid |
| | b. _____ (Manufacturer) | Add/Deduct from Base Bid \$ _____ |
| | c. _____ (Manufacturer) | Add/Deduct from Base Bid \$ _____ |

Note: The Bidder shall circle the word "Add" or "Deduct" to indicate that the amount for the Alternate Equipment or Material is to be added to or deducted from the Base Bid Lump Sum. This Schedule may be photocopied and attached to the Proposal if additional space for alternates is required.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.
- 6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.
- 6.03 Bidder agrees to comply with Idaho Code 44-1001 through 44-1005, regarding employment of Idaho residents.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are submitted with and made a condition of this Bid:
 - A. Required Bid security in accordance with Article 8 of the Instructions to Bidders.
 - B. Bidder shall include in his Bid the name, or names and address, or addresses, and Idaho Public Works Contractor License Numbers of the Subcontractors who shall, in the event the Bidder secures the Contract, subcontract the plumbing, heating and air-conditioning work, and electrical work under the general Contract;
 - C. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;
 - D. State of Idaho Public Works Contractor's License No.: _____ [or] Evidence of Bidder's ability to obtain a State Contractor's License prior to award since federal funds are being used for the project.
 - E. Other Documents:
 - 1. Non-Collusion Affidavit, Document 00415;
 - 2. Anti-Discrimination Affidavit, Document 00420;
 - 3. Naming of Subcontractors, Document 00440;
 - 4. Evidence of Authority to Sign (if applicable).

ARTICLE 8 – DEFINED TERMS

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Attest _____

Date of Qualification to do business in Idaho is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____

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

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____

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

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address _____

Phone No. _____ Fax No. _____

E-mail _____

SUBMITTED on _____, 20____.

Idaho Public Works Contractor License No. _____.

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

Anti-Discrimination Affidavit

STATE OF _____:

COUNTY OF _____:

The Bidder hereby covenants, stipulates and agrees that no person shall be discriminated against in the bidding of the services and/or materials herein under and that the Bidder shall not refuse to hire any person therefore because of such person's race, creed, sex, color, or national origin, unless based on a bona fide occupational qualification. Also, the Bidder will in no manner discriminate against any person because of such person's race, creed, sex, color, or national origin. Any such discrimination shall be deemed a violation of this Bid and shall render this Bid subject to forfeiture.

Contractor's Signature

Subscribed and sworn to before me this _____ day of _____, 20__.

Notary Public

State of _____

Residing at _____

My Commission Expires _____

(SEAL)

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BID BOND

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

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

CITY OF POST FALLS
408 N. SPOKANE STREET
POST FALLS, ID 83854

BID

Bid Due Date:

Description *(Project Name and Include Location)*:

BOND

Bond Number:

Date *(Not earlier than Bid due date)*:

Penal sum

_____ \$ _____

(Written in Words)

(Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

(Seal)

(Seal)

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By:

Signature

By:

Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest:

Signature

Attest:

Signature

Title

Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

Naming of Subcontractors Form

Per Idaho Code, 67-2310, Bidder shall include in his or her Bid the names and address, and Idaho Public Works Contractor License Number of the Subcontractors who shall, in the event the Bidder secures the Contract, subcontract the plumbing, heating and air-conditioning work, and electrical work under the general Contract.

If the Bidder intends to self-perform the plumbing, heating and air-conditioning work, or the electrical work, the Bidder must list itself and list its valid contractor's license number for the plumbing, heating and air-conditioning work, or electrical work that it intends to self-perform as required by I.C. 67-2310.

Failure to name Subcontractors as required, or indicate Bidder as performing the work, shall render any Bid submitted by the Bidder unresponsive and void. If category does not apply to this project, indicate "not applicable".

| <u>Subcontractor Name and Address</u> | <u>Classification</u> | <u>PWC License Number</u> |
|---|-------------------------|---------------------------|
| Plumbing _____ _____ _____ _____ | _____ _____ _____ | _____ _____ _____ |
| HVAC _____ _____ _____ _____ | _____ _____ _____ | _____ _____ _____ |
| Electrical _____ _____ _____ _____ | _____ _____ _____ | _____ _____ _____ |

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Section 1-B

Contract Forms

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**City of Post Falls
Kootenai County, Idaho**

WRF Tertiary Treatment Modifications

SUCCESSFUL BIDDER'S CHECKLIST

The Successful Bidder's Checklist is offered to assist the successful bidder in checking that all required documentation is being provided to the Owner. Funding agencies may have additional forms that may be required. This checklist is provided as a guide and does not relieve the Successful Bidder or Contractor from properly completing his/her Contract obligations.

Following receipt of the Notice of Award from the Owner, the Successful Bidder shall complete and return the following documentation before Notice to Proceed will be issued:

Check off when completed:

1. _____ Completed Agreement Form 00520, and associated assignment exhibits.
2. _____ Completed Performance Bond Form 00610.
3. _____ Completed Payment Bond Form 00615.
4. _____ Certificates of Insurance.
5. _____ Completed Contractor's Affidavit Concerning Taxes Form 00950.
6. _____ Completed Idaho Tax Commission WH-5 Public Works Contract Report.

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Notice of Award

Date: _____

Project: City of Post Falls WRF: Biosolids Hopper Modifications

Owner: City of Post Falls

Owner's Contract No.:

Contract:

Engineer's Project No.: 20-23-033

Bidder:

Bidder's Address: *[send Notice of Award Certified Mail, Return Receipt Requested]*

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for _____

[Indicate total Work, alternates, or sections of Work awarded.]

The Contract Price of your Contract is _____ Dollars (\$_____).

[Insert appropriate data if unit prices are used. Change language for cost-plus contracts.]

_____ copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

_____ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 15 days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), General Conditions (Paragraph 5.01), and Supplementary Conditions (Paragraph SC-5.01).
3. Other conditions precedent:

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Owner
By: _____
Authorized Signature

Title

Copy to Engineer
(Use Certified Mail, Return Receipt Requested)

AGREEMENT

Modified from

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

For The

**CITY OF POST FALLS
WRF BIOSOLIDS HOPPER MODIFICATIONS**

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

**FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)**

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES



ASCE American Society
of Civil Engineers

P/E National Society of
Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

**AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT
(STIPULATED PRICE)**

THIS AGREEMENT is by and between _____ City of Post Falls, Idaho _____ (“Owner”) and
_____ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

1. Addition of actuated gates, and associated piping to the four live bottom screw conveyors for the biosolids storage hopper.
2. Relocation of the biosolids loadout screw conveyor, collection hopper and associated structural and architectural modifications to the building.
3. Associated electrical system improvements.
4. Other ancillary system improvements.

ARTICLE 2 – THE PROJECT

1.02 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

City of Post Falls, Idaho – WRF Biosolids Hopper Modifications

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by J-U-B ENGINEERS, Inc., 7825 Meadowlark Way, Coeur d’Alene, Idaho 83815 (Engineer), which is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Days to Achieve Substantial Completion and Final Payment*

- A. The Work will be substantially completed within 150 calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions & SC-2.03, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 180 calendar days after the date when the Contract Times commence to run.
- B. An Intermediate Milestone for substantial completion of the Work is defined as 60 calendar days after the date the Contractor notifies Owner of Notice to Proceed with Shut-Down of the Elevated Biosolids Hopper and Loadout Facility. *Reference Technical Specification Section 01400 Work Sequence.*

4.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02.A or 4.02.B above (i.e. if either the Intermediate Milestone or overall Substantial Completion time are not met), plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner \$750 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner \$500 for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined below:
 - A. For all Work, at the price stated in the Contractor’s Bid, attached hereto as an exhibit (**EXHIBIT B-1**).

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 30th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.
 - 1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions.
 - a. Ninety-five (95%) percent of Work completed (with the balance being retainage); and
 - b. Ninety-five (95%) percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage), if suitably stored and secured on site in a manner acceptable to the Owner.
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 200percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

- 7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 5 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

- 8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph SC-4.06 of the Supplementary Conditions as containing reliable "technical data."
- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents as well as the Scope of all Contracts Assigned to the Contractor.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. The Contractor is an appropriately licensed public works contractor per Section 54-1902 (Idaho Code) and all subcontractors listed as required per Section 67-2310.
- K. Contractor shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages __ to __, inclusive).
 - 2. Performance bond (pages _____ to _____, inclusive).
 - 3. Payment bond (pages _____ to _____, inclusive).
 - 4. Other bonds (pages _____ to _____, inclusive).
 - a. _____ (pages _____ to _____, inclusive).
 - b. _____ (pages _____ to _____, inclusive).
 - c. _____ (pages _____ to _____, inclusive).
 - 5. Assigned contracts:
 - a. NA
 - 6. General Conditions – Division 100 of the Idaho Standards for Public Works Construction (attached).
 - 7. Supplementary Conditions (pages _____ to _____, inclusive).
 - 8. Specifications as listed in the table of contents of the Project Manual.
 - 9. Drawings consisting of _____ sheets with each sheet bearing the following general title:
WRF Tertiary Treatment Improvements.
 - 10. Addenda (numbers _____ to _____, inclusive).
 - 11. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor’s Bid (**EXHIBIT B-1**) (pages _____ to _____, inclusive).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).
 - c. *[List other required attachments (if any), such as documents required by funding or lending agencies].*
 - 12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages _____ to _____, inclusive).

- b. Work Change Directives.
 - c. Change Orders.
 - d. Field Orders
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

- A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents may ~~shall~~ be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Nondiscrimination Requirements*

- B. During the performance of this contract, the contractor/consultant, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:
1. Compliance with Regulations - The contractor shall comply with the Regulations relative to non-discrimination in federally assisted programs of United States Department of Transportation (USDOT), Title 49, Code of Federal Regulations, part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract. The Parties acknowledge that this is not a USDOT project and the referenced regulations are adopted for purposes of spelling-out and clarifying non-discrimination for application to this project.
 2. Non-discrimination - The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, sex, or national origin in the selection and retention of sub-contractors, including procurement of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination, including employment practices.
 3. Solicitations for Sub-contracts, Including Procurement of Materials and Equipment - In all solicitations either by competitive bidding or negotiations made by the contractor for work to be performed under a sub-contract, including procurement of materials or leases of equipment, each potential sub-contractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to non-discrimination on the grounds of race, color, sex, or national origin.

4. Information and Reports - The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the contracting agency or the appropriate federal agency to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to ITD or the USDOT as appropriate, and shall set forth what efforts it has made to obtain the information.
5. Sanctions for Non-compliance - In the event of the contractor's non-compliance with the non-discrimination provisions of this contract, the contracting agency shall impose such contract sanctions as it or any other appropriate agency may determine to be appropriate, including, but not limited to:
 - Withholding of payments to the contractor under the contract until the contractor complies, and/or;
 - Cancellation, termination, or suspension of the contract, in whole or in part.

C. Incorporation of Provisions

1. The contractor shall include the provisions of paragraphs (1) through (5) in every sub-contract, including procurement of materials and leases of equipment. The contractor shall take such action with respect to any sub-contractor or procurement as the contracting agency or any other appropriate agency may direct as a means of enforcing such provisions including sanctions for non-compliance.
2. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request Owner enter into such litigation to protect Owner's.

10.07 Contractor Acknowledgement of Owner-Furnished Equipment Contracts:

- A. The following Pre-Procured Equipment contracts have been executed by Owner for goods and startup support services related to said equipment. These contract(s) are identified below:
 - a. Owner as "buyer" and Consolidated Supply as "seller" for procurement of goods and special services of valves and electric motor actuators and related components are to be furnished by Owner incorporated into the Work by Contractor. This equipment has been purchased through a separate agreement included with these Contract Documents (**VOLUME II – TECHNICAL SPECIFICATION SECTION 01625, APPENDIX A**).

11.01 ADDITIONAL REQUIREMENTS OF THE STATE OF IDAHO:

- A. The clauses in this Section are required by the State of Idaho. The inclusion of these clauses in this Agreement by the City does not indicate the City's support or opposition to these clauses nor acknowledgment by the City that these clauses are relevant to the subject matter of this Agreement. Instead, these clauses are included solely to comply with Idaho state law.

- B. Boycotting Israel: If payments under this Agreement exceed one hundred thousand dollars (\$100,000) and the Contractor employs ten (10) or more persons, then the Contractor certifies that it is not currently engaged in and will not, for the duration of this Agreement, engage in a boycott of the goods or services of the state of Israel or territories under its control as those terms are defined in the “Anti-Boycott Against Israel Act” (Idaho Code 67-2346).
- C. Government of China: Contractor certifies that it is not and will not, for the duration of this Agreement, be owned or operated by the government of China as those terms are defined in Idaho Code Title 67, Chapter 23.
- D. Contract with Abortion Providers: To the extent this Agreement is subject to the use of public funds, Contractor certifies that it is not, and will not, for the duration of this Agreement, become an abortion provider or an affiliate of an abortion provider as those terms are defined in the “No Public Funds for Abortions Act” (Idaho Code Title 18, Chapter 87).
- E. Employment of Bona Fide Idaho Residents: If this Agreement contemplates public works construction, Contractor agrees to employ ninety-five percent (95%) bona fide Idaho residents, as that term is defined in Idaho Code 44-103, as employees on the Work in order to comply with the requirements of Chapter 10, Title 44, Idaho Code. If Contractor employs less than fifty (50) employees on the Work, Contractor may employ up to ten (10%) nonresidents on the Work. In all cases, Contractor agrees to give a preference to bona fide Idaho residents. The parties agree that if the Work involves the expenditure of federal aid funds, that this clause will not be enforced in a manner that conflicts with federal statutes prescribing a labor preference for veterans or prohibiting unlawful discrimination or preferences among United States citizens.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR

By: _____

By: _____

Title: _____

Title: _____

(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

Idaho Public Works
Contractors License No.: _____

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Agent for service of process:

Notice to Proceed

Date: _____

Project: City of Post Falls WRF: Biosolids Hopper Modifications

| | |
|--|-----------------------------------|
| Owner: City of Post Falls | Owner's Contract No.: |
| Contract: | Engineer's Project No.: 20-23-033 |
| Contractor: | |
| Contractor's Address: <i>[send Certified Mail, Return Receipt Requested]</i> | |

You are notified that the Contract Times under the above Contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____ [(or) the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Dates to achieve the Intermediate Milestone (as defined in Section 01400 Work Sequence and 4.02 B of the Agreement) is 60 calendar days after the date the Contractor notifies Owner of Notice to Proceed with Shut-Down of the Elevated Biosolids Hopper and Loadout Facility.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds and loss payees) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

_____ *[add other requirements]*.

| | |
|-------|----------------------|
| _____ | Owner: |
| _____ | Given by: |
| _____ | Authorized Signature |
| _____ | Title |
| _____ | Date |

Copy to Engineer (Use Certified Mail, Return Receipt Requested)

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PERFORMANCE BOND

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

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

CITY OF POST FALLS
408 N. SPOKANE STREET
POST FALLS, ID 83854

CONTRACT

Effective Date of Agreement:

Amount (Figures):

Description (*Name and Location*):

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

Amount:

Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.
2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
 - 2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
 - 2.3 Owner has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract; or
 2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.
3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:
 - 3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 2. Deny liability in whole or in part and notify Owner citing reasons therefor.
4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the

Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

- 5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
- 5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
- 5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.

7. Surety hereby waives notice of any change, including changes of time, to Contract or to related subcontracts, purchase orders, and other obligations.

8. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located, and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

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

11. Definitions.

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

FOR INFORMATION ONLY – *(Name, Address and Telephone)*

Surety Agency or Broker:

Owner's Representative *(Engineer or other party)*:

PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):

CITY OF POST FALLS
408 N. SPOKANE STREET
POST FALLS, ID 83854

CONTRACT

Effective Date of Agreement:
Amount (Figures):
Description (*Name and Location*):

BOND

Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

(Seal)
Contractor's Name and Corporate Seal

(Seal)
Surety's Name and Corporate Seal

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
Promptly makes payment, directly or indirectly, for all sums due Claimants, and
Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.
 6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
Pay or arrange for payment of any undisputed amounts.
 7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
 8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the

Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.

9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders, and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
15. Definitions

Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

| |
|--|
| FOR INFORMATION ONLY – (<i>Name, Address, and Telephone</i>) Surety Agency or Broker: Owner's Representative (<i>Engineer or other</i>): |
|--|

Contractor's Application for Payment No.

| | | |
|--|---|---|
| | Application Period: | Application Date: |
| To (Owner): City of Post Falls | From (Contractor): | Via (Engineer): J-U-B ENGINEERS, Inc. |
| Project: Post Falls WRF: Biosolids Hopper Improvements | Contract: Biosolids Hopper Improvements | |
| Owner's Contract No.: | Contractor's Project No.: | Engineer's Project No.: 20-23-033 |

Application For Payment Change Order Summary

| Approved Change Orders | | |
|--------------------------------|-----------|------------|
| Number | Additions | Deductions |
| CO #1 | \$0.00 | \$0.00 |
| CO #2 | | |
| CO #3 | | |
| CO #4 | | |
| CO #5 | | |
| | | |
| | | |
| | | |
| | | |
| TOTALS | \$0.00 | \$0.00 |
| NET CHANGE BY CHANGE ORDERS | \$0.00 | |

| | | |
|---|--------|---|
| 1. ORIGINAL CONTRACT PRICE..... | \$ | |
| 2. Net change by Change Orders..... | \$0.00 | |
| 3. Current Contract Price (Line 1 ± 2)..... | \$ | - |
| 4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate)..... | \$ | - |
| 5. RETAINAGE: | | |
| a. 5% X \$ - Work Completed..... | \$ | - |
| b. 5% X \$ - Stored Material..... | \$ | - |
| c. In accordance with Agreement Article 6.02 B | \$ | - |
| d. Total Retainage (Line 5a + Line 5b + Line 5c)..... | \$ | - |
| 6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c)..... | \$ | - |
| 7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)..... | \$ | - |
| 8. AMOUNT DUE THIS APPLICATION..... | \$ | - |
| 9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above)..... | \$ | - |

| | |
|---|-------|
| Contractor's Certification | |
| <p>The undersigned Contractor certifies that to the best of its knowledge: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.</p> | |
| Signature: | Date: |
| By: | |

| | | |
|--------------------|---|--------|
| Payment of: | \$0.00 | |
| | <i>(Line 8 or other - attach explanation of the other amount)</i> | |
| is recommended by: | J-U-B ENGINEERS, Inc. | (Date) |
| Payment of: | \$0.00 | |
| | <i>(Line 8 or other - attach explanation of the other amount)</i> | |
| is approved by: | City of Post Falls | (Date) |
| Approved by: | Funding Agency | (Date) |

| For (Contract): Post Falls WRF: Biosolids Hopper Improvements City of Post Falls | | | | | | | | Application Number: | | | | | | |
|---|-------------|-----|--------------|------------|-----------------|---------------------------|-----------------|---------------------|-----|--|--|--------------------|---------------------------|-------------------|
| Application Period: | | | | | | | | Application Date: | | | | | | |
| A | | B | | | | Work Completed | | | E | F | | G | | |
| Item | | Qty | Unit of Mst. | Unit Price | Scheduled Value | C | | D.1 | D.2 | Materials Presently Stored (not in C or D) | Total Completed and Stored to Date (D.2 + E) | % Complete (F / B) | Balance to Finish (B - F) | Note (see bottom) |
| Pay Item No. | Description | | | | | Qty Previous Applications | Qty This Period | Total Value To Date | | | | | | |
| Item 1 | | | | | | | | | | | | | | |
| 1.01 | | | | | | | | | | | | | | |
| 1.02 | | | | | | | | | | | | | | |
| 1.03 | | | | | | | | | | | | | | |
| Item 2 | | | | | | | | | | | | | | |
| 2.01 | | | | | | | | | | | | | | |
| 2.02 | | | | | | | | | | | | | | |
| 2.03 | | | | | | | | | | | | | | |
| Item 3 | | | | | | | | | | | | | | |
| 3.01 | | | | | | | | | | | | | | |
| 3.02 | | | | | | | | | | | | | | |
| 3.03 | | | | | | | | | | | | | | |
| Change Orders | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| Totals | | | | | | | | | | \$0.00 | \$0.00 | 0.0% | 0.00 | |
| NOTES: | | | | | | | | | | | | | | |
| (A) | | | | | | | | | | | | | | |
| (B) | | | | | | | | | | | | | | |
| (C) | | | | | | | | | | | | | | |
| (D) | | | | | | | | | | | | | | |
| (E) | | | | | | | | | | | | | | |



Form WH-5 Public Works Contract Report

| |
|--|
| |
|--|

Contractors awarded Idaho public works contracts must submit this form to the Tax Commission within 30 days of receiving the award. (Idaho Code sections 54-1904A and 63-3624(g)).

Contract awarded by (public body and address)

Contract awarded to (contractor's name and address)

| | | |
|---|--|--|
| State of incorporation | Federal Employer Identification Number (EIN) | Date qualified to do business in Idaho |
| Business operates as <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Partnership <input type="checkbox"/> Corporation <input type="checkbox"/> LLC | | Public works contractor license number |
| Sole proprietor's Social Security number | Idaho sellers permit number | Idaho withholding tax permit number |
| Awarding agency project number | | Amount of contract \$ |

Description and location of work to be performed

Project Dates

Scheduled project start date: _____ Completion date: _____

If the following information isn't available at this time, please enter date it will be: _____

All Subcontractors

| | | | |
|---------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |

Description of work

| | | | |
|---------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |

Description of work

| | | | |
|---------|-------|----------|--------------------------------|
| Name | | | Federal EIN |
| Address | | | Public works contractor number |
| City | State | ZIP Code | Amount of subcontract \$ |

Description of work

| | | | |
|---------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |

Description of work

All Subcontractors (continued)

| | | | |
|---------------------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |
| Description of work | | | |

| | | | |
|---------------------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |
| Description of work | | | |

| | | | |
|---------------------|-------|----------|--|
| Name | | | Federal EIN |
| Address | | | Public works contractor license number |
| City | State | ZIP Code | Amount of subcontract \$ |
| Description of work | | | |

Suppliers

List your major suppliers of materials, equipment, and supplies. Include items removed from inventory and items provided to you by the government agency for use in this project.

| | | | |
|-----------------------|--------------|--|-------------------|
| Name | | Federal EIN | Total value \$ |
| Address | | Materials and equipment purchased and used | |
| City, State, ZIP Code | Phone number | Please select how sales or use tax was paid. <input type="checkbox"/> Tax paid to supplier <input type="checkbox"/> Tax paid to state* <input type="checkbox"/> No tax was paid | |

| | | | |
|-----------------------|--------------|--|-------------------|
| Name | | Federal EIN | Total value \$ |
| Address | | Materials and equipment purchased and used | |
| City, State, ZIP Code | Phone number | Please select how sales or use tax was paid. <input type="checkbox"/> Tax paid to supplier <input type="checkbox"/> Tax paid to state* <input type="checkbox"/> No tax was paid | |

| | | | |
|-----------------------|--------------|--|-------------------|
| Name | | Federal EIN | Total value \$ |
| Address | | Materials and equipment purchased and used | |
| City, State, ZIP Code | Phone number | Please select how sales or use tax was paid. <input type="checkbox"/> Tax paid to supplier <input type="checkbox"/> Tax paid to state* <input type="checkbox"/> No tax was paid | |

*If you're reporting any untaxed materials, equipment, or supplies as "items subject to use tax" on your Idaho return, provide the period when you did or will report it: _____

If you paid tax to a state other than Idaho, write the name state next to "total value" boxes, above. For any tax due that you haven't reported yet, include payment with this form. You can make copies of this form if you need more room.

| | | | | |
|------------------|----------------------|------------|--------------|------|
| Sign Here | Authorized signature | Print name | Phone number | Date |
| | | | | |

File with the Idaho State Tax Commission, PO Box 36, Boise ID 83722-0410
 For more information, call (208) 334-7618 | Fax: (208) 332-6619 | Email: contractdesk@tax.idaho.gov

Certificate of Substantial Completion

Project: WRF Biosolids Hopper Modifications

Owner: City of Post Falls

Owner's Contract No.:

Contract: WRF Biosolids Hopper Modifications

Engineer's Project No.:20-18-024

This [tentative] [definitive] Certificate of Substantial Completion applies to:

- All Work under the Contract Documents: The following specified portions of the Work:

Date of **[tentative] [definitive]** Substantial
Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

- Amended Responsibilities Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

| | | |
|-------------|-------------------------|-----------------------|
| Project: | Owner: | Owner's Contract No.: |
| Contract: | Date of Contract: | |
| Contractor: | Engineer's Project No.: | |

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:

CHANGE IN CONTRACT TIMES:

Original Contract Price:

\$ _____

[Increase] [Decrease] from previously approved
Change Orders No. _____ to No. _____:

\$ _____

Contract Price prior to this Change Order:

\$ _____

[Increase] [Decrease] of this Change Order:

\$ _____

Contract Price incorporating this Change Order:

\$ _____

Original Contract Times: Working days Calendar days

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

[Increase] [Decrease] from previously approved Change Orders
No. _____ to No. _____:

Substantial completion (days): _____

Ready for final payment (days): _____

Contract Times prior to this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

[Increase] [Decrease] of this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

Contract Times with all approved Change Orders:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

RECOMMENDED:

By: _____
Engineer (Authorized Signature)

Name: _____
Print Name

Date: _____

Approved by Funding Agency (if applicable):

ACCEPTED:

By: _____
Owner (Authorized Signature)

Name: _____
Print Name

Date: _____

ACCEPTED:

By: _____
Contractor (Authorized Signature)

Name: _____
Print Name

Date: _____

Date: _____

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

Field Order

No. _____

Date of Issuance: _____ Effective Date: _____

| | | |
|-------------|--------|-------------------------|
| Project: | Owner: | Owner's Contract No.: |
| Contract: | | Date of Contract: |
| Contractor: | | Engineer's Project No.: |

Attention:

You are hereby directed to promptly execute this Field Order issued in accordance with General Conditions Paragraph 9.04.A, for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Reference: _____ (Specification Section(s)) _____ (Drawing(s) / Detail(s))

Description:

Attachments:

| |
|--|
| Engineer: Signature: _____ Print Name: _____ |
|--|

| | |
|---|-------------|
| Receipt Acknowledged by Contractor: Signature: _____ Print Name: _____ | Date: _____ |
|---|-------------|

Copy to Owner

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Section 2

General Conditions

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

ISPWC DIVISION 100 – STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Modified From

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

2015 IDAHO STANDARDS FOR PUBLIC WORKS CONSTRUCTION (ISPWC)

NOTE: The base document is the 2007 EJCDC version. Items added to EJCDC to form the 2015 ISPWC are underlined. Items deleted from the EJCDC to form the 2015 ISPWC are shown in strikeout format.

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

ACEC

AMERICAN COUNCIL OF ENGINEERING COMPANIES



ASCE American Society
of Civil Engineers

P/E National Society of
Professional Engineers
Professional Engineers in Private Practice

AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

AMERICAN SOCIETY OF CIVIL ENGINEERS

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

| | Page |
|---|-------------|
| Article 1 – Definitions and Terminology | 1 |
| 1.01 Defined Terms | 1 |
| 1.02 Terminology | 4 |
| Article 2 – Preliminary Matters | 5 |
| 2.01 Delivery of Bonds and Evidence of Insurance | 5 |
| 2.02 Copies of Documents | 5 |
| 2.03 Commencement of Contract Times; Notice to Proceed | 5 |
| 2.04 Starting the Work | 5 |
| 2.05 Before Starting Construction | 6 |
| 2.06 Preconstruction Conference; Designation of Authorized Representatives | 6 |
| 2.07 Initial Acceptance of Schedules | 6 |
| Article 3 – Contract Documents: Intent, Amending, Reuse | 6 |
| 3.01 Intent | 6 |
| 3.02 Reference Standards | 7 |
| 3.03 Reporting and Resolving Discrepancies | 7 |
| 3.04 Amending and Supplementing Contract Documents | 8 |
| 3.05 Reuse of Documents | 8 |
| 3.06 Electronic Data | 8 |
| Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points | 8 |
| 4.01 Availability of Lands | 8 |
| 4.02 Subsurface and Physical Conditions | 9 |
| 4.03 Differing Subsurface or Physical Conditions | 9 |
| 4.04 Underground Facilities | 10 |
| 4.05 Reference Points | 11 |
| 4.06 Hazardous Environmental Condition at Site | 11 |
| Article 5 – Bonds and Insurance | 13 |
| 5.01 Performance, Payment, and Other Bonds | 13 |
| 5.02 Licensed Sureties and Insurers | 13 |
| 5.03 Certificates of Insurance | 13 |
| 5.04 Contractor’s Insurance | 14 |
| 5.05 Owner’s Liability Insurance | 15 |
| 5.06 Property Insurance | 15 |
| 5.07 Waiver of Rights | 17 |
| 5.08 Receipt and Application of Insurance Proceeds | 17 |
| 5.09 Acceptance of Bonds and Insurance; Option to Replace | 17 |
| 5.10 Partial Utilization, Acknowledgment of Property Insurer | 18 |
| Article 6 – Contractor’s Responsibilities | 18 |
| 6.01 Supervision and Superintendence | 18 |
| 6.02 Labor; Working Hours | 18 |
| 6.03 Services, Materials, and Equipment | 18 |
| 6.04 Progress Schedule | 19 |
| 6.05 Substitutes and “Or-Equals” | 19 |

| | | |
|--|--|----|
| 6.06 | Concerning Subcontractors, Suppliers, and Others | 21 |
| 6.07 | Patent Fees and Royalties | 22 |
| 6.08 | Permits..... | 22 |
| 6.09 | Laws and Regulations | 22 |
| 6.10 | Taxes | 24 |
| 6.11 | Use of Site and Other Areas | 24 |
| 6.12 | Record Documents..... | 25 |
| 6.13 | Safety and Protection..... | 25 |
| 6.14 | Safety Representative | 26 |
| 6.15 | Hazard Communication Programs..... | 26 |
| 6.16 | Emergencies | 26 |
| 6.17 | Shop Drawings and Samples | 26 |
| 6.18 | Continuing the Work..... | 27 |
| 6.19 | Contractor’s General Warranty and Guarantee | 28 |
| 6.20 | Indemnification | 28 |
| 6.21 | Delegation of Professional Design Services..... | 29 |
| 6.22 | <u>Quality Control</u> | 29 |
| Article 7 – Other Work at the Site..... | | 29 |
| 7.01 | Related Work at Site..... | 29 |
| 7.02 | Coordination..... | 30 |
| 7.03 | Legal Relationships | 30 |
| Article 8 – Owner’s Responsibilities..... | | 30 |
| 8.01 | Communications to Contractor..... | 30 |
| 8.02 | Replacement of Engineer | 30 |
| 8.03 | Furnish Data | 31 |
| 8.04 | Pay When Due..... | 31 |
| 8.05 | Lands and Easements; Reports and Tests..... | 31 |
| 8.06 | Insurance | 31 |
| 8.07 | Change Orders..... | 31 |
| 8.08 | Inspections, Tests, and Approvals | 31 |
| 8.09 | Limitations on Owner’s Responsibilities | 31 |
| 8.10 | Undisclosed Hazardous Environmental Condition..... | 31 |
| 8.11 | Evidence of Financial Arrangements | 31 |
| 8.12 | Compliance with Safety Program..... | 31 |
| Article 9 – Engineer’s Status During Construction..... | | 32 |
| 9.01 | Owner’s Representative | 32 |
| 9.02 | Visits to Site | 32 |
| 9.03 | Project Representative..... | 32 |
| 9.04 | Authorized Variations in Work | 32 |
| 9.05 | Rejecting Defective Work..... | 32 |
| 9.06 | Shop Drawings, Change Orders and Payments | 33 |
| 9.07 | Determinations for Unit Price Work | 33 |
| 9.08 | Decisions on Requirements of Contract Documents and Acceptability of Work..... | 33 |
| 9.09 | Limitations on Engineer’s Authority and Responsibilities..... | 33 |
| 9.10 | Compliance with Safety Program..... | 34 |
| Article 10 – Changes in the Work; Claims..... | | 34 |
| 10.01 | Authorized Changes in the Work | 34 |
| 10.02 | Unauthorized Changes in the Work | 34 |
| 10.03 | Execution of Change Orders | 34 |
| 10.04 | Notification to Surety | 35 |
| 10.05 | Claims | 35 |

| | |
|---|----|
| Article 11 – Cost of the Work; Allowances; Unit Price Work | 35 |
| 11.01 Cost of the Work | 35 |
| 11.02 Allowances | 37 |
| 11.03 Unit Price Work | 38 |
| Article 12 – Change of Contract Price; Change of Contract Times | 38 |
| 12.01 Change of Contract Price | 38 |
| 12.02 Change of Contract Times | 39 |
| 12.03 Delays | 39 |
| Article 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK.... | 40 |
| 13.01 Notice of Defects | 40 |
| 13.02 Access to Work | 40 |
| 13.03 Tests and Inspections..... | 40 |
| 13.04 Uncovering Work..... | 41 |
| 13.05 Owner May Stop the Work..... | 41 |
| 13.06 Correction or Removal of Defective Work | 41 |
| 13.07 Correction Period | 42 |
| 13.08 Acceptance of Defective Work | 42 |
| 13.09 Owner May Correct Defective Work | 43 |
| Article 14 – Payments to Contractor and Completion..... | 43 |
| 14.01 Schedule of Values | 43 |
| 14.02 Progress Payments..... | 43 |
| 14.03 Contractor’s Warranty of Title | 45 |
| 14.04 Substantial Completion | 45 |
| 14.05 Partial Utilization | 46 |
| 14.06 Final Inspection | 46 |
| 14.07 Final Payment..... | 47 |
| 14.08 Final Completion Delayed..... | 48 |
| 14.09 Waiver of Claims..... | 48 |
| Article 15 – Suspension of Work and Termination | 48 |
| 15.01 Owner May Suspend Work | 48 |
| 15.02 Owner May Terminate for Cause | 48 |
| 15.03 Owner May Terminate For Convenience | 49 |
| 15.04 Contractor May Stop Work or Terminate..... | 50 |
| Article 16 – Dispute Resolution | 50 |
| 16.01 Methods and Procedures | 50 |
| Article 17 – Miscellaneous..... | 50 |
| 17.01 Giving Notice | 50 |
| 17.02 Computation of Times..... | 51 |
| 17.03 Cumulative Remedies..... | 51 |
| 17.04 Survival of Obligations | 51 |
| 17.05 Controlling Law | 51 |
| 17.06 Headings..... | 51 |

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
 12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
 13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
 14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.
40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
- 42.a. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
- 42.b. *Standard Specifications*—Wherever in these Contract Documents reference is made to the Standard Specifications, said reference shall be understood as referring to the Idaho Standards for Public Works Construction which applicable parts are incorporated herein and made a part of these Documents by specific reference thereto. If requirements contained in the Standard Specifications are modified by or are in conflict with supplemental information in these Contract Documents, the requirements of these Contract Documents shall prevail.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

- A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives:*
 1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
 2. “Command” type language is used in the Contract Documents. This command language refers to, and is directed to the Contractor.
- C. *Day:*
 1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
- D. *Defective:*
 1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or

- b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
- c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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

- 1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 - 2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 - 3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 - 4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

2.02 *Copies of Documents*

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

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 2. a preliminary Schedule of Submittals; and
 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

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

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
 2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
 3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 - 1. A Field Order;
 - 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
 - 3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
 - 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 - 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if

any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

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

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

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.
- C. *Possible Price and Times Adjustments:*
1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
 3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

- A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:
1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
 2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

- d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

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

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

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

within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

1. The Contractor's scope of work shall include implementation of necessary safety, public health and environmental procedures and requirements relating to sanitary sewage encountered during the work.
 2. The Contractor's scope of work shall include necessary safety and environmental requirements for handling and disposal of asbestos pipe removed from service or excavated during the course of the work.
- D. If Contractor encounters a Hazardous Environmental Condition not indicated in the Drawings or Specifications or identified in the Contract Documents or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligent acts or omissions ~~negligence~~.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions. Surety and insurance companies from which the bonds and insurance for this Project are purchased shall have a Best's rating of no less than A:VII, in addition to the other requirements specified herein.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 Contractor's Insurance

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
 2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
 3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
 4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
 5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07;
 6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.

- b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuing coverage during the two year period of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

NOTES TO USER

The Owner, in consultation with their attorney and risk manager, should choose which party shall provide property insurance. In accordance with the Owner's direction, use the appropriate Section A below.

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.
- A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof. This insurance shall:
1. include the interests of Owner, Contractor, Subcontractors, Engineer, Engineer's Consultants and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners,

employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. ~~Owner~~Contractor shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- ~~D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.~~
- D. Contractor shall be responsible for any deductible or self-insured retention.
- ~~E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.~~
- E. If Owner requests in writing that other special perils be included in the property insurance policies provided under paragraphs 5.06.A or 5.06.B of the General Conditions, Contractor shall, if possible, include such insurance, and the cost thereof will be charged to Owner by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, Contractor shall in writing advise Owner whether or not such other insurance has been procured by Contractor.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
 - 1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 - 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

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

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

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing

within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit ~~overtime work~~ or the performance of Work outside the regular working hours or on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties, special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
 - 1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and,
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
 - 2. *Substitute Items:*
 - a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
 - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable

substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
 - d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
 - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 - 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier ~~who is listed as a loss payee~~ whose interests are included on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the

Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

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

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.
- D. While not intended to be inclusive of all Laws or Regulations for which Contractor may be responsible under paragraph 6.09, the following Laws or Regulations are included as mandated by statute or for the convenience of the Contractor:

Idaho Code Section 63-1501. Definitions. As used in this act, the following terms shall have the following meanings:

“Contracting units” shall include the state or any officer or department thereof, the counties or other subdivisions of the state, and all municipal and quasi-municipal corporations therein.

“Contractor” shall mean any person, firm, co-partnership, association, or corporation, foreign or domestic, entering into a contract for the construction, erection, repair, or improvement of any kind or character of public works in this state.

“Taxes” shall mean all taxes, assessments, excises, and license fees authorized to be levied, assessed, and collected under the laws of this state, other than taxes on real property.

“Taxing unit” shall mean the state or any officer or department thereof, the counties or other subdivisions of the state, and all municipal and quasi-municipal corporations therein authorized by law to assess, levy and collect taxes.

Idaho Code Section 63-1502. Conditions precedent to contract for public works. Before entering into a contract for the construction of any public works in this state, the contracting unit shall require as conditions precedent that the contractor be authorized to do business in this state and that he furnish satisfactory evidence that he has paid or secured to the satisfaction of the respective taxing units all taxes for which he or his property is liable then due or delinquent.

Idaho Code Section 63-1503. Contractor for public works to pay or secure taxes—Agreement. Every contract for the construction of public works by a contracting unit of this state shall contain substantially the following provisions:

The contractor, in consideration of securing the business of erecting or constructing public works in this state, recognizing that the business in which he is engaged is of a transitory character, and that in the pursuit thereof, his property used therein may be without the state when taxes, excises, or license fees to which he is liable become payable, agrees:

1. To pay promptly when due all taxes (other than on real property), excises and license fees due to the state, its subdivisions, and municipal and quasi-municipal corporations therein accrued or accruing during the term of this contract, whether or not the same shall be payable at the end of such term;
2. That if the said taxes, excises, and license fees are not payable at the end of said term, but liability for the payment thereof exists, even though the same constitute liens upon his property, to secure the same to the satisfaction of the respective officers charged with the collection thereof; and
3. That in the event of his default in the payment or securing of such taxes, excises, and license fees, to consent that the department, officer, board, or taxing unit entering into this contract may withhold from any payment due him hereunder the estimated amount of such accrued and accruing taxes, excises, and license fees for the benefit of all taxing units to which said contractor is liable.

Idaho Code Section 44-1002 requires the following: The Contractor must employ ninety-five percent (95%) bona fide Idaho residents as employees on any job under any such contract except where under such contracts fifty (50) or less persons are employed, the Contractor may employ ten percent (10%) nonresidents, provided, however, in all cases employers must give preference to the employment of bona fide residents in the performance of said work, and no contract shall be let to any person, firm, association, or corporation refusing to execute an agreement with the above mentioned provisions in it; provided, that, in contracts involving the expenditure of federal aid funds this act shall not be enforced in such a manner as to conflict with or be contrary to the federal statutes prescribing a labor preference to honorably discharged soldiers, sailors, and marines, prohibiting as unlawful any other preference or discrimination among citizens of the United States.

Idaho Code Chapter 19 of Title 54 requires proper licensing of Public Works Contractors.

6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- B. In the event of the Contractor's default on the payment of taxes, excises, and license fees as set forth in Idaho Code 63-1503, the Owner shall have the authority to withhold from any payment due the Contractor under this contract, the estimated amount of such accrued and accruing taxes, excises, and license fees for the benefit of all taxing authorities to which said Contractor is liable.

6.11 Use of Site and Other Areas

- A. *Limitation on Use of Site and Other Areas*
 - 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work. Contractor shall not enter upon nor use property not under Owner control until appropriate easements have been executed and a copy is on file at the site.
 - 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
 - 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.
 - 1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.
 - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
 - 2. *Samples:*
 - a. Submit number of Samples specified in the Specifications.
 - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Submittal Procedures:*
 - 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

- b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

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

6.19 *Contractor's General Warranty and Guarantee*

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

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

6.22 *Quality Control*

- A. 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 Engineer, in writing, prior to any change in quality control representative assignment.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a

reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful actions or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *Insurance*

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

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

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

ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

9.01 *Owner’s Representative*

- A. Engineer will be Owner’s representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner’s representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

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

9.03 *Project Representative*

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

9.04 *Authorized Variations in Work*

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

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

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

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

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

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.
- F. Contractors, Subcontractors, Suppliers and others on the Project, or their sureties, shall maintain no direct action against the Engineer, its officers, employees, affiliated corporations, and subcontractors, for any claim arising out of, in connection with, or resulting from the engineering services performed. Only the Owner will be the beneficiary of any undertaking by the Engineer.

9.10 *Compliance with Safety Program*

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

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 Notification to Surety

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

10.05 Claims

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than ~~30~~ 10 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within ~~60~~ 20 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within ~~30~~ 10 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within ~~30~~ 20 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 - 1. deny the Claim in whole or in part;
 - 2. approve the Claim; or
 - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said ~~30~~ 21 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

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

11.01 Cost of the Work

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality

of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in

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

- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

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

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

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

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

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

B. *Cash Allowances:*

- 1. Contractor agrees that:

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

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

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

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

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

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

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

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the claim to the Engineer and the other party to the Contract in accordance with the provisions of paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

13.01 *Notice of Defects*

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

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. ~~Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:~~ Contractor shall employ an independent testing laboratory or testing agency and shall be responsible for arranging and shall pay for all specified tests, inspections, and approvals (including tests, inspections, and approvals to be paid for on a cash allowance basis) required for Owner's and Engineer's acceptance of the Work at the site except:
 1. ~~for inspections, tests, or approvals covered by paragraphs 13.03.C and 13.03.D below; costs incurred in connection with tests or inspections pursuant to paragraph 13.04.B of the General Conditions shall be paid for as provided in said paragraph; and as otherwise specifically provided in the Contract Documents.~~
 2. ~~that costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.04.B shall be paid as provided in said paragraph 13.04.C; and.~~

~~3. as otherwise specifically provided in the Contract Documents.~~

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.
- F. Uncovering Work as provided in paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not

limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

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

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. repair such defective land or areas; or
 - 2. correct such defective Work; or
 - 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 - 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

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

entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

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

14.02 *Progress Payments*

- A. *Applications for Payments:*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within ~~7~~40 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
 - a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner referred to in Paragraph 14.02.B.2. Engineer may also

refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

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

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items including, but not limited to, liquidated damages entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
 - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars

in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

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

14.08 *Final Completion Delayed*

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

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if, within 7 days of receipt of notice of intent to terminate, Contractor begins to correct its failure to perform and proceeds diligently to cure such failure and become in compliance with the contract requirements. Such cure must occur within no more than 30 days of said notice unless otherwise extended by the Engineer. ~~Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.~~
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 - 1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 - 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 - 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

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Section 3

Supplementary Conditions

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications Project

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions of the Construction Contract (ISPWC Division 100, 2015 edition). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

SC-1.01.A.2. Add the following language at the end of Paragraph 1.01.A.2:

The Agreement may also be referred to as "Contract" within these Contract Documents.

SC-1.01.A.3. Add the following language at the end of Paragraph 1.01.A.3:

The Application for Payment form to be used on this Project is included in the contract package.

SC-1.01.A.9. Add the following language at the end of Paragraph 1.01.A.9:

The Change Order form to be used on this Project is included in the contract package.

SC-1.01.A.19. Delete paragraph 1.01.A.19 in its entirety and insert the following in its place:

ENGINEER:

J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d'Alene, ID 83815
(208) 762-8787

who is hereinafter called Engineer and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

SC-1.01.A.20. Add the following language at the end of Paragraph 1.01.A.20:

The Field Order form to be used on this Project is included in the contract package.

SC-1.01.A.44. Supplement Paragraph 1.01.A.44 as follows:

Substantial Completion is further defined as (i) that degree of completion of the Project's operating facilities or systems sufficient to provide the Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and (ii) all required functional, performance and acceptance, testing of systems, and commissioning has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of the Engineer in accordance with the requirements of the Specifications; and (iii) the Acceptance Testing period has been successfully completed without significant interruption, as specified; and (iv) all inspections required have been completed and identified defective Work replaced or corrected.

SC-1.01.A.51. Add the following language at the end of Paragraph 1.01.A.51:

The Work Change Directive form to be used on this Project is included in the contract package.

SC-1.01.A.52. Add the following new paragraph immediately after paragraph 1.01.A.51:

52. *Request for Information* – A written request for information, requiring a written response, to Owner, Engineer, or Contractor, initiated by Owner, Engineer, or Contractor.

SC-2.02. Delete paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to the Contractor a PDF copy of the Contract Documents which will contain plans, specifications and addenda. Contractor is responsible for generating the number of hard copies as deemed necessary by Contractor, including full-size prints of the plans. Conformed documents incorporating responses and Addenda developed during the bidding process will not be provided.

SC-2.03. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

A. A Notice to Proceed shall be issued to the Contractor establishing the day Contract Times will commence to run. The day indicated on the Notice to Proceed shall be any day after the Effective Date of the Agreement, but in no event will the Contract Times commence to run later than 60 days after the Effective Date of the Agreement. The Owner will work with the Contractor to select a mutually acceptable date that the Contract Times will commence to run within the above time frame.

SC-2.05.B. Add the following new paragraph immediately after Paragraph 2.05.A:

B. Within the timeframe noted in the Notice of Award, the Bidder to whom the award is made, shall execute and return the Agreement in the required number of copies, shall furnish the required Payment and Performance Bonds, the original plus one copy of completed WH-5 Public Works Contract Report, and shall provide certificates of insurance (and other

evidence of insurance which the Owner and any additional insured may reasonably request) with copies to each additional insureds identified in the Supplementary Conditions which Contractor is required to purchase and maintain in accordance with Article 5 of the General Conditions.

SC-3.01. Add the following new paragraphs immediately after Paragraph 3.01.C:

- D. The Specifications may vary in form, format and style. Some specification sections are written in varying degrees of streamlined or declarative style and some sections may be relatively narrative by comparison. Omissions of such words and phrases as “the Contractor shall,” “in conformity with,” “as shown,” or “as specified” are intentional in streamlined sections. Omitted words and phrases shall be supplied by inference. Similar types of provisions may appear in various parts of a section or articles within a part depending on the format of a section. The Contractor shall not take advantage of any variation of form, format or style in making claims for extra work.

- E. The cross referencing of specification sections under the subparagraph heading “Related Sections include but are not necessarily limited to: ” and elsewhere within each specification section is provided as an aid and convenience to the Contractor. The Contractor shall not rely on the cross referencing provided and shall be responsible to coordinate the entire work under the Contract Documents and provide a complete Project whether or not the cross referencing is provided in each section or whether or not the cross referencing is complete.

SC-4.01.B. Delete the paragraph in its entirety.

SC-4.02. Add the following new paragraphs immediately after Paragraph 4.02.B:

- C. In the preparation of Drawings and Specifications, Engineer or Engineer’s Consultants relied upon the following reports of explorations and tests of subsurface conditions at the Site:
 - a. N/A

- D. In the preparation of Drawings and Specifications, Engineer or Engineer’s Consultants relied upon the following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities), which are at or contiguous to the Site:
 - 1. Phase II, Stage 1 Record Drawings, 1990
 - 2. Phase II, Stage IIA Record Drawings 1995
 - 3. Phase II, Stage IIB Record Drawings 1995
 - 4. WWTP Expansion Record Drawings, 2010
 - 5. UV Disinfection and Standby Power, As-Built Drawings, Nov. 26, 2001
 - 6. WWTP Phase I, As-Built Drawings, 1983
 - 7. Headworks, Equalization and Sludge Loading Improvements, Record Drawings Feb, 16, 2017.

Copies of reports and drawings itemized in SC-4.02.C and SC-4.02.D that are not included with Bidding Documents may be examined at the offices of J-U-B ENGINEERS, Inc. during regular

business hours. A pdf copy will also be provided upon request. These reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which the Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

SC-4.05.A Add the following to the end of the paragraph:

- A. At the discretion of the Owner, any stakes or benchmarks that are not protected by the Contractor and are ultimately destroyed or disturbed by the Contractor will be replaced by the Owner and the cost charged to the Contractor.

SC-4.05. Add the following new paragraph immediately after Paragraph 4.05.A:

- B. The Owner shall provide engineering surveys to establish the following reference points for construction control: As indicated in the Contract Documents.

SC-4.06. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

- A. Not Used.
- B. Not Used.

SC-4.06.D Revise the first sentence as follows:
“If Contractor encounters a Hazardous Environmental Condition, Contractor shall immediately:
(i) secure...”

SC-4.06.G Delete Paragraph 4.06.G in its entirety.

SC-5.03 Delete Paragraphs 5.03.B and 5.03.D in their entirety.

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

- C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
 - 1. Workers' Compensation and related coverages under paragraphs 5.04.A.1. and 5.04.A.2 of the General Conditions:
 - a. State: Statutory
 - b. Applicable Federal (e.g., Longshoreman's): Statutory
 - c. Employer's Liability: \$1,000,000
 - 2. Contractor's General Liability under paragraphs 5.04.A.3. through 5.04.A.6 of the General Conditions which shall include completed operations and product liability

coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

- a. General Aggregate \$2,000,000
 - b. Products - Completed Operations Aggregate \$2,000,000
 - c. Personal and Advertising Injury \$1,000,000
 - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
 - e. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.
 - f. Excess or Umbrella Liability
 - General Aggregate \$1,000,000
 - Each Occurrence \$_____
3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
- a. Combined Single Limit of \$1,000,000
4. The Contractual Liability coverage required by Paragraph 5.04.B.3 of the General Conditions shall provide coverage for not less than the following amounts:
- a. Bodily Injury:
 - Each person \$1,000,000
 - Each Accident \$1,000,000
 - b. Property Damage:
 - Each Accident \$1,000,000
 - Annual Aggregate \$1,000,000

SC-5.06 CONTRACTOR shall purchase and maintain property insurance upon the Work at the site. Consequently, delete Paragraph 5.06.A regarding OWNER-provided property insurance; retain Paragraph 5.06.A regarding CONTRACTOR-provided property insurance.

SC-5.09 Delete Paragraph 5.09.A in its entirety and insert the following:

- A. If Owner has any objection to the coverage afforded by or other provision of the bonds or insurance required to be purchased and maintained in accordance with Article 5 on the basis of non-conformance with the Contract Documents, Owner so notify Contractor in writing within 10 days after receipt of the certificates (or other evidence requested)

required by Paragraph 2.01.B. Contractor shall provide such additional information in respect of insurance provided may reasonably request. If Contractor does not purchase or maintain all of the bonds and insurance required by the Contract Documents, Contractor shall notify Owner in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

SC-5.10. Add the following new paragraphs immediately after Paragraph 5.10.A:

- B. The property insurance shall contain no partial occupancy restriction for utilization of the Project by the Owner for the purpose intended.
- C. All insurance required by the Contract Documents, or by law or regulations shall remain in full force and effect on all phases of the Work, whether or not the Work is occupied or utilized by Owner, until all Work included in the agreement has been completed and final payment has been made.
- D. Nothing contained in the insurance requirements shall be construed as limiting the extent of Contractor's responsibility for payment of damages resulting from his operations under the Contract. Contractor agrees that he alone shall be completely responsible for procuring and maintaining full insurance coverage as provided herein or as may be otherwise required by the Contract Documents. Any approval by Owner or Engineer shall not operate to the contrary.

SC-6.02.B. Add the following to the end of Paragraph 6.02.B of the General Conditions:

Contractor (and Subcontractors) regular working hours for noisy operations shall be limited to the hours of 7:00 a.m. to 7:00 p.m. weekdays only, unless otherwise approved by the Owner. Other construction activities not generating significant noise including the warming up, repair, arrival, departure or running of trucks, earthmoving equipment, construction equipment and any other associated equipment shall be limited to the period between 7:00 a.m. and 7:00 p.m. weekdays only, unless otherwise approved by the Owner.

SC-6.07.B. Add the following immediately following Paragraph B:

- 1. The Owner's liability shall be limited under this Article to their actions.

SC-6.08.A. Add the following immediately following Paragraph A:

- 2. Owner shall pay for the Building Permit required for the Work.

SC-6.17. Amend all paragraphs of 6.17 by striking out "review and approval" and replacing with "review for general compliance with the design intent."

SC-6.17.D. Add the following new paragraphs immediately after Paragraph 6.17.D.3:

4. Engineer's review of Shop Drawings and Samples, Standard Specifications and descriptive literature submitted by Contractor will be only for general conformance with design concept, except as otherwise provided, and shall not be construed as:
 - a. permitting any departure from the Contract Requirements;
 - b. relieving Contractor of the responsibility for any error in details dimensions or otherwise that may exist in such submittals;
 - c. constituting a blanket approval of dimensions, quantities, or details of the material or equipment shown; or
 - d. approving departures from additional details or instructions previously furnished by Engineer. Such check or review shall not relieve Contractor of the full responsibility of meeting all of the requirements of the Contract Documents."

SC-6.17 Add the following new paragraphs immediately after Paragraph 6.17.E:

- F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer's charges for such time.
- G. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

SC-6.23. Add the following new paragraphs immediately after Paragraph 6.22:

- A. Electronic Submittal Tracking Software:
 1. A Web-based Cloud submittal and construction administration software will be used throughout the construction process to aid the project communication and submittal review process at no cost, liability or responsibility to the Owner or Engineer.
 2. Contractor shall be responsible for all startup and setup required for the successful operation of the software. The Contractor shall provide assistance to and coordinate assistance as required throughout the project to the Engineer, the Owner, and their designated representatives to successfully apply the software and its application to the Project. The Engineer, Owner and their representatives are responsible for their own hardware, web access, and internal operating systems necessary to access the Cloud web-based software website.
 3. The use of Web-based Cloud software does not eliminate the Contractors' responsibilities for maintaining in a safe place at the site one record copy of all

Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction under the General Conditions, Section 6.12.

4. The Owner and Engineer reserve the right to require paper copies and transmittal procedures of any documents they deem necessary. Examples of such paper copies that are currently intended to be transmitted in hard-copy are: fully executed contracts, pay requests, and change orders; control system drawings; rebar submittal drawings; one copy of the final Operations and Maintenance information; and the Contractor's final record drawing information.
5. The items below provide a general list of documents intended to be stored, transmitted and accessed with the Web-based Cloud Software system:
 - a. Bid Set Electronic Copy of Project Plans, Specifications, and Addenda
 - b. Submittals including Shop Drawings – Contractor is required to include the submittal transmittal with contractor's stamp per the documents with every submittal. Three exceptions for electronic submittals are known at this time:
 - i. Submittals required under Specification Section 16928 Control System
 - ii. All oversized (larger than 8.5"X11" shop drawings submitted for review)
 - iii. Product Samples
 - c. Submittal Log Maintenance
 - d. Requests for Information (SC-1.01.A.52) – A written request for information, requiring a written response, to Owner, Engineer, or Contractor, initiated by Owner, Engineer, or Contractor
 - e. Electronic copies of executed Field Orders
 - f. Electronic copies of executed Work Change Directives
 - g. Electronic copies of executed Change Orders
 - h. Contractor's Applications for Payment
 - i. Electronic copies of executed Recommendation of Payment
6. At the end of each three month period during the construction process, the Contractor shall deliver to the Engineer as a required submittal, one electronic progress copy of all information exchanged through the Web-based Cloud system by all parties using the system for the project.
7. Prior to Final Completion of the project, the Contractor shall deliver to the Engineer as a required submittal, three complete electronic copies of all information exchanged through the Web-based Cloud system by all parties using the system for the project. The information shall be on set(s) of DVDs or other suitable electronic storage media agreeable to the Engineer and the Owner. The information must be readily reviewable in standard operating system software generally and publicly available to the Owner and Engineer. The Engineer shall review the submitted electronic information for completeness and format and respond to the Contractor as to the acceptability of the submittal and/or any modifications or resubmittal that is required to be made and/or resubmitted by the Contractor.

8. In the event that the Web-based Cloud system becomes unavailable, unusable, or otherwise unsuitable for continued use for this project at the sole discretion of the Engineer, the Contractor is responsible for delivering all electronic information previously transmitted for the project through the Web-based Cloud system in an acceptable electronic format to the Engineer and/or paper copies of that information acceptable to the Engineer and Owner.

SC-7.01.D. Add the following new paragraphs immediately following Paragraph 7.01.C:

- D. The Owner shall let as separate contract or perform work themselves, in the same general timeframe as this project, the following project(s) that will require coordination by the Contractor:
 1. Post Falls WRF: Tertiary Treatment Improvements

SC-8.02.A. Amend Paragraph 8.02.A by striking out the following words:

“...to whom Contractor makes no reasonable objection,...”

SC-9.03. Add the following new paragraphs immediately following Paragraph 9.03.A:

- B. The Resident Project Representative (RPR) will be Engineer's employee or agent at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions. RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall be through or with the full knowledge and approval of Contractor. The RPR shall:
 1. *Schedules:* Review the progress schedule, schedule of Shop Drawing and Sample submittals, and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
 2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
 3. *Liaison:*
 - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's authorized representative, assist in providing information regarding the intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

4. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
5. *Shop Drawings and Samples:*
 - a. Record date of receipt of Samples and approved Shop Drawings.
 - b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
6. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
7. *Review of Work and Rejection of Defective Work:*
 - a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress will not produce a completed Project that conforms generally to the Contract Documents or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
8. *Inspections, Tests, and System Startups:*
 - a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
 - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
9. *Records:*
 - a. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
 - b. Maintain records for use in preparing Project documentation.
10. *Reports:*

- a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.
- b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
- c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, damage to property by fire or other causes, or the discovery of any Hazardous Environmental Condition.

11. *Payment Requests:* Review Applications for Payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

12. *Certificates, Operation and Maintenance Manuals:* During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Specifications to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

13. *Completion:*

- a. Participate in a Substantial Completion inspection, assist in the determination of Substantial Completion and the preparation of lists of items to be completed or corrected.
- b. Participate in a final inspection in the company of Engineer, Owner, and Contractor and prepare a final list of items to be completed and deficiencies to be remedied.
- c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the Notice of Acceptability of the Work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
3. Undertake any of the responsibilities of Contractor, Subcontractors, Suppliers, or Contractor's superintendent.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work unless such advice or directions are specifically required by the Contract Documents.
5. Advise on, issue directions regarding, or assume control over safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
8. Authorize Owner to occupy the project in whole or in part.

SC-12.01 C.2.a. Add the following to the end of Paragraph 12.01.C.2.a. as follows:

said 15 percent shall include all taxes and any additional insurance and bond costs.

SC-12.01 C.2.b. Add the following to the end of Paragraph 12.01.C.2.b. of the General Conditions as follows:

said five percent shall include all taxes and any additional insurance and bond costs.

SC-12.01 C.2.c. Add the following to the end of Paragraph 12.01.C.2.c. of the General Conditions as follows:

, except the maximum total allowable cost to OWNER shall be the Cost of the Work plus a maximum collective aggregate fee for CONTRACTOR and all tiered Subcontractors of 20 percent.

SC-12.03.A Add the following to the end of Paragraph 12.03.A of the General Conditions:

Time extensions will not be granted for rain, wind, flood, or other natural phenomena of normal intensity for the locality where Work is performed. For purposes of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for a minimum continuous period of at least one-fourth of the Contract Time involved with the average of the preceding 5-year climatic rate during the same time interval based on U.S. Weather Bureau Statistics for the locality where the Work is performed.

SC-13.03. Replace paragraph 13.03.B with the following:

- B. Testing responsibilities for Contractor and Owner shall be per Specification SECTION 01400 QUALITY ASSURANCE AND QUALITY CONTROL.

SC-13.03. Add the following new paragraphs immediately after Paragraph 13.03.F:

- G. For each test CONTRACTOR causes to be performed on-site, the CONTRACTOR shall furnish to ENGINEER a copy of the record of test(s) in accordance with Specification SECTION 01300 SUBMITTALS.
- H. The CONTRACTOR's independent testing laboratory(ies) for Quality Control or Quality Assurance purposes shall meet the following applicable requirements:
 - 1. Basic requirements of ASTM E 329, "Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials as Used in Construction" and ASTM D 3666, "Standard Specification for Minimum Requirements for Agency Testing and Inspecting Bituminous Paving Materials," as applicable.
 - 2. Calibrate testing equipment at reasonable intervals by devices of accuracy traceable to either the national Bureau of Standards or accepted values of natural physical constants.
- I. Contractor shall arrange, schedule and coordinate with appropriate agenc(ies) and testing laboratory(s) for all tests, inspections and approvals necessary for the Work.

SC-13.07.A. Modify the last sentence of Paragraph A as follows:

- A. "...contemplated in Paragraph 6.11.A.3 found to be defective, Contractor shall within 7 days of written notification from Owner, propose a solution back to Owner, and within 14 days implement the solution, without cost to Owner and in accordance with the Owner's written instructions:"

SC-13.07.B. Delete the first sentence of Paragraph B and insert the following:

" If Contractor does not address the defective Work within the timelines established in 13.07.A and comply with the terms of Owner's written instructions, or in an emergency case where delay would cause serious risk, of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced."

SC-14.02.C.1 Delete paragraph 14.02.C.1 of the General Conditions in its entirety and insert the following in its place:

- 1. Forty-five (45) days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of paragraph 14.02.D and upon release of funds from the Funding Agencies) become due, and when due will be paid by Owner to Contractor.

SC-14.07.C.1. Revise the first sentence of Paragraph 14.07.C.1 as follows:

"Forty-five days after the presentation...."

SC-14.07.C.1. Add the following language at the end of Paragraph 14.07.C.1:

“Final payment shall not be made until the State Tax Commission issues and the Owner receives a tax release stating that all taxes have been paid.”

SC-15.04.A: Revise the first sentence as follows:
“...submitted, or (iii) Owner fails for 45 days to pay Contractor...”

SC-15.04.B: Revise the first sentence as follows:
“...submitted, or Owner has failed for 45 days to pay Contractor...”

SC-17 Delete Paragraphs 17.01.A.1 and A.2 and replace with the following:

1. delivered at or sent by registered or certified mail, postage prepaid, to the City Clerk and Public Works Director for the City of Post Falls.”
2. delivered in writing to the City Clerk and Public Works Director for the City of Post Falls, by electronic transmission if a method for electronic transmission is outlined in the Agreement or through common practice by the parties, with the words “Formal Notice” or something similar in the electronic transmission’s subject line.

END OF SECTION

BID AND CONTRACT DOCUMENTS

VOLUME II

TECHNICAL SPECIFICATIONS

for

**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

February 2024

| | |
|------------|---|
| Volume I | Bidding and Agreement Forms |
| Volume II | Technical Specifications (Divisions 1-16) |
| Volume III | Plans |



Engineers

J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d'Alene, Idaho 83815
(208) 762-8787



Owner

City of Post Falls
408 N. Spokane St.
Post Falls, Idaho 83854
(208) 773-3511

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**City of Post Falls
Kootenai County, Idaho**

WRF Biosolids Hopper Modifications

Table of Contents

VOLUME 1 – BIDDING AND AGREEMENT FORMS

SECTION 1-A – BID FORMS

Document 00030 – Advertisement for Bids
Document 00040 – Bidder’s Checklist
Document 00200 – Instructions to Bidders
Document 00410 – Bid Form
Document 00415 – Contractor’s Non-Collusion Affidavit
Document 00420 – Anti-Discrimination Affidavit
Document 00430 – Bid Bond – Penal Sum Form
Document 00440 – Naming of Subcontractors Form

SECTION 1-B – CONTRACT FORMS

Document 00500 – Successful Bidder’s Checklist
Document 00510 – Notice of Award
Document 00520 – Agreement between Owner and Contractor for Construction Contract
Document 00550 – Notice to Proceed
Document 00610 – Performance Bond
Document 00615 – Payment Bond
Document 00620 – Contractor’s Application for Payment
WH-5 Public Works Contract Report
Document 00625 – Certificate of Substantial Completion
Document 00940 – Work Change Directive
Document 00941 – Change Order
Document 00942 – Field Order
Document 00950 – Contractor’s Affidavit Concerning Taxes

SECTION 2 – GENERAL CONDITIONS

ISPWC Division 100 – Standard General Conditions to the Construction Contract

SECTION 3 – SUPPLEMENTARY CONDITIONS

VOLUME 2 – TECHNICAL SPECIFICATIONS (Divisions 1-16)

Division 1 – General Requirements

Section 01010 – Summary of Work
Section 01014 – Work Sequence
Section 01019 – Contract Considerations
Section 01025 – Measurement and Payment
Section 01039 – Coordination and Meetings
Section 01063 – Health and Safety
Section 01300 – Submittals
Section 01310 – CPM Construction Schedule
Section 01400 – Quality Assurance and Quality Control
Section 01500 – Construction Facilities and Temporary Controls
Section 01560 – Environmental Controls
Section 01600 – Materials and Equipment
Section 01625 – Pre-Procured Equipment Coordination
 Appendix A – Pre-Procured Equipment Agreements (and Information)
Section 01650 – Starting of Systems
Section 01700 – Contract Closeout
Section 01730 – Installation, Operation, and Maintenance Manuals

Division 2 – Site Work

NA

Division 3 – Concrete

NA

Division 4 – Masonry

Section 04010 – Maintenance of Masonry
Section 04100 – Mortar and Grout
Section 04300 – Reinforced Unit Masonry

Division 5 – Metals

Section 05041 – Hot-Dip Galvanizing
Section 05120 – Structural Steel
Section 05500 – Metal Fabrications

Division 6 – Wood and Plastics

NA

Division 7 – Thermal and Moisture Protection

NA

Division 8 – Windows and Doors

NA

Division 9 – Finishes

Section 09900 – High-Performance Coatings

Division 10 – Specialties

NA

Division 11 – Equipment

Section 11000 – General Requirements for Equipment

Division 12 – Furnishings

NA

Division 13 – Special Construction

NA

Division 14 – Conveying Systems

NA

Division 15 – Mechanical

Pipe and Fittings (*Specified on Plans*)

Section 15850 – Removeable Insulation for Equipment

Division 16 – Electrical

Section 16012 – Electrical General

Section 16119 – Conductors and Cables

Section 16126 – Grounding and Bonding

Section 16129 – Hangers and Supports

Section 16133 – Raceways and Boxes

Section 16153 – Identification for Electrical Systems

Section 16430 – Enclosed Switches and Circuit Breakers

Section 16670 – Electrical Testing

Section 16858 – Heat Trace

Section 16926 – Control System

Appendix A – LCP-SL Drawings

VOLUME 3 – PLANS:

See Drawing Index

**SECTION 01010
SUMMARY OF WORK**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Project Summary
- B. Regulatory Requirements and Permits
- C. Work by Owner
- D. Contractor Use of Site and Premises
- E. Work Sequence
- F. Project Sign
- G. Owner Occupancy
- H. Work by other Contractors
- I. Abbreviations

1.2 PROJECT SUMMARY

- A. The WRF Tertiary Treatment Improvements Project is an upgrade to the City of Post Falls Water Reclamation Facility (WRF):
- B. The existing WRF generally consists of the following:
 - 1. Headworks, including fine screen, grit channels and influent sampler
 - 2. Influent Flow Equalization Tanks and Pump Station
 - 3. 6 oxidation ditches and 8 Secondary Clarifiers
 - 4. Tertiary Plate Settlers and Tertiary Filtration (under construction)
 - 5. UV Disinfection (under construction)
 - 6. Plant effluent reuse (utility water) pump system (under construction)
 - 7. Liquid biosolids storage and belt filter press dewatering
 - 8. Elevated dewatered solids storage
 - 9. Multiple plant drainage pump stations
 - 10. Biofilter odor control systems
 - 11. Administrative and laboratory buildings
- C. The upgrades included within this project are improvements to an existing wastewater reclamation facility (WRF), generally including the following:
 - 1. Equipment modifications and additions to the elevated dewatered solids storage and loadout facility.

2. Electrical, Controls and SCADA Improvements

1.3 REGULATORY REQUIREMENTS AND PERMITS

- A. Comply with all Federal, State, and local laws, regulations, and ordinances applicable to work.
- B. Reference in Contract Documents to local codes shall mean the codes in effect in the State of Idaho, Kootenai County, City of Post Falls, and Panhandle Health District, Kootenai-County Fire and Rescue, East Greenacres Water District, Rathdrum-Prairie Soul Source Aquifer Protection District, and Idaho Department of Environmental Quality.
- C. Owner shall obtain and pay for any necessary building permits. The permit shall be assigned to the Contractor, and the Contractor shall coordinate inspections and execute permit requirements as necessary.
- D. Contractor shall coordinate with utilities (Power, Natural Gas and Water) for connection to systems and shall coordinate inspections and execute any and all requirements by the utilities. Owner shall pay-for Connection Fees related to Power, Natural Gas and Water for elements incorporated into the facility, but not for Contractor's use during construction.
- E. Contractor shall apply for, pay for, and execute all other permits applicable to the work.
- F. Other standards and codes that apply to the work are designated in the Specifications.

1.4 WORK BY OWNER

- A. Normal day-to-day operations of the existing WRF will be ongoing. Construction shall not isolate or interrupt existing wastewater conveyance and treatment activities, including, but not limited to, Owner's staff operation, maintenance, and repair except as specifically described herein and described in 01014 Construction Work Sequencing.
- B. Whenever existing systems and equipment are scheduled to be taken out of service, the Owner will operate all valves and equipment to shut off and isolate the system from plant flow stream.

1.5 CONTRACTOR USE OF SITE AND PREMISES

- A. Limit use of site and premises to allow:
 - 1. Access by property owners.
 - 2. Work by others and work by Owner.
 - 3. Maintain work schedule to allow facilities traffic at all times.
- B. Contractor shall have access to the 'Staging Area' generally depicted in the Plans. Contractor shall grade and prepare the area as necessary for Contractor's use. At

completion of the project, the area shall be graded to match existing site contours and returned to an equal or better condition compared to the beginning of construction.

- C. Contractor's traffic is not permitted to travel on the "Streets Department Road" – without specific, written permission from Owner on a case-by-case basis. No construction parking shall be permitted in this corridor at any time.
- D. Owner's activities (including hauling biosolids, equipment deliveries, chemical deliveries, maintenance, etc.) requires a full access road (facility loop) at all times and access for loadout at the solids loading ramp west of the solids hopper building. Contractor shall maintain the biosolids haul loop access road at all times during construction. Road shall be one lane, 12' wide minimum. Short-term closures limited to 1-2 days may be permitted, provided a request is made 14 days prior, Owner is able to reschedule activities requiring use of the road, and upon written acceptance by Owner.
- E. Construction operations limited to rights-of-way, easements, and property lines of Owners property.
- F. Time Restrictions for Performing Work:
 - 1. Reference Supplementary Conditions to the General Conditions – Paragraph SC-6.02.B. No work shall be performed outside these hours or on weekends unless authorized in writing by the Owner.
- G. Spillage of wastewater to the ground is not allowed. Contractor shall implement all necessary Best Management Practices as necessary to prevent spillage. If any spills occur, notify Owner and IDEQ immediately. Any spills shall be contained, cleaned, and remediated as necessary in accordance with IDEQ requirements.

1.6 WORK SEQUENCE

- A. Contractor shall be solely responsible for sequencing all construction activities to meet the requirements of the Contract Documents. Refer to Section 01014 "Work Sequence" for additional requirements.

1.7 PROJECT SIGN

- A. Not Applicable.

1.8 OWNER OCCUPANCY

- A. Owner will occupy the premises during the entire period of construction for normal operation of the WRF. Cooperate with Owner in all startups, testing, and demonstration period operation to minimize conflict and to facilitate Owner usage.
- B. Owner's personnel will be responsible for operating the existing WRF throughout the execution of this Contract. Equipment presently installed in the WRF must be available to Owner's personnel at all times for use, maintenance, and repairs.

1.9 WORK BY OTHER CONTRACTORS

- A. Additional work by other Contractors may be performed at the WRF site under separate contract and will require coordination and scheduling by Contractor with those separate efforts, at no additional cost.
 - 1. Additional work on site under separate contract includes:
 - a. Owner-Provided programming (following Contractor testing of hardware and communications I/O per DIV 16) and SCADA development – H2E Engineering.
- B. Contractor shall coordinate with other contractors on site as noted above (or as required during the course of this project) during all work phases, including, but not limited to, shutdowns, equipment installation, startups, testing, and demonstration period operation to minimize conflicts and to facilitate usage of WRF systems by Owner.

1.10 OWNER FURNISHED EQUIPMENT COORDINATION

- 1. Equipment Numbers: SL-FV-0731A, B, C and D
- 2. The Owner will furnish a knife gate valves, actuators. The parts have not been used. Scope of supply for these items is included in these Contract Documents.

1.11 ABBREVIATIONS

- A. Wherever the following abbreviations are used, they shall have the meanings indicated:

| | |
|--------|--|
| AASHTO | American Association of the State Highway and Transportation Officials |
| ACI | American Concrete Institute |
| AGA | American Gas Association |
| AGMA | American Gear Manufacturers' Association |
| AI | The Asphalt Institute |
| AIA | American Institute of Architects |
| AISC | American Institute of Steel Construction |
| AISI | American Iron & Steel Institute |
| AITC | American Institute of Timber Construction |
| ANSI | American National Standards Institute |
| APA | American Plywood Association |
| API | American Petroleum Institute |
| APWA | American Public Works Association |
| AREA | American Railway Engineering Association |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigerating, and Air Conditioning Engineers |
| ASME | American Society of Mechanical Engineers |
| ASQC | American Society for Quality Control |
| ASTM | American Society for Testing and Materials |
| AWPA | American Wood Preservers Association |
| AWPI | American Wood Preservers Institute |
| AWS | American Welding Society |

| | |
|-------|---|
| AWWA | American Water Works Association |
| CBM | Certified Ballast Manufacturers |
| CLFMI | Chain Link Fence Manufacturers Institute |
| CRSI | Concrete Reinforcing Steel Institute |
| DIPRA | Ductile Iron Pipe Research Association |
| ETL | Electrical Test Laboratories |
| FHWA | Federal Highway Administration |
| IBC | International Building Code |
| ICEA | Insulated Cable Engineers Association |
| IDEQ | Idaho Department of Environmental Quality |
| IEEE | Institute of Electrical and Electronics Engineers |
| IPCEA | Insulated Power Cable Engineers Association |
| ISA | Instrument Society of America |
| ISO | Insurance Services Office |
| ISPWC | Idaho Standards for Public Works Construction |
| ITE | Institute of Transportation Engineers |
| MUTCD | Manual on Uniform Traffic Control Devices |
| NEC | National Electrical Code |
| NEMA | National Electrical Manufacturers Association |
| NEPA | National Environmental Policy Act |
| NFPA | National Fire Protection Association |
| NFPA | National Forest Products Association |
| OSHA | Occupational Safety and Health Act of 1970 |
| PCA | Portland Cement Association |
| SAE | Society of Automotive Engineers |
| SEPA | State Environmental Policy Act |
| SSPC | Steel Structures Painting Council |
| UBC | Uniform Building Code, International Conference of Building Officials |
| UL | Underwriters' Laboratories, Inc. |
| UPC | Uniform Plumbing Code |
| WAC | Washington Administrative Code |
| WCLIB | West Coast Lumber Inspection Bureau |
| WCRSI | Western Concrete Reinforcing Steel Institute |
| WRI | Wire Reinforcement Institute |
| WRF | Water Reclamation Facility |
| WWPA | Western Wood Products Association |
| WWTF | Wastewater Treatment Facility |
| WWTP | Wastewater Treatment Plant |

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

**SECTION 01014
WORK SEQUENCE**

PART 1 GENERAL

1.1 EXISTING WATER RECLAMATION FACILITY (WRF)

- A. The existing WRF is currently and continuously receiving wastewater from the collection system and treating the wastewater prior to discharge. Those functions necessary for treatment in the existing WRF prior to discharge are not to be interrupted except as specified herein.

- B. The existing WRF generally consists of the following:
 - 1. Headworks, including fine screen, grit channels and influent sampler
 - 2. Influent Flow Equalization Tanks and Pump Station
 - 3. 6 oxidation ditches and 8 Secondary Clarifiers
 - 4. Tertiary Plate Settlers and Tertiary Filtration (under construction)
 - 5. UV Disinfection (under construction)
 - 6. Plant effluent reuse (utility water) pump system (under construction)
 - 7. Liquid biosolids storage and belt filter press dewatering
 - 8. Elevated dewatered solids storage
 - 9. Multiple plant drainage pump stations
 - 10. Biofilter odor control systems
 - 11. Administrative and laboratory buildings

1.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT CONDITIONS

- A. Discharge from the WRF must satisfy the following conditions:
 - 1. The Owner's IPDES Discharge Permit (ID0025852). Compliance with the NPDES Permit shall be maintained at all times during construction. A copy of the permit may be obtained from the City.

- B. Owner will notify Contractor immediately if permit limits are violated.

- C. If Contractor's actions result in a violation of the NPDES Permit or an imminent violation as determined by Owner and/or Engineer, Contractor shall mitigate any damages, suspend certain aspects of work if deemed necessary by Owner and Engineer, and fully cooperate with Owner and Engineer to bring facility into compliance with IPDES Permit at no cost to Owner.

- D. Penalties and any and all related costs, including but not limited to legal and engineering expenses, imposed on or incurred by Owner as a result of any bypass or IPDES permit violation caused by the actions or inactions of the Contractor, its employees, subcontractors or agents, are to be borne in full by the Contractor.
- E. Bypassing of untreated or partially treated wastewater to surface waters is prohibited.

1.3 MAJOR WORK ELEMENTS

- A. Elevated Dewatered Solids Sludge Storage and Loadout (Process Area SL)
 - 1. The Elevated Sludge Storage and Loadout System includes multiple sub-processes and equipment.
 - 2. Portions of the new equipment (valves, actuators and flexible pipe connectors) were procured by the Owner to facilitate final design of the facility. These equipment items will be furnished to the Contractor for coordination, installation and commissioning as required in the Contract Documents for a complete and operable system.
- B. Electrical and Instrumentation Systems
 - 1. The existing electrical components must be maintained throughout construction until the modifications are complete and operational, which includes successful start-up, acceptance testing and successful operations in the WRF processes that satisfy the Owner's IPDES Permit.

1.4 SUBMITTALS

- A. Provide detailed outage and time schedule plan for each work item that may impact plant operation. Provide long-range and short-range plans, as appropriate for coordinating work with Owner.
- B. Submit in accordance with Section 01300.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL

- A. Owner will occupy the premises during the entire construction period and continue operations of the existing WRF until the new facility is complete. Contractor shall cooperate, schedule, and coordinate all activities and minimize all conflicts with facility Owner's usage, operation, and maintenance.

- B. Except for the shutdown durations specified in this section, Contractor's means and methods shall be implemented such that the existing WRF shall remain in continuous satisfactory operation during the entire construction period. Work shall be so scheduled and conducted by Contractor such that it shall not impede any treatment process, create potential hazards to operating equipment and plant personnel, or reduce the quality of the finished water. In performing the work shown and specified, Contractor shall plan and schedule the work to meet both the constraints outlined in this section and plant operating requirements.
- C. Contractor has the option of providing additional temporary facilities that can eliminate a constraint, provided it is done without additional cost to the Owner, presents no safety hazards, and provided that all requirements of these Specifications are fulfilled.
- D. Contractor shall be responsible for coordinating all shutdowns with the Owner and Engineer. Contractor shall, whenever possible, combine discrete shutdown procedures identified in this section or by Contractor into a single shutdown when the duration of the shutdowns or the work requirements allow such combining to occur on a unit process or work area. The intent of combining procedures is to minimize the impacts upon plant operations and processes by limiting the number of shutdowns required.
- E. Shutdown activities requiring dewatering or transferring of tank contents require a minimum two weeks advance notice to Engineer and Owner in writing. Contractor shall not shut off or disconnect any operating system of the plant unless approved by the Owner, in writing. All plant equipment operations and shutdowns shall be executed by the Owner unless otherwise noted. Contractor shall seal Owner-operated gates and valves to prevent unnecessary leakage. After Contractor's work has been completed, Contractor shall remove the seal to the satisfaction of the Engineer.
- F. Contractor shall be responsible for providing all temporary pipelines, fittings, valves, pumps, meters, backflow preventers, spare parts, supports, electrical, power, controls, any other appurtenances, and labor required for the installation and operation of temporary bypass lines, pumping systems, processes, or conveyance systems required to maintain operations of the plant during construction activities, including those items deemed appropriate and/or necessary by the Owner and Engineer for satisfactory operation of the facility.
- G. Unless otherwise specified, Contractor shall dewater and remove solids from process tanks and pipelines at the beginning of each shutdown. Contractor shall be responsible for washing down and cleaning all tanks, basins, solids storage facilities, pipelines, and other work areas. It is the responsibility of the Contractor to remove all washdown, cleaning, and stormwater that accumulates in the work areas. Approximate depth of debris that can be expected to accumulate in the bottom of basins is 12 to 18 inches. Contractor shall be responsible for removing this material and disposing of it.
- H. Contractor's schedule shall include prior to the date of Substantial Completion a designated period for activities described in Section 01650 – Starting of Systems, including, but not limited to:

1. Initial starting and testing of systems
2. Owner Training
3. Owner Programming Period
4. Initial and Final Acceptance Testing Periods (isolated unit process)
5. Commissioning of Systems (milestone)

3.2 WORK SEQUENCE

- A. The Contractor shall submit a detailed plan for the Work, portions of which are listed herein, for general review and consideration by the Owner and Engineer. In all cases, operation of existing plant equipment and processes must be maintained to maintain compliance with the Owner's NPDES Permit.
- B. Contractor shall submit a Progress Schedule, with monthly updates, in accordance with the General Conditions.
- C. Some work elements may be done simultaneously. Not all construction activities are noted. Coordinate construction schedule to incorporate the listed Major Work Elements items as a minimum.
- D. Planned Outages
 1. Contractor shall notify Owner and Engineer through a formal submittal (per Section 01300) at least four weeks (28 calendar days) in advance of any requested planned outage, unless otherwise noted.
 2. Operating processes, systems, individual equipment items, piping, or controls shall be isolated, dewatered, decommissioned, de-energized, or depressurized only during scheduled, planned outages. The treatment plant manager, or designated representative, shall have the right to cancel or terminate an outage at no cost to the Owner when in his opinion the potential for a safety hazard or violation of the discharge permit exists. However, this does not relieve the contractor of the responsibility to maintain a safe working environment and to maintain treatment plant operations.
 3. If requested by the Owner or Engineer, the Contractor shall send a representative to meet with plant and Engineer's staff to plan activities during the requested outage.
 4. Outages shall not be permitted on Fridays, weekends, or Holidays. Shutdowns shall not occur on consecutive days unless previously approved by the Engineer and accepted by the Owner.
- E. Monitoring for IPDES Permit compliance when unit processes are out of service, being temporarily modified, or otherwise impacted during construction shall be the responsibility of the Owner. If Contractor's construction activities impact Owner's ability to sample for compliance, Contractor shall provide assistance as necessary, including but not limited to, labor, tools, equipment, and temporary structures.

- F. Contractor's schedule shall include critical work elements generally noted herein and a sequence developed to:
1. Minimize disruption to existing processes and facility operations.
 2. Comply with effluent quality limitations and maintain compliance with the IPDES Permit.
 3. Maintain the highest possible level of treatment during construction.
 4. Maintain the necessary minimum number of liquid and solid stream units in effective operation.
 5. Continuously maintain plant monitoring and control functions.
 6. Ensure the availability of adequate electrical power and controls.
 7. Ensure the availability of support systems (or provide temporary / alternate feed sources) at all times during the completion of this contract.
 8. Existing electrical systems (or alternate feed sources) to the existing facility shall be maintained throughout construction.
 9. Upon acceptance of the new facility, those items designated for removal may be removed from service by Contractor.
 10. Contractor's attention is directed to Section 1.2 regarding effluent requirements for discharge to surface waters.
- G. A summary of critical construction items is included in **Table A**.
1. The table includes a discussion of each identified item, envisioned coordination with other work activities, potential temporary systems, and process constraints for continued operation of the WRF. The summary shall not be construed as stipulating the means and methods for completion of the Work. It is presented to highlight sequencing needs in general and to aid Contractor in preparation of Contractor's detailed work schedule.
 2. Some outages (short- and/or long-term) cannot be combined while maintaining satisfactory operation of the WRF. Potential combinations that would compromise the WRF operation and potentially result in NPDES permit violations are identified in the table. However, it is not possible to identify all possible combinations that Contractor may wish to use in sequencing the work. In preparing an outage request, Contractor shall identify all other outages (short- and long-term) that would be in effect for that process and other processes. Owner reserves the right to prohibit outage combinations if, in the sole opinion of the Owner, such outages could result in NPDES permit violations.

Table A – Summary of Critical Construction Steps

| | Item | Discussion, Coordination with Other Work Activities, Process Constraints, Etc. |
|---|--------------------|---|
| Administration and Laboratory Procedures | | |
| 1 | General | The City’s Wastewater Division (collection system and treatment) is operated from the water reclamation facility. Personnel and equipment must access the site daily. No work is planned in the Administration / Laboratory facilities for this project with the exception of fiber-optic network and telecommunications. |
| 2 | Short-term outages | N/A |
| 3 | Long-term outages | N/A |
| Site Access | | |
| 1 | General | Access to the site must be maintained for plant activities including deliveries, sludge hauling and emergency services. |
| 2 | Short-term outages | Short term access interruptions demolition or related to the sludge conveyor area is allowed, however a minimum 1-lane access must always available for pull-through access by a Truck-and-Pup sludge hauler to access and utilize the sludge loadout ramp, just west of the solids storage building. |
| 3 | Long-term outages | N/A |
| Elevated Biosolids Holding Sludge Storage and Loadout Facility | | |
| 1 | General | Dewatered waste sludge is conveyed to the elevated sludge storage hopper where it is collected and stored prior to being loaded into trucks and are hauled off-site by a third-party entity for final treatment via composting. |
| 2 | Short-term outages | NA |
| 3 | Long-term outages | <u>The single 60-calendar day (sequential days) shut-down of the biosolids loadout facility shall be allowed to perform the Work and shall occur within the Contract Time to achieve Substantial Completion Intermediate Milestone for the improvements as defined in the Agreement between Owner and Contractor.</u> The City anticipates taking the biosolids sludge facility offline for one single period of time to allow for cleanout of the hopper and conveyors, measurements of as-built conditions to allow for fabrications by the contractor, demolition and construction of improvements. During this shut-down, solids will be diverted to the covered sludge storage building and loaded on trucks with a front-end loader by the City. This shutdown shall be included within the times noted in the Agreement for the Contractor to achieve Substantial Completion. It is anticipated that this off-line/shut down period shall commence upon written notice from the Contractor that all Contractor-provided materials have been procured and are on-site and all Owner-Furnished Goods are on-site to perform the |

| | Item | Discussion, Coordination with Other Work Activities, Process Constraints, Etc. |
|---------------------------------------|--------------------|--|
| | | <p>improvements. Advance notice of the proposed shut-down shall be given per paragraph 3.2 of this specification to allow time for Owner to draw-down and begin haul-off of Biosolids Hopper Contents. This will reduce the amount of off-line time for the solids storage and loadout conveyor system.</p> <p>The Owner Furnished Goods are anticipated to be on-site by July 19, 2024 (reference Volume II Technical Specifications – Appendix A: Pre-Procured Equipment Agreements).</p> |
| Electrical, Controls and SCADA | | |
| 1 | General | The Project includes modifications to the existing electrical electric and controls systems, as well as construction of new components. All processes shall be maintained with uninterrupted service except as permitted herein for short-term and long-term outages. |
| 2 | Short-term outages | Reference Division 16 |
| 3 | Long-term outages | Reference Division 16 and shut-downs for Elevated Sludge Storage and Loadout Facility. |

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**SECTION 01019
CONTRACT CONSIDERATIONS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Application for Payment
- B. Change procedures

1.2 RELATED SECTIONS

- A. Section 2 – General Conditions. Contract sum/price, including allowances
- B. Section 3 – Supplementary Conditions
- C. Section 4 and 4A– IDEQ SRF Insert and Wage Decision
- D. Section 01025 – Measurement and Payment: Schedule of Values
- E. Section 01310 – CPM Construction Schedule
- F. Section 01600 – Materials and Equipment
- G. Section 01700 – Contract Closeout

1.3 APPLICATIONS FOR PAYMENT

- A. Submit each application on Form C-620, Contractors Standard Form, or electronic media printout from the approved Schedule of Values. The total number of final, signed copies shall be established during the pre-construction conference.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment. For each item, provide a column for listing: Item Number, Description of Work, Unit Price, Quantity, Amount, Previous Applications, Work in Place under this Application, Authorized Change Orders, Total Completed to Date of Application, Percentage of Completion, Balance to Finish, and Retainage.
- C. Revise work schedule and submit with each Application for Payment. List approved Change Orders with each Application for Payment. (Reference Section 01310)
- D. Payment Period: Payment period shall be established by Owner in conformance with the Agreement and the General Conditions.

- E. Waiver of Liens: The Contractor shall provide a Waiver of Lien to the Owner as part of the Application for Payment.
- F. Prepare Application for Final Payment as specified in Section 01700.
- G. When Owner, Engineer, or funding agency (as applicable) requires substantiating information for review, approval, or processing an Application for Payment, submit such information as requested.

1.4 CHANGE PROCEDURES

- A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Price or Contract Time as authorized by Article 9.04 in the General Conditions by issuing supplemental instructions on Form C-940, Work Directive Change.
- B. Contractor will submit the name of the individual authorized to receive change documents and be responsible for informing others in contractor's employ or subcontractors of changes to the work.
- C. The Engineer may issue a Notice of Change which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, and a change in Contract Time for executing the change. Contractor will prepare and submit an estimate within ten (10) days.
- D. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Price and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01600.
- E. Stipulated Sum/Price Change Order: Based on Contractor's request for a Change Order as approved by the Engineer.
- F. Unit Price Change Order: For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Work Directive Change. Changes in Contract Price or Contract Time will be computed as specified for Time and Material Change Order.
- G. Work Directive Change: Engineer may issue a directive, on Form C-940 Work Directive Change signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Price or Contract Time. The Contractor shall promptly execute the change.

- H. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Engineer will recommend to the Owner the change allowable in Contract Price and Contract Time as provided in the Contract Documents.
- I. All change orders and work directive changes must be approved by the Owner and funding agencies prior to commencing the change.
- J. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- K. Change Order Forms: Form C-941 as provided herein.
- L. Execution of Change Orders: Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- M. Promptly revise progress schedules to reflect any changes in contract time, revise sub-schedules to adjust time for other items of work affected by the change and resubmit.
- N. Revise project record documents per the changes.
- O. Revise Schedule of Values and Application for Payment forms to record each authorized Change Order. Adjust contract price.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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**SECTION 01025
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Schedule of Values
- C. Schedule of Estimated Progress Payments
- D. General Description of Measurement and Payment
- E. Application for Payment
- F. Nonpayment for Rejected or Unused Goods
- G. Partial Payment for Stored Materials and Equipment
- H. Schedule of Bid Items

1.2 SUBMITTALS

- A. Informational Submittals:
 - 1. Project Schedule: Progress schedule documenting work to-date and adherence to project times. Provide monthly updates concurrent with each Application for Payment.
 - 2. Schedule of Values: Submit on Contractor's standard forms.
 - 3. Schedule of Estimated Progress Payments:
 - a. Submit with initially acceptable Schedule of Values.
 - b. Submit adjustments thereto with Application for Payment.
 - 4. Application for Payment.
 - 5. Final Application for Payment.

1.3 LUMP SUM WITH SCHEDULE OF VALUES FOR SCHEDULE – BIOSOLIDS STORAGE HOPPER MODIFICATIONS

- A. Prepare a separate Schedule of Values for each schedule of the work under the Agreement for work in the WRF. Schedule of Values shall list values for all Work for complete installation to serve as the basis for computing values for progress payments during construction.

B. List bonds and insurance premiums, mobilization, demobilization, and contract closeout separately in the Schedule of Values.

C. Lump Sum Work:

1. The Schedule of Values shall include all equipment, additive alternates (as applicable), specified allowances, labor, tools, materials, piping, fittings, temporary bypass, environmental controls and permitting, appurtenances, and all other items of expense for a complete and properly functional installation as shown on the Drawings and described in the Specifications and Contract Documents.

2. Payment shall be made at the approved Schedule of Value prices. Provide a breakdown of costs by Process Area (below) and subsequent breakdown by corresponding Technical Division (e.g., 1-16). Breakdown by Process Area shall be made as shown below and as-delineated elsewhere in the Contract Documents:

| Process Areas |
|--------------------------------------|
| Sludge Storage and Loadout Area (SL) |

3. Within the Process Area and Technical Division Schedule of Values breakdown described above:
- i. Itemize each equipment item separately with separate amounts for 1) Equipment Purchase and Delivery, and 2) Equipment Installation, Training, & Commissioning. For Contractor provided equipment, the following payment schedule (**Table 1**) describes the maximum cumulative percentages that shall be paid in progress payments for the listed project milestones. Scheduled Values for individual process equipment items shall include the material and labor for all packaged components (instruments, control panels, etc.) supplied by a single vendor associated with that equipment item.
 - ii. For Pre-Procured Equipment, payment terms shall be per the Assigned Procurement Agreement; specific to that equipment package.

Table 1 – Equipment Payment Schedule

| Scheduled Value | Approved Submittal | Delivered and Stored On-Site ^(b) | Completed Initial Starting and Testing ^(a) | Completed Owner Training | Completed Commissioning | Approved Final O&M Manual |
|---|---------------------------|--|--|---------------------------------|--------------------------------|--------------------------------------|
| Equipment Purchase & Delivery | 10% | 85% | 90% | 95% | 100% | --- |
| Equipment Installation, Training, & Commissioning | 0% | 0% | 85% | 90% | 95% | 100- |

^(a) Reference Section 01650 corresponds to Notice of Completed Installation

^(b) Must include approved draft O&M Manual for equipment

- D. An unbalanced or front-end loaded schedule will not be acceptable.
- E. Summation of the complete Schedule of Values representing all the work shall equal the Contract Price.
- F. Submit Schedule of Values in spreadsheet format compatible with latest version of Excel.

1.4 SCHEDULE OF ESTIMATED PROGRESS PAYMENTS

- A. Show estimated payment requests throughout Contract Times aggregating initial Contract Price.
- B. Base estimated progress payments on initially acceptable progress schedule. Adjust to reflect subsequent adjustments in progress schedule and Contract Price as reflected by modifications to the Contract Documents.

1.5 GENERAL DESCRIPTION OF MEASUREMENT AND PAYMENT

- A. Measurement and Payment for the bid items listed in the Bid Form - Unit Price Schedule shall be on the basis of the description in the Contract Documents. Unless the work to be done is specifically called out to be measured and paid for in the Bid Form - Unit Price Schedule, payment for such work shall be included in other applicable items, and there shall be no separate measurement and payment for the work.
- B. Items listed in the Bid Form - Unit Price Schedule as lump sum (LS) shall include all work for the complete installation as generally described in the Contract Documents.
- C. Payment shall be made at the contract unit bid price listed in the Bid Form - Unit Price Schedule. The price listed therein shall be payment in full for all labor, tools, equipment, materials, etc., which are required to construct the respective bid items according to the Contract Documents including all work and materials incidental thereto.

- D. Partial payment for unit bid items and lump sum bid items only partially completed at the end of monthly pay periods shall be made based upon the percentage of work completed.

1.6 APPLICATION FOR PAYMENT

- A. Transmittal Summary Form: Attach one Summary Form with each detailed Application for Payment for each schedule and include Request for Payment of Materials and Equipment on Hand as applicable. Execute certification by authorized officer of Contractor.
- B. Use detailed Application for Payment Form suitable to Engineer.
- C. Provide separate form for each schedule as applicable.
- D. Include accepted Schedule of Values for each schedule or portion of work, the unit price breakdown for the work to be paid on unit price basis, if applicable, and allowances, as appropriate.
- E. Preparation:
 - 1. Round values to nearest dollar.
 - 2. List each Change Order executed prior to date of submission as separate line item. Totals to equal those shown on the Transmittal Summary Form for each schedule as applicable.
 - 3. Take all measurements and compute quantities to estimate percent complete of each item listed in the Schedule of Values. The Engineer will review measurements, quantities, and percent complete with Contractor's Application for Payment.
- F. Submit Application for Payment, including a Transmittal Summary Form and detailed Application for Payment Form(s) for each schedule as applicable, a listing of materials on hand for each schedule (as applicable) and such supporting data as may be required by Funding Agency (or Agencies) and Engineer. Contractor shall include an update to the Progress Schedule per the General Conditions with each application for payment.
- G. American Iron and Steel (IDEQ SRF Requirements): Not Applicable to this Project.
- H. The date of the month for Contractor's submission of monthly Application for Payment shall be established at the Preconstruction Conference.
- I. Progress payments will be made monthly, provided Contractor's submissions are in accordance with the Contract Documents and acceptable to the funding agencies.

1.7 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS

- A. Payment will not be made for the following:
1. Loading, hauling, and disposing of rejected material.
 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
 4. Material not unloaded from transporting vehicle.
 5. Defective work not accepted by Owner.
 6. Material remaining on hand after completion of Work.
 7. Products placed beyond lines and levels of required Work.

1.8 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

- A. Partial Payment: No partial payments will be made for materials and equipment delivered and stored on site (but not incorporated into the Work) unless:
1. Submittals and Shop Drawings have been approved
 2. The items are properly stored and secured on site in a manner acceptable to the Owner and Funding Agencies.
- B. No payment shall be made for materials or equipment not delivered to the site and properly stored.
- C. Final Payment: Final payment will be made for products only incorporated in work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

1.9 BID SCHEDULE

ITEM 1 – BIOSOLIDS SLUDGE STORAGE HOPPER MODIFICATIONS

- A. Basis of Measurement: Lump Sum
- B. Basis of Payment: Unless otherwise itemized separately in the Unit Price Schedule, Payment will be made at the contract lump sum price for all project improvements, complete and operational, based on agreed upon Schedule of Values submitted by the Contractor. Included in this item are all costs to manufacture, construct, deliver, install, etc. all components of the Work and shall include coordination with the Owner, vendors, and other Contractors noted in the Contract Documents; progress meetings, project administration, submittals, equipment, materials, labor, excavation, backfill,

compaction, watering/dewatering, erosion control (including SWPPP preparation and compliance), assembly, testing, startup, training, commissioning, and all other items of expense for a complete and functional system per the Contract Documents, excluding Additive Alternates as identified.

ITEM 1: OWNER FURNISHED EQUIPMENT USE TAX ALLOWANCE

- A. Basis of Measurement: Lump Sum
- B. Basis of Measurement and Payment: Payment for use tax shall be made for actual tax paid for "Owner Furnished Equipment" upon receipt of supporting documentation from Contractor indicating taxes have been paid to the Idaho State Tax Commission.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

**SECTION 01039
COORDINATION AND MEETINGS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination
- B. Operational coordination
- C. Field engineering
- D. Preconstruction conference
- E. Progress Meetings

1.2 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 Drawings. 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 clean up of Work of separate Sections in preparation for Substantial Completion.
- D. Coordinate startup with the Owner, Engineer, state agencies, and funding agencies.
- 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.
- F. Coordinate work with additional work being performed by additional contractors on site. Also see Section 01010 – Summary of Work.

1.3 OPERATIONAL COORDINATION

- A. Owner will be responsible for operating the existing treatment plant throughout the execution of this Contract. Refer to Section 01014 "Work Sequence" for operational coordination.
- B. Contractor shall maintain road access for plant operations vehicles to all treatment process units, from at least one direction, or provide alternate temporary road access at no additional cost to the Owner, at all times.

1.4 FIELD ENGINEERING

- A. Engineer will provide survey control and reference points during construction as follows. Each mobilization consists of one 8-hour work day on-site.
 - 1. All work is associated with existing equipment. No survey Owner provided survey control anticipated for this project.

1.5 PRECONSTRUCTION CONFERENCE

- A. Engineer will schedule a conference after Notice of Award.
- B. Attendance Required: Owner or his representative, Engineer, resident project representatives, Contractor, and funding agencies.
- C. Agenda:
 - 1. Submission of executed bonds and insurance certificates.
 - 2. Distribution of Contract Documents.
 - 3. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
 - 4. Designation of personnel representing the parties in Contract, and the Engineer.
 - 5. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal request, Change Orders and Contract closeout procedures.
 - 6. Scheduling.
 - 7. Surveying (if applicable) layout and scheduling.
 - 8. Specific funding agency requirements.

1.6 PROGRESS MEETINGS

- A. The Engineer will schedule and administer meetings as needed by Owner, Contractor, vendor(s), and agencies throughout progress of the Work.
- B. Attendance Required: Contractor's project manager, Job superintendent, major subcontractors and suppliers; Owner; Engineer; agencies; and others as considered necessary by Owner/Engineer during the course of the work as appropriate to agenda topics for each meeting.
- C. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of Work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Other business relating to Work.
- D. Meetings are anticipated to occur weekly but may be extended depending on work progress.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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**SECTION 01063
HEALTH AND SAFETY**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. This section specifies procedures for complying with applicable laws and regulations related to safety and health of the worker and the public. It is not the intent of the Owner or the Engineer to develop and/or manage the safety and health programs of Contractors or in any way assume the responsibility for the safety and health of their employees. It is required that Contractor adheres to applicable Federal, State, and local safety and health regulations.
- B. This section describes the Accident Prevention Program that is a subset of the Safety Program.
- C. Related sections are as follows:
 - 1. Section 01560 – Environmental Controls

1.2 REFERENCES

- A. Comply with and enforce on-the-job site current applicable local, State, and Federal Health and Safety Standards, including, but not limited to, the following:

| Reference | Title |
|--------------------|--|
| 29 USC 651 et seq. | Federal Occupational Safety and Health Act |
| 29 CFR 1910 | OSHA General Health and Safety Standards |
| 29 CFR 1926 | OSHA Construction Safety and Health Standards |
| | Idaho General Safety and Health Standards |
| SARA Title III | Emergency Planning and Community Right-to-Know |

1.3 DEFINITIONS

- A. A hazardous substance is defined as follows:
 - 1. A substance classified as “dangerous waste” in accordance with 49 CFR 173.127 or that in sufficient quantities would be classified as “dangerous wastes.”
 - 2. A solid waste, or combination of solid wastes, that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may 1) cause or significantly contribute to an increase in mortality or increase in

serious, irreversible, or incapacitating reversible illness; or 2) pose substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed or otherwise managed.

3. Asbestos material.
4. Polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PHAs), explosives, radioactive materials, and other materials designated as hazardous by regulating agencies having jurisdiction over such matters.

B. A contaminated substance is defined as follows:

1. A substance containing materials in sufficient quantities as hydrocarbons, PCBs, diesel fuels, gasoline, heavy metals, solvents, and other types of fuel oils present in the soil, water, or air.
2. An element, compound, mixture, solution, or substance designated under Section 102 of CERCLA and/or applicable parts of MTCA.
3. A hazardous waste having the characteristics identified under or listed pursuant to Section 3001 of Solid Waste Disposal Act (i.e., RCRA) except those suspended by an act of Congress.
4. A toxic pollutant listed under Section 307 (a) of the Federal Water Pollution Control Act (FWPCA).
5. A hazardous air pollutant listed under Section 112 of the Clean Air Act.
6. An imminently hazardous chemical substance or mixture with respect to which the EPA administrator has taken action pursuant to Section 7 of the Toxic Substance Control Act.

C. Confined space is defined as follows:

1. It is large enough and so configured that a person can bodily enter and perform assigned work.
2. It has limited or restricted means of entry or exit.
3. It is not designed for continuous employee occupancy.

D. *Permit-Required Confined Space.* A confined space that has one or more of the following characteristics:

1. Contains or has potential to contain a hazardous atmosphere.
2. Contains material that has potential for engulfing an entrant.
3. Is shaped inside in such a way that someone entering could be trapped or asphyxiated.

4. Contains other recognized serious safety or health hazards.

1.4 SUBMITTAL PROCEDURES

- A. All submittals in this section are considered informational. The following submittals shall be provided in accordance with Section 01300, Submittals:
 1. *Accident Prevention Program for the Contractor.* This program shall outline the anticipated hazards and safety controls necessary to safeguard Contractor's employees. The public and other personnel shall be specific to the job and site, meet federal, state and local jurisdictional requirements. The program will be reviewed for compliance with this Section prior to the start of work.
 2. *Revisions.* Revise the accident prevention program prior to the start of work to accommodate changes requested by City and/or regulatory agencies or jurisdiction. Post a copy of the accepted program at the Contractor's job site office, and each of the subcontractor's offices. Three additional copies shall be provided to the Engineer.
 3. Health and Safety equipment and/or training material as specified in this section.

1.5 QUALITY ASSURANCE

- A. Ensure that subcontractors receive a copy of this Specification section. The Contractor is responsible for ensuring compliance with the Accident Prevention Program.
- B. Coordinate with the Engineer to obtain approval to disconnect or reconnect utilities.
- C. Coordinate with the Engineer and Owner regarding the shutdown and safety tagout/lockout of pressurized systems, electrical, mechanical, pneumatic, hydraulic, etc. systems, and other equipment and utilities.
- D. Maintain good housekeeping in work areas.
- E. Ensure that all health and safety submittals are reviewed and approved by a Certified Safety Professional (CSCP) and/or Certified Industrial Hygienist (CIH).
- F. Provide a qualified health and safety supervisor, with responsibility and full authority to coordinate, implement and enforce the Contractor's accident prevention program for the duration of this Contract. The name and telephone number of the safety supervisor shall appear in the accident prevention program.

1.6 SPECIAL CONSIDERATIONS

- A. This paragraph describes certain minimum precautions for consideration in developing an Accident Prevention Program. It supplements the regulatory requirements. Failure to comply with safety and health regulations may result in work suspension until adequate safety and health measures are implemented.
1. Hazard Communication
 - a. Provide a written Hazard Communication Program and emergency management plan addressing the potential hazardous substances on site.
 - b. Prior to commencing work, provide a list and corresponding Material Safety Data Sheets (MSDS) for hazardous chemicals to be used on site. If no hazardous chemicals are to be used, provide statement to that effect.
 2. Confined Space
 - a. The nature of work under this Contract may expose workers to permit-required confined spaces having possible toxic and oxygen fluctuation conditions.
 - b. Prior to execution of work in confined spaces, submit a written confined space safety program that meets the requirements 29 CFR 1910.146 and applicable Idaho regulations.
 3. Other Site Safety Considerations. Supply to Engineer for review prior to commencing work on this Contract, a comprehensive written Accident Prevention Program covering the Contractor's activities on site. As a minimum, the program shall include the following:
 - a. Respiratory Protection
 - b. Accident/Injury Reporting
 - c. Emergency Plan (SARA Title-III—Community Right-to-Know)
 - d. Personal Protective Equipment
 - e. Fall Restraint and Fall Arrest
 - f. Fire Safety and Prevention
 - g. Hand and Power Tools
 - h. Welding and Cutting
 - i. Electrical
 - j. Vehicles and Other Motorized Equipment
 - k. Tagout/Lockout Hearing Conservation

4. Special Hazards
- a. Infectious Disease. Sewers carry a wide spectrum of disease-producing organisms. Submit a written hazard communication and biological blood borne pathogen program detailing the preventive measures to be taken by the Contractor to provide an appropriate work environment for its employees as well as other employees on site. These may include, but are not limited to the following:
 - i. Instruction in appropriate measures to avoid contamination.
 - ii. A preventative inoculation program (tetanus/diphtheria, etc.) available to all personnel.
 - iii. Clothing to protect against infection, including rubber boots with full sole and heel steel insert-liners, safety glasses or goggles, and gloves.
 - iv. Facilities for workers to clean up and wash.
 - b. Additional chemicals are present within the WRF Site and associated MSDS are available upon request. Contractors Work area and activities for this project are not anticipated to be within areas of where these chemicals are stored or utilized.
 - d. Process Safety Management. Waste treatment plants must comply with the provisions of the Process Safety Management Regulations, 29 CFR 1910.119. This project may affect the regulated processes. Submit a written Process Safety Management Plan. At a minimum, the plan should cover the following:
 - i. Process Safety Information
 - ii. Operating Procedures
 - iii. Management of Change
 - iv. Contractors or Subcontractors
 - v. Review of Hot Work Permits
 - vi. Process Hazard Analysis
 - vii. Safe Work Practices
 - viii. Pre-startup Safety Review
 - ix. Mechanical Integrity
 - x. Emergency Planning and Response
 - xi. Training
 - xii. Compliance Audits
 - e. Contaminant gases that may be encountered include but are not limited to Hydrogen Sulfide, Methane, Carbon Monoxide, Carbon

Dioxide and Sulfur Dioxide. Provide a written Emergency Management Plan to address these and other potential hazardous substances on site.

- f. Fall Protection. Work activities on this project may expose employees to fall hazards. Contractor must provide a written Fall Protection Plan for each fall hazard encountered throughout the project.

1.7 UTILITIES

- A. Take appropriate precautions in working near or with utilities and dangerous substances during the performance of work in order to protect the health and safety of the worker, the public, property, and the environment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 SAFETY AND HEALTH COMPLIANCE

- A. Occasionally, the Owner may audit the Contractor's Accident Prevention Program. The Owner reserves the right to stop that portion of the Contractor's work that is determined to be a serious health and safety violation. Ongoing work that is considered a safety or health risk by the Owner shall be corrected immediately.
 - 1. Ensure that necessary air monitoring, ventilation equipment, protective clothing, and other supplies and equipment as specified are available to implement the Accident Prevention Program.
 - 2. Notify the Engineer and Owner immediately of accidents resulting in any serious injury or immediate or probable fatality to any employees or public, or which result in hospitalization of any employees.

3.2 ACCIDENT PREVENTION PROGRAM REVISIONS

- A. In the event that involved regulatory agencies or jurisdictions determine the Accident Prevention Program or associated documents, organizational structure, or Comprehensive Work Plan to be inadequate to protect employees and the public:
 - 1. Modify the Program to meet the requirements of said regulatory agencies or jurisdictions.
 - 2. Provide the Engineer and the Owner with the revisions to the Program within 7 days of the notice of deficiency.

3.3 EMERGENCY SERVICES NOTIFICATION

- A. Contractor shall notify local Emergency Service providers as necessary during the course of the Work. Notification shall be provided when road closures occur, Contractor's personnel must enter confined spaces with significant exposure/risk as required in the Contractors' Accident Prevention Program.

END OF SECTION

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**SECTION 01300
SUBMITTALS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Web-based administration of submittals
- B. Submittal procedures
- C. Construction progress schedules
- D. Proposed products list
- E. Shop drawings and Coordination Drawings
- F. Product data
- G. Samples
- H. Manufacturers' instructions
- I. Manufacturers' certificates
- J. Manufacturing Location Certification Documentation (American Iron and Steel Certification)
- K. Spare Parts and Maintenance Materials
- L. Submittal Limits
- M. Electronic Web-Based Cloud Construction Administration Software

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Control: Manufacturers' field services and reports
- B. Section 01650 – Starting of Systems
- C. Section 01700 - Contract Closeout: Contract warranty and manufacturer's certificates and closeout submittals
- D. Section 01730 – Operation and Maintenance Data

E. Section 11000 – General Requirements for Equipment

1.3 WEB-BASED ADMINISTRATION OF SUBMITTALS

- A. Contractor shall pay for and utilize a web-based Cloud Construction Administration Software (Software) throughout the construction process to aid the project communication and submittal review process.
- B. Contractor shall be responsible for all costs and fees associated with the software through the duration of the Contract.
- C. Contractor shall be responsible for all startup and setup required for the successful operation of the software. The Contractor shall provide assistance to and coordinate assistance as required throughout the project to the Engineer, the Owner, and their designated representatives to successfully apply the software and its application to the Project. The Engineer, Owner and their representatives are responsible for their own hardware, web access, and internal operating systems necessary to access the Cloud web-based software website.
- D. The use of Construction Administration Software does not eliminate the Contractors' responsibilities for maintaining (in a safe place at the site) one record hard copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction under the General Conditions, Section 6.12.
- E. The items below provide a general list of documents intended to be stored, transmitted and accessed with the Web-based Cloud Construction Administration Software:
 - 1. Bid Set Electronic Copy of Project Plans, Specifications, and Addenda
 - 2. Submittals including Shop Drawings – Contractor is required to include the submittal transmittal (an example is attached at the end of this section) with contractor's stamp per the documents with every submittal.
 - 3. Submittal Log Maintenance
 - 4. Requests for Information (SC-1.01.A.52) – A written request for information, requiring a written response, to Owner, Engineer, or Contractor, initiated by Owner, Engineer, or Contractor
 - 5. Electronic copies of executed Field Orders (GC 9.04)
 - 6. Electronic copies of executed Work Change Directives (GC 10.03)
 - 7. Electronic copies of executed Change Orders
 - 8. Contractor's Applications for Payment
 - 9. Electronic copies of executed Recommendation of Payment

10. American Iron and Steel Compliance Documentation

- F. At the end of each three month period during the construction process, the Contractor shall deliver to the Engineer as a required submittal, one electronic progress copy of all information exchanged through the Web-based Cloud system by all parties using the system for the project.
- G. Prior to Final Completion of the project, the Contractor shall deliver to the Engineer as a required submittal, three complete electronic copies of all information exchanged through the Web-based Cloud system by all parties using the system for the project. The information shall be on set(s) of DVDs or other suitable electronic storage media agreeable to the Engineer and the Owner. The information must be readily reviewable in standard operating system software generally and publicly available to the Owner and Engineer. The Engineer shall review the submitted electronic information for completeness and format and respond to the Contractor as to the acceptability of the submittal and/or any modifications or resubmittal that is required to be made and/or resubmitted by the Contractor.
- H. In the event that the Web-based Cloud system becomes unavailable, unusable, or otherwise unsuitable for continued use for this project at the sole discretion of the Engineer, the Contractor is responsible for delivering all electronic information previously transmitted for the project through the Construction Administration Software in an acceptable electronic format to the Engineer and/or paper copies of that information acceptable to the Engineer and Owner.
- I. The Owner and Engineer reserve the right to require paper copies and transmittal procedures of any documents they deem necessary. Examples of such paper copies that are currently intended to be transmitted in hard-copy are: fully executed contracts, pay requests, change orders, control system drawings, all over-sized submittals (larger than 8-1/2" x 11" sheets), motor control center submittals, rebar submittal drawings, final Operations and Maintenance information, and the Contractor's final record drawing information.
- J. For Hard (Paper Copy) Submittals and Samples:
 - 1. Contractor shall utilize the Construction Administration Software to assist tracking, posting, review, and return of review comments for all Hard (Paper Copy) Submittals and Samples.
 - a. For Samples, contractor shall submit one sample to Engineer (which will be retained).
 - b. For Paper Copies of Submittals (where deemed necessary by Engineer), submit four (4) copies to be retained by Engineer, plus the number required to be returned to the Contractor.

1.4 SUBMITTAL PROCEDURES

- A. Contractor shall develop submittals as necessary to document proposed goods, materials, systems, plans, etc. for completion of the Work. Contractor shall submit a "Schedule of Submittals" per General Conditions, Article 2.07.A.2. Owner and Engineer reserve the right to request such additional submittal items as deemed necessary throughout the course of the Work, at no additional cost to Owner.
- B. Coordinate and group submission of related items.
- C. The Contractor is responsible for reviewing submittals prior to submitting to Engineer. Verify compatibility with field conditions, dimensions, product selections and designations, quantities, and conformance with Contract Documents.
- D. Sequentially number the submittals with XXXXX-YY-ZZ where:
 - 1. XXXXX is the 5 digit specification number
 - 2. YY is the different submittal for the specification
 - 3. ZZ is the number of times that submittal has been made, the initial submittal shall be "01"
- E. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.
- F. Transmit each submittal with a letter of transmittal containing all pertinent information required for identification and checking of submittals. An example of a submittal transmittal appears at the end of this section. By submitting to Engineer, Contractor certifies that:
 - 1. Contractor has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal
 - 2. The Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies
 - 3. Contractor has identified the proposed product as AIS compliant (Yes, No, or Not Applicable)
- G. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- H. Contractor shall identify all variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. All deviations from the governing technical specifications and/or

drawing shall be referenced to the appropriate paragraph of the section or page of the drawing. If there are no deviations, the statement shall be noted as such. Any submittal not accompanied by such a statement will be returned for resubmittal.

- I. Provide space for Contractor and Engineer review stamps.
- J. Revise and resubmit submittals as required, identify all changes made since previous submittal in the transmittal sheet or in a cover letter.
- K. The Contractor shall submit a copy of the technical specification with each subsection clearly marked for conformance to the subsection or exceptions taken. Where exceptions are taken, all necessary information and supporting calculations to evaluate the deviation shall be attached. The Owner retains the right to reject the proposed deviation in favor of the specification, as written.
- L. The Contractor shall be responsible for submitting complete and accurate information in accordance with the Contract Documents.

1.5 SUBMITTAL REVIEW

- A. The Engineer's 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. Review of a specific item shall not include review 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 procedures of construction; coordination of the Work of all trades; and for performing all work in a safe and satisfactory manner.
- B. Engineer's review will result in the following submittal review designations:
 - 1. No Exceptions Taken – does not require resubmittal
 - 2. Revise and Re-submit – requires resubmittal
 - 3. Rejected – requires resubmittal
 - 4. Submit Specific Item – requires resubmittal
- C. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
- D. Engineer reserves the right to request additional submittal items related to the project.

1.6 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial progress schedule in duplicate within 15 days after date established in Notice of Award for Engineer review. Submit progress schedule no later than Preconstruction Conference.
- B. Revise and resubmit with each Application for Payment, identifying changes since previous version.
- C. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- D. Indicate estimated percentage of completion for each item of Work at each submission.
- E. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.7 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Notice to Proceed, compile and submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
- B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
- C. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

1.8 SHOP DRAWINGS

- A. All shop drawings shall be accompanied by a written statement noting all deviations from the governing technical specifications and/or drawing and shall be referenced to the appropriate paragraph of the section or page of the drawing. If there are no deviations, the statement shall be noted as such. Any submittal not accompanied by such a statement will be returned for resubmittal.
- B. Shop drawings are required for all mechanical installations, piping connections to existing piping, fabrications, etc. These drawings shall show adequate dimensions to review submittals for fit. Engineer reserves the right to request additional submittal items as required.
- C. After review distribute in accordance with Article on Procedures above and for Record Documents described in Section 01700 - Contract Close-out.

1.9 PRODUCT DATA, CALCULATIONS and DESIGN MIXTURES

- A. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- B. After review, distribute in accordance with Article on Procedures above and provide copies for Record Documents described in Section 01700 - Contract Closeout.
- C. Indicate product characteristics that vary from these Specifications.
- D. When required per the Technical Specification, provide signed and stamped engineering calculations and drawings.
- E. Provide OSHA information as applicable for all chemicals as requested.

1.10 SAMPLES

- A. Submit samples when requested in individual sections or as requested by the Engineer.
- B. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- C. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Owner's selection.
- D. Include identification on each sample, with full Project information.
- E. Submit the number or samples specified in individual specification Sections; one of which will be retained by Engineer.
- F. Reviewed samples which may be used in the Work are indicated in individual specification Sections.

1.11 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification Sections or as requested by Engineer, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.
- B. Identify conflicts between manufacturers' instructions and Contract Documents.

- C. Reference Section 01650 Starting of Systems and Section 01730 Installation and O&M Manuals.

1.12 MANUFACTURER'S CERTIFICATES

- A. When specified in individual specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product but must be acceptable to Engineer.

1.13 MANUFACTURING LOCATION CERTIFICATION DOCUMENTATION (AMERICAN IRON AND STEEL CERTIFICATIONS)

- A. Not Applicable.

1.14 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.
- B. Deliver to project site; obtain receipt prior to final payment.
- C. Reference Section 01650 Starting of Systems and Section 01730 Installation and O&M Manuals.

1.15 SUBMITTAL LIMITS

- A. Two submittals will be permitted for each item in this section at no cost to the Contractor. The two submittals include one initial submittal and one resubmittal.
- B. All submittals requiring a third review by the Engineer shall be considered unresponsive and the Owner will charge the Contractor on a Time and Materials basis for the third and all subsequent reviews and all related administrative costs not to exceed \$1,000.00 for each resubmittal.
- C. All submittals, unless noted otherwise in the Contract Documents, shall be submitted within sixty (30) days from the Notice to Proceed. Those items requiring resubmittal shall be submitted within thirty (30) days from the date of return to Contractor.

PART 2 PRODUCTS

2.1 WEB-BASED CLOUD CONSTRUCTION ADMINISTRATION SOFTWARE

- A. Software Packages:
1. Procore Cloud-Based Construction Software
 2. Approved Equivalent
- B. The items below provide a general list of features required of the Web-based Cloud Construction Administration Software:
1. 100% web-based cloud with unlimited users interface – no client software required, accessible from any internet connected device)
 2. Auditing – records for all actions performed on each document with a time stamp and user details
 3. Process Flow and Project Team Setup – defined organizational structure
 4. Customizable – add fields or completely new documents (submittal transmittals)
 5. Central Repository for drawings, specification, schedules, submittals, RFIs, and Change Order, or any other custom document category
 6. Print or exportable to PDF or similar file
 7. Attach or upload any file type (PDF, JPEG, CAD, DWG, DWFX)
 8. Reporting logs for Submittal
 9. Collaborative Review of submittals – comments from several users incorporated on one electronic file; software shall provide ability for simultaneous review by multiple reviewers.
 10. Email Notifications and alerts for outstanding documents
 11. Document Reporting and History
 12. Automatic Workflow Process
 13. Complete hosted solution with 24 hours, 7 days a week access, redundant servers, daily tape backup.

PART 3 EXECUTION

Not used.

END OF SECTION

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL
(Attach to Each Submittal)

TO: J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d'Alene, ID 83815

FROM: _____
(Contractor)

Date: _____

Submittal No.: _____ --
(Specification Section No.) - (Sequential No.)

New Submittal Resubmittal
Previous Submittal No(s): _____
Project: _____

Project No.: _____

(Cover only one section with each transmittal)

SUBMITTAL TYPE: Shop Drawings Administrative Sample
 Quality Control Contract Closeout Or-Equal/Substitute

The following items are hereby submitted:

| Number of Copies | Description of Item Submitted (Type, Size, Model Number, Etc.) | Spec. Para. No. | Drawing or Brochure Number | Contains Variation to Contract | | AIS Compliant | | |
|------------------|--|-----------------|----------------------------|--------------------------------|-----|---------------|----|-----|
| | | | | No | Yes | N/A | No | Yes |
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CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By: _____
CONTRACTOR (Authorized Signature)

**SECTION 01310
CPM CONSTRUCTION SCHEDULE**

PART 1 GENERAL

1.1 SCOPE

- A. The project management tool critical path method, commonly called CPM, shall be employed by the Contractor for the cost value reporting, planning, and scheduling of all work required under the Contract Documents.

1.2 SUBMITTAL PROCEDURES

- A. ***Time of Submittals.*** Within ten (10) working days of Notice to Proceed the Contractor shall submit to the Engineer an arrow-type network diagram describing the activities to be accomplished in the project and their dependency relationships as well as a tabulated schedule (as defined following). The schedule produced and submitted shall indicate a project completion date on or before the contract completion date. Within ten (10) working days after receipt of the network arrow diagram, the Engineer shall meet with a representative of the Contractor to review the proposed plan and schedule.
- B. The Contractor shall revise the network arrow diagram as required and resubmit the network arrow diagram and a tabulated schedule produced therefrom within five (5) working days after the conclusion of the Engineer's review period. The revised network arrow diagram and tabulated schedule shall be revised and either accepted or rejected by the Engineer within ten (10) working days after receipt. When accepted by the Engineer, the network arrow diagram and tabulated schedule shall constitute the project work schedule until a revised schedule is submitted. The project work schedule shall be followed unless there are delays beyond the control and without the fault or negligence of the Contractor.
- C. ***Acceptance.*** When the network arrow diagram and tabulated schedule have been accepted, the Contractor shall submit to the Engineer four (4) copies of the time-scaled network arrow diagram, four (4) copies of a tabulated schedule in which the activities have been sequenced by i-j numbers, four (4) copies of a tabulated schedule in which the activities have been sequenced by Early Starting Date, and four (4) copies of a tabulated schedule in which activities have been sequenced by Total Float.
- D. ***Additional Work Schedules.*** If requested by the Engineer, the Contractor shall provide an additional work schedule if, at any time, the Engineer considers the completion date to be in jeopardy because of "activities behind schedule." The additional work schedule shall include a new arrow diagram and tabulated schedule conforming to the requirements of Paragraph 01310 Article 1.5 herein designed to show how the Contractor intends to accomplish the work to meet the completion date. The form and method employed by the Contractor shall be the same as for the original work schedule.

- E. **Schedule Revisions.** The Engineer may require the Contractor to modify any portions of the work schedule that become infeasible because of “activities behind schedule” or for any other valid reason. An activity that cannot be completed by its original latest completion date shall be deemed to be behind schedule.

1.3 CHANGE ORDERS

- A. Upon approval of a change order, the approved change order shall be reflected in the next submittal by the Contractor.

1.4 CPM STANDARDS

- A. **Definition.** CPM, as required by this section, shall be interpreted to be generally as outlined in the Associated General Contractors of America publication, *The Use of CPM in Construction*. Such other terms used in this section are as defined in this publication, if not stated therein as generally utilized in the industry.

- B. **Work Schedules.** Work schedules shall include a graphic network and tabulated schedules, as described below.

- C. **Networks**

1. The CPM network, or arrow diagram, shall be in the form of a time-scaled arrow diagram, shall be of the customary activity-on-arrow type, and may be divided into a number of separate pages with suitable notation relating the interface points among the pages. Individual pages shall not exceed 36-inch x 60-inch. Notation on each activity arrow shall include a brief work description and a duration estimate (see below).
2. All construction activities and procurement shall be indicated in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity arrow shall be plotted so that the beginning and completion dates of said activity can be determined graphically by comparison with the calendar scale. All activities shall be shown using the symbols that clearly distinguish between critical path activities, non-critical activities, and free float for each non-critical activity. All non-critical path activities shall show estimated performances time and free float time in scaled form.

- D. **Tabulated Schedules.** The initial schedule shall include the following minimum data for each activity:

1. Activity beginning and ending event numbers (i-j numbers).
2. Estimated duration.
3. Activity description.
4. Early start date (calendar dated).
5. Early finish date (calendar dated).

6. Latest allowable start date (calendar dated).
7. Latest allowable finish date (calendar dated).
8. Status (whether critical).
9. Total float.
10. Free float for each activity.
11. Cost value for each monthly time period.

E. **Project Information.** Each tabulation shall be prefaced with the following summary data:

1. Project name.
2. Contractor.
3. Type of tabulation (initial or updated).
4. Project duration.
5. Project scheduled completion date.
6. The effective or starting date of the schedule.
7. If an updated (revised) schedule, the new project completion date and project status.

F. The CPM schedule shall include a detailed outage plan and time schedule for each operation, which will make it necessary to remove a tank, pipeline, channel, electrical circuit, instrument loop, equipment, or structure from service. The number of outages shall be minimized through planning and use of isolation valves and terminal boxes. The schedule shall be a part of the CPM schedule. The detailed plan shall describe the Contractor's method for preventing bypassing of other treatment units, the length of time required to complete said operation, and the necessary plant and equipment that the Contractor shall provide in order to prevent bypassing of associated treatment units. Systems or individual equipment items shall be isolated, dewatered, decommissioned, de-energized, or de-pressurized in accordance with the detailed outage plan and schedule.

1.5 SCHEDULE MONITORING

- A. With each pay application, and when specifically requested by the Engineer, the Contractor shall submit to the Engineer a revised schedule for those activities that remain to be completed.
- B. The revised schedule shall be submitted in the form, sequence, and in the number of copies requested for the initial schedule.

1.6 COST VALUE FOR MONTHLY TIME PERIODS

- A. The Contractor shall establish a cost value for the time period of each month of the estimated project period, as predicted by the Contractor's CPM network and schedule.

The purpose of the cost schedule is to aid the Owner and Engineer in predicting project cash flows and to aid in measuring project progress and preparing progress payments.

- B. As provided for in Paragraphs 1.03 E, 1.04, and 1.06 above, the Engineer may require the Contractor to update or revise the CPM network and schedule to reflect project delays or accelerations and change orders. As part of the revision, the Contractor shall re-evaluate and revise the schedule of monthly cost values to reflect the change in the CPM network and project schedule.

1.7 SPECIFIC ACTIVITY REQUIREMENTS

- A. **General Categories.** The construction schedule shall, as a minimum, be divided into the following general categories:

1. Mobilization
2. Demolition
3. Administrative (Submittals and Procurement)
4. Construction
5. Start-Up, Testing and Commissioning Activities

1.8 TRADES AND SUBCONTRACTS

- A. For each general category the construction schedule shall identify the following trades or subcontracts whose work is represented:

1. Structural work (to include demo and installation of structural components and steel erection work, etc.).
2. Pre-cast concrete and masonry (to include both architectural and structural).
3. Architectural work (all except painting).
4. Mechanical work (to include piping, pumps, conveyors, and process equipment, support equipment, etc.).
5. Plumbing work.
6. Heating, ventilation, and air conditioning work. (NA)
7. Electrical work.
8. Instrumentation and controls.
9. Painting and waterproof system.

1.9 ACTIVITIES AND EVENTS

A. The construction schedule shall indicate the following procurement, construction, and testing activities and events in their logical sequence for materials and equipment for each of the trades and subcontracts identified above:

1. Preparation and transmittal of submittals.
2. Submittal review periods.
3. Shop fabrication periods.
4. Erection or installation.
5. Product data (manufacturer's operations and maintenance instruction, etc.).
6. Installed materials testing.
7. Installed equipment testing, adjusting, and balancing.
8. Plant operator instruction (as applicable).
9. Operational testing.
10. Commissioning.
11. Final inspection.

END OF SECTION

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SECTION 01400
QUALITY ASSURANCE AND QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality Control (QC)
- B. Quality Assurance (QA)
- C. Tolerances
- D. References
- E. Labeling
- F. Mockup requirements
- G. Testing and special inspection services
- H. Manufacturers' field services

1.1 DEFINITIONS

- A. Quality Control (QC) Testing and Inspections: Testing and Inspections scheduled and paid for by the Contractor. QC testing may include testing above and beyond minimum QA testing requirements specified in the IBC. QC testing includes any testing and inspections required by the project specifications outside 5 feet beyond the building footprint.
- B. Quality Assurance (QA) Testing and Inspections: Testing and Inspections scheduled by the Contractor and paid for by the Owner. QA testing includes minimum testing requirements specified in the IBC and summarized in the project plans and specifications. QA testing for this project is limited to inspecting work extending within 5 feet of structures.
- C. Independent Testing Firm: Testing firm selected by the Owner or Contractor to provide QC or QA laboratory and field testing and inspections.

1.2 SUMMARY

- A. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
- B. Specified tests, inspections, and related actions do not limit Contractor's or other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
- C. Requirements for Contractor to provide quality-assurance and quality-control services

required by Owner, Building Official, Engineer, or other authorities having jurisdiction are not limited by provisions of this Section.

1.3 CONFLICTING REQUIREMENTS

- A. **Conflicting Standards and Other Requirements:** If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for direction before proceeding.
- B. **Minimum Quantity or Quality Levels:** The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.4 QUALIFICATION REQUIREMENTS

- A. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized services representative requirements.
- B. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Installer Qualifications:** A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- E. Independent Testing Firm Qualifications: An independent agency with the experience and capability and training/certifications to conduct testing and inspecting indicated; and where required by authorities having jurisdiction, that is acceptable to authorities.

1.5 RELATED SECTIONS

- A. Section 01300 - Submittals: Submission of Manufacturers' Instructions and Certificates
- B. Section 01600 – Materials and Equipment

1.6 QUALITY CONTROL

- A. All quality control testing and inspection services are to be coordinated by the Contractor and paid for by the Contractor.
- B. The Contractor shall provide quality control, which shall include the initial and subsequent testing and inspections of Contractor's Work to ensure that the Work conforms to the Contract Documents. Submit QC reports to Owner for their records.
- C. Contractor shall designate the person responsible for Contractor's quality control while Work is in progress, and shall notify Engineer, in writing, prior to any change in quality control representative assignment.
- D. Contractor shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.
- E. Comply fully with manufacturers' instructions, including each step in sequence.
- F. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- G. 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.
- H. Perform work by persons qualified to produce workmanship of specified quality.
- I. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- J. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.
- K. Testing Required and Paid by Contractor:
 - 1. Grading, Excavation, Backfilling, and Compaction: Contractor shall provide testing

and retesting during earthwork excavations, trench backfilling, grading, and backfilling operations beyond 5 feet from structures.

2. Hot Mix Asphalt (HMA) in-place density testing, collection of loose mix field samples and laboratory testing.
3. Concrete: Contractor shall provide testing and documentation of non-structural slabs on grade and site work concrete fully supported on earth and not containing reinforcing steel.
4. The contractor shall provide a temperature-controlled space (i.e. cure box or approved equivalent) on-site that allows the independent testing firm to store up to 12, 6-inch by 12-inch concrete cylinders for the initial 24-hours after casting. The controlled space shall maintain a temperature between 60 and 80 degrees Fahrenheit as required by ACI.
5. The Contractor shall provide all equipment, supplies, manpower, etc., to conduct all acceptance (leak, pressure, etc.) tests on utilities and equipment. Submit results of all QC reports to Engineer and Owner for their records.
6. And such tests as required for Contractor's QC measures necessitated in Paragraph 1.3.

1.4 QUALITY ASSURANCE

- A. All quality assurance testing and inspections are to be coordinated by the Contractor and paid for by the Owner.
- B. The Owner or the Owner's Representative will perform Quality Assurance as deemed necessary by the Owner or the Owner's Representative. Quality Assurance will include the observation and testing of Contractor's work. Testing will occur after Contractor's Quality Control Measures. Quality Assurance may be any of the following:
 1. Tests by an independent laboratory testing firm or Engineer of Record
 2. Observation of work
- C. The Contractor shall coordinate his work with the Engineer 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 requiring testing services clearly identified.
 2. Notify Engineer and testing company 24 hours prior to expected time for operations requiring services.
 3. Failure of Contractor to provide adequate notice (as specified above) shall not be grounds for claims of delay by the Contractor.

- D. Re-testing required because of non-conformance to specified requirements shall be performed at no cost to the Owner. Contractor shall be responsible for payments due by re-testing. Payment for re-testing will be charged to the Contractor by deducting the inspection and testing charges from the Contract Price.

1.5 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 Engineer 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.

1.6 FIELD SAMPLES

- A. Store field samples at the site as required by individual specifications Sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Engineer.

1.7 CONSTRUCTION OBSERVATION

- A. The Owner shall provide observation during construction for quality assurance as defined in the Contract Documents. Contractor shall cooperate with the observer.

1.8 SPECIAL INSPECTIONS AND TESTING LABORATORY SERVICES

- A. Owner will support, appoint, employ, and pay for services of an independent firm to perform special inspecting and testing as required per International Building Code (IBC) Section 1701.
- B. Test and Inspection Reports: The Owner's testing firm shall prepare and submit written reports specified in other Specification Sections to the Contractor, Owner, Building Official, and Engineer indicating observations and compliance or non-compliance with Contract Documents. The Owner's testing firm shall provide preliminary field reports to the Contractor, Owner, Building Official, and Engineer within 24 hours of leaving the project site. The Owner's testing firm shall provide reviewed and signed field reports on a bi-weekly basis. Include the following with each report:
 - 1. Date of issue.
 - 2. Project title and number.

3. Name, address, telephone number, and email address of testing firm.
 4. Date and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results when appropriate.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name or laboratory inspector and signature of reviewer.
 13. Recommendations on re-testing and re-inspection.
- C. Concrete test reports shall show time and date samples were taken, specific location of concrete placement, slump, air content, ambient air temperature, concrete temperature, date received by lab, field data submitted by, mix number, delivery ticket number, specified strength requirement, requested lab-cure and field-cure break results, day projected high and low temperatures and weather conditions. The Owner's testing firm shall collect and provide scanned copies of original batch tickets to the Contractor, Owner, Building Official, and Engineer.
- D. Cooperate with independent firm by providing samples of materials, concrete and asphalt mix designs, equipment, tools, storage, site access, and assistance as requested by the testing firm.
1. Submit weekly schedules and updates by 12:00 PM (noon) Friday for the following week's work elements with days requiring testing services clearly identified. Schedule shall be submitted to Engineer and independent testing firm. Schedule submittal is meant for informational purposes only and not as a request for testing services.

2. Formal notification to Engineer and independent testing firm shall be provided in writing a minimum of 24 hours prior to expected time for operations requiring services. The day of the week shall have previously been defined in the weekly schedule.
 3. Coordinate scheduling for services with independent firm.
 4. Arrange with independent firm and pay for additional samples and tests required for Contractor's use.
 5. Failure of Contractor to provide adequate notice to independent firm (as specified above) shall not be grounds for claims of delay by the Contractor. The Contractor shall not proceed with Work requiring testing and inspections if the Independent Testing Firm is unable to accommodate schedule requests due to inadequate notification from the Contractor.
 6. Independent testing services shall be performed between the hours of 7:00 AM and 5:00 PM Monday through Friday at the Owner's expense, excluding travel time to the job site. Contractor shall reimburse Owner for independent services required outside the specified timeframe unless the Owner agrees to pay for the service outside of the above specified timeframe. Efforts should be taken by the contractor to prevent the need for independent testing services outside of this timeframe.
- E. Additional testing requested by Contractor or retesting required because of non-conformance to specified requirements shall be performed by the same independent testing firm on instructions by the Engineer. Contractor shall be responsible for payments due for additional testing, and/or retesting, which shall be charged to the Contractor by deducting inspection or testing charges from the Contract Price or by direct payment to the independent testing firm.
- F. Quality Assurance Testing and Special Inspections: In addition to the testing specified herein, the Owner will employ one or more testers or special inspectors who will provide observation, testing, and/or inspections during construction on the following types of work:
1. Subgrade observations: Engineer shall be provided the opportunity to observe and document exposed subgrade conditions within the building footprint to support the recommendations provided in the Geotechnical Report issued for the project.
 2. Soil Density Testing: Independent testing firm shall observe and document compaction means and methods and perform soil density testing during subgrade recompaction below footings and slabs and during placement of embankment and structural fill, footing, and base course.
 3. Concrete: Independent testing firm shall observe and document means and methods of placing reinforced concrete and pneumatically placed concrete and take test specimens for laboratory analysis. Non-structural slabs on grade and site work concrete fully supported on earth and not containing reinforcing steel do not require Quality Assurance special inspection.
 4. Post Installed Bolts Installed in Concrete: During installation of bolts and placing of concrete around such bolts as indicated.

5. Reinforcing Steel: During placing of reinforced steel, for all concrete required to have special inspection by Item No. 1. The Special Inspector need not be present during entire reinforcing steel-placing operations, provided he has inspected for conformance with the approved plans, prior to the closing of forms and final inspection of forms prior to the delivery of concrete to the jobsite.
 6. Welding: All structural and on-site fabrication welding, including welding of reinforcing steel as indicated.
 7. High-Strength Bolting: During all bolt installations and tightening operations. The Special Inspector need not be present during the entire installation and tightening operation for load indicator bolts, provided the Special Inspector has:
 - a. Inspected the surfaces and bolt type for conformance to plans, specifications, and shipping certification prior to start of bolting.
 - b. Observed initial bolting operation for proper sequencing.
 - c. Upon completion of all bolting, verify visually all connections.
 8. Special Grading, Excavation, and Filling: During earthwork excavations, trench backfilling, grading, and backfilling operations within 5 feet of structures.
- G. Approved Fabricator Shop Certificate: Special inspection per IBC Section 1701 shall not be required where the work is done on the premises of a fabricator registered and approved by the Building Official having jurisdiction to perform such work without inspection. Provide a certificate from the Building Official that shows the shop approval.
- H. Non-Approved Fabricator Special Inspection: The Contractor shall reimburse the Owner for the costs incurred for special inspection of fabrication in a non-approved shop.

1.9 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment, as applicable, and to initiate instructions when necessary.
- B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report within 15 days of observation to Engineer for review.

1.10 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

- C. Adjust products to appropriate dimensions; position before securing products in place.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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SECTION 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Water, electricity, sanitary and telephone facilities
- B. Temporary Controls: Barriers, water control, dust control, erosion and sediment control, pollution control, and noise control
- C. Construction Facilities: Access roads and parking
- D. Protection: Security, tree and plant protection, and protection of installed work
- E. Progress cleaning
- F. Field offices and sheds
- G. Removal of utilities, facilities and controls
- H. Pedestrian access

1.2 RELATED SECTIONS

- A. Section 01010 – Summary of Work: Contractor use of site and premises
- B. Section 01039 – Coordination and Meetings: Field engineering
- C. Section 01700 - Contract Closeout: Final cleaning

1.3 TEMPORARY UTILITIES

- A. Provide, maintain, and pay for suitable quality water required as a result of construction operations.
- B. Provide and maintain required sanitary facilities and enclosures. Fixed or portable chemical toilets shall be provided by the Contractor, wherever needed, for the use by employees. Toilets at construction job sites shall conform to the requirements of Subpart D, Section 1926.51 of the OSHA Standards for Construction. Existing facilities shall not be used.
- C. The Contractor shall establish a regular collection of all sanitary and organic wastes. All wastes and refuse from sanitary facilities provided by the Contractor, or organic material wastes from any other source related to the Contractor's operations, shall be

disposed of away from the site in accordance with all laws and regulations pertaining thereto. Disposal of all such wastes shall be at the Contractor's expense.

- D. Provide, maintain, and pay for temporary electricity as needed for construction. Contractor may utilize the existing power service; however, all of Contractor's electrical shall be metered to be separate from Owner's use. Contractor shall reimburse Owner for electrical costs associated with the Work if used by the Contractor.
- E. Provide telephone, internet, and fax service to Contractor's job office/shed throughout construction.

1.4 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, to protect public safety, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide protection for plant life designated to remain. Replace damaged plant life.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.5 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment as needed.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion and puddling.
- C. Contractor shall follow BMPs for dewatering activities.

1.6 DUST CONTROL

- A. This item shall consist of furnishing and applying POTABLE water required in construction and for dust control, in accordance with the requirements of these specifications.
- B. Water, when required, shall be applied at the locations and in the amounts required to properly compact the work. An adequate water supply shall be provided by the Contractor. The equipment used for watering shall be of ample capacity and of such design as to assure uniform application of water in the amounts required.
- C. If possible, watering shall be done at times when evaporation loss will be at a minimum.
- D. In watering of subgrades, the Engineer may request the Contractor to apply water in such quantities that the subgrade shall be compacted at a moisture content in excess of "optimum moisture." In no case will the Contractor be required to apply water in excess of three percent (3%) of optimum moisture.

- E. The Contractor shall also apply water during the course of the work to control dust, maintaining all embankment and base courses in a damp condition.
- F. The Contractor shall provide sufficient equipment to apply water as directed for controlling dust caused by construction activities. If dusty conditions continue to exist due to insufficient or inadequate watering practices or lack of watering equipment, it shall cause the closing down of those operations affected until remedied. Watering shall be done on Saturdays, Sundays, and Holidays at the same frequency and amounts as specified for work days at the Contractor's expense.
- G. Watering equipment shall consist of water-tight tanks mounted on trucks, adequately powered, and capable of applying water as required. The water shall be applied under pressure from the tank through a spray apparatus as directed. The spray apparatus shall be equipped as to provide uniform, unbroken spread of water over the surface being watered. A suitable device for positive shut-off and for regulating the flow of water shall be located so as to permit positive drive control from the cab.

1.7 EROSION AND SEDIMENT CONTROL

- A. Contractor shall comply with all provisions noted the United States Environmental Protection Agency, including, but not limited to, the National Pollutant Discharge Elimination System (NPDES) Construction General Permit for Storm Water Discharges from Construction Activities (**SEE LINK BELOW**) and the Construction Storm Water Pollution Prevention Plan (SWPPP).

- B.
 - 1. *Not applicable/required for this project.*

In addition, the contractor is required to submit an Erosion Control Plan to the Engineer and IDEQ prior to construction that provides a list of the controls and Best Management Practices (BMPs) that will be implemented during construction.

- C. Plan and execute construction methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- D. Minimize amount of bare soil exposed at one time.
- E. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
- F. Construct fill and waste areas by selective placement to avoid erosion of surface materials.
- G. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.8 POLLUTION CONTROL

- A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
- B. Protect and drainage ditches from surface runoff during construction operations.
- C. Equipment and fuel storage shall be kept secured. Waste oil and waste fluids shall not be stored or changed at any construction site.
- D. Spills of hazardous or toxic materials shall be promptly reported to the Idaho Department of Environmental Quality. Contractor shall take emergency measures to limit the amount of the releases at Contractor's own expense.

1.9 SECURITY

- A. Provide security and temporary fencing of facilities to protect work from unauthorized entry, vandalism or theft.

1.10 NOISE CONTROL

- A. Construction involving noisy operations, including starting and warming up of equipment, shall be restricted to the hours noted in Section 01010 and the Supplementary General Conditions. Noisy operations shall be scheduled to minimize their duration and to ensure their completion within the contract working hours.
- B. Notification of special circumstances or emergency conditions that require work beyond the hours specified above shall be provided as follows:
 - 1. The Contractor shall notify the Engineer 48 hours in advance of any proposed extended work hours for preauthorization. Notification shall include a written request for authorization to perform work specified and the circumstances that warrant this request. This notification shall include any additional measures to mitigate noise generated by this construction activity if deemed necessary by the Engineer.
 - 2. If an emergency situation occurs that warrants extended hours, the Contractor shall notify the Engineer immediately upon determining the need for this work.

1.11 TREE AND PLANT PROTECTION

- A. **CULTIVATED AREAS AND OTHER SURFACE IMPROVEMENTS:** All landscaped areas and other surface improvements which are damaged by actions of the Contractor shall be restored to a condition equal to or better than it was prior to construction. Areas shall not be cleared until related construction activities require the work.

1.12 PROTECTION OF INSTALLED WORK

- A. Protect installed Work and provide special protection where specified in individual specification Sections.
- B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

1.13 ACCESS ROADS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area. Contractor shall provide temporary roadways when construction activities limit the Owners access and use of existing roads or access to buildings.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide and maintain access for emergency vehicles, mail delivery, trash pickup, etc.
- D. Provide and maintain access to existing driveways and approaches to private residences.
- E. Provide means of removing mud from vehicle wheels before entering streets.

1.14 PARKING

- A. Do not allow construction personnel to park in any way which may affect the access and egress of plant personnel, deliveries, emergency vehicles, etc. The Contractor shall provide a separate parking area for Contractor's personnel and equipment within the designated Staging Area. Provide off-site parking as necessary in compliance with local requirements.

1.15 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition. Establish regular intervals of collection and disposal of such materials and waste.
- B. At no additional cost to Owner, remove waste materials, debris, and rubbish from the site and dispose it off-site at a solid waste facility in accordance with local codes and ordinances governing locations and methods of disposal.
- C. Provide necessary containment and clean-up of all hazardous/dangerous materials on-site that result from Contractor's actions.
- D. Dispose of all hazardous/dangerous waste in approved hazardous waste facilities that result from Contractor's actions.

1.16 FIELD OFFICES AND SHEDS

A. Contractor Job Office

1. Contractor to provide temporary office to house record drawings and for their job superintendent use.
2. Office Requirements: Weather-tight, with lighting, electrical outlets, telephone service, internet, and heating equipment, and equipped with sturdy furniture and drawing display table.
3. Size as required for contractors needs.

B. RPR Job Office

1. Not applicable to this project.

1.17 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

1.18 PEDESTRIAN ACCESS

- A. Provide access by pedestrian foot traffic to the facility during construction.
- B. Protect pedestrians from potentially dangerous areas by barricades, walkways, signs, or other means as appropriate and necessary.

1.19 SPECIFIC SITE ENVIRONMENTAL CONSIDERATIONS

A. Work Requirements and BMPs:

1. When performing Work in the potential contamination area, the Contractor shall identify any visible staining of soils or odors being emanated from the soils.
2. Contractor shall coordinate with the Owner to mitigate tracking or migration of spoils piles outside the identified potential contamination area into "clean" areas. Excavation or placement of contaminated spoils piles on "clean areas" in the project area requires removal and replacement with clean material at the Contractor's expense.

3. The existing construction contaminated area has not been remediated, however the remainder of the site is considered “clean” and shall not be contaminated by tracking or stockpiling/spreading of contaminated soils onto these areas.
 - a. Trucks must not transport contaminate material on tires, bumpers, etc. through BMPs. All loads must use tarpaulins.
 - b. Contractor must institute BMPs to prevent tracking, runoff, and dust. If contaminated soils contaminate “clean” areas, contractor is responsible for removing and replacing at no additional cost to Owner.
 - c. All contractors and subcontractors will be responsible for implementing BMPs to minimize contamination or spreading of contaminated materials.
 - d. Contractor and all workers performing excavation, grading, and demolition must have appropriate licenses and training. Contractor and crews working in those areas must have HAZWOPR training as required by federal law for working in and around hazardous materials.
 - e. All excavated materials that are contaminated from trench/site soils must be transported to an approved hazardous material disposal facility. Contractor shall submit information for approval by Owner and IDEQ of final disposal facility.
4. Coordination, training, permitting (HAZWOPER/OSHA etc.), hauling, disposal fees all other elements are considered incidental to other work. No separate payment will be made.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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SECTION 01500 - 8

**CONSTRUCTION FACILITIES
AND TEMPORARY CONTROLS**

**SECTION 01560
ENVIRONMENTAL CONTROLS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Explosives and Blasting
- B. Chemicals
- C. Cultural Resources

1.2 EXPLOSIVES AND BLASTING

- A. Not applicable to this project.

1.3 CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether defoliant, soil sterilant, herbicide, pesticide, disinfectant, polymer, reactant or of other 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.

1.4 CULTURAL RESOURCES

- 3. Not applicable to this project.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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**SECTION 01600
MATERIALS AND EQUIPMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products
- B. Transportation and handling
- C. Storage and protection
- D. Product options
- E. Substitutions

1.2 RELATED SECTIONS

- A. Instructions to Bidders: Product options and substitution procedures
- C. Section 01400 - Quality Control: Product quality monitoring

1.3 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Furnish products of qualified manufacturers suitable for intended use.
- C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- D. Provide interchangeable components of the same manufacturer, for similar components.

1.4 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly review shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weathertight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- D. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- E. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- F. Arrange storage of products to permit access for review. Periodically review to assure products are undamaged and are maintained under specified conditions.

1.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for 'Or Equals' or Substitutions: Submit a request for "or equal" or substitution for any manufacturer not named. Items requiring pre-approval prior to bidding shall be submitted in accordance with Instructions to Bidders Article 11.

1.7 AMERICAN IRON AND STEEL (AIS) REQUIREMENTS

- A. Not applicable to this project.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01600 - 2

MATERIALS AND EQUIPMENT

**SECTION 01625
PRE-PROCURED EQUIPMENT COORDINATION**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Contract description of Pre-Procured equipment
- B. Coordination and Delivery
- C. Schedule
- D. Payment

1.2 REFERENCES

- A. Section 01010 – Summary of Work
- B. Section 01014 – Work Sequence
- C. Section 01039 – Coordination and Meetings

1.3 CONTRACT DESCRIPTION OF PRE-PROCURED EQUIPMENT

- A. The Owner has previously purchased a portion of the equipment for this work under separate Agreement(s). These pre-procured equipment agreement(s) are generally described as follows:
 - 1. The knife gate valves and actuator equipment generally includes the following: Four 16-inch nominal knife gate valves, Four electric motor operated actuators. Flange bolts/gaskets are not provided. The Contractor will be required to coordinate with the equipment manufacturer and will be responsible for delivery, installation (including coordination of vendor support) for startup of the equipment. This equipment has been purchased through a separate agreement included with these Contract Documents (**01625 APPENDIX A - PRE-PROCURED EQUIPMENT AGREEMENTS**).

1.4 COORDINATION AND DELIVERY

- A. Contractor is required to attend coordination meetings with Pre-Procured Equipment Suppliers, Owner, and Engineer at no additional cost to Owner.
- B. Contractor shall coordinate with the Equipment Suppliers and Owner as required during the course of this project during all work phases. Coordination shall include, but not be limited to, scheduling for delivery, unpacking, warehousing, shutdowns, equipment

installation, startups, testing, meetings, and demonstration period operation to minimize conflicts and to facilitate usage of the facility by Owner.

- C. Contractor will coordinate with Equipment Suppliers to inspect all Packing Lists (Bills of Lading) for completeness of orders during delivery and unloading of Pre-Procured equipment.
- D. Contractor shall provide storage for all goods from Equipment Suppliers as outlined in the General Conditions and Procurement Documents, and as necessary, at no additional cost to Owner.

1.5 SCHEDULE

- A. The delivery schedule for the Pre-Procured Provided equipment is outlined in the Procurement Agreements between Owner and the Equipment Suppliers. The Contractor shall coordinate their work to comply with the schedule specified in the Procurement Contracts.
- B. The Contractor will be required to coordinate with the equipment manufacturer and will be responsible for delivery, installation (including coordination of vendor support) for startup of the equipment.

1.6 PAYMENT

- A. The Contractor is required to pay applicable use-taxes under State of Idaho Tax Law.
- B. Contractor will provide documentation regarding coordinated work, inspections, delivery inspections, etc. as requested by the Owner/Engineer to support or deny claims for payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

- 3.1 The Contractor shall unload, unpack, assemble, and install equipment items furnished by the Owner as shown on the Drawings and Manufacturer Submittals and as specified herein. The Owner Provided equipment submittals, including process and electrical control drawings, has been included with these Contract Documents. In addition, the Contractor shall furnish and install additional equipment items, interconnecting piping, bolting, valves, instruments, fabrications, power and control wiring, and all other appurtenances required to provide a complete and operable system.
- 3.2 Contractor shall be responsible for commissioning of individual items of equipment and Owner Provided Pre-Procured Equipment as defined in the specifications. The Contractor shall coordinate system testing and commissioning and participate in the startup of the overall system as required herein.

SECTION 01625 APPENDIX A

PRE-PROCURED EQUIPMENT AGREEMENTS

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**Consolidated
Supply Co.**

**** Quotation ****

Bid #: S011658610
Page #: 1

Send P/O To:
CONSOLIDATED SUPPLY CO - CDA
155 EAST DALTON AVE
DALTON GARDENS, ID 83815

Phone # : 208-762-2568

Bid To:
CITY OF POST FALLS
408 N SPOKANE ST
POST FALLS, ID 83854

Ship To:
CITY OF POST FALLS
408 N SPOKANE ST
POST FALLS, ID 83854

Requested By: ADAM TATE
Phone # : 208-457-3318

JOB: 16" KNIFE GATE

~~Bid-Date-Expr-Date-Writer~~ _____ ~~Salesperson~~ _____ ~~Ship Via~~ _____
11/14/23 12/14/23 Kevin Swarner - CDA Andy Wilson - Corpora WCN WC NOW

| Quantity | Description | Unit Price | Ext Price |
|----------|--|-------------|-----------|
| | ***** Shipping Instructions ***** * SHIP MATERIAL TO: 2002 W. SELTICE * * POST FALLS, ID * ***** | | |
| 1MC | PROJECT: CITY OF POST FALLS KNIFE GATE VALVE LOCATION: CITY OF POST FALLS BID DATE: PRIVATE NOTE: QUOTING THE FOLLOWING KNIFE GATE PER CONVERSATION BETWEEN DEZURIK AND ADAM TATE (CHIEF OPERATOR AT POST FALLS WRF). PLEASE NOTE THE FOLLOWING IS NON-CANCELABLE AND NON-RETURNABLE. | 0.000ea | 0.00 |
| 4MC | KGC,16,ES,F1,S2,ASP,S2-M*X*Modified Style: KGC - Cast Stainless Steel Knife Gate Valve (KGC) Size: 16 - 16 Inch (400mm) Body Style: ES - Extended Service Valve End Connection: F1 - Flanged Drilling; ASME Class 150 Body Material: S2 - 316 Stainless Steel Cast Packing: ASP - Self Adjusting PTFE Braided Packing with Copolymer of Tetrafluoroethylene/Propylene Fluoroelastomer Cord; | 14893.547ea | 59574.19 |

*** Continued on Next Page ***

**** Quotation ****

Bid #: S011658610
Page #: 2

CITY OF POST FALLS

| Quantity | Description | Unit Price | Ext Price |
|----------|--|------------------|-----------|
| 1MC | Temperature to 400 ⁻ F. (205 ⁻ C.) (pH Range 0-14) Gate Material: S2 - 316 Stainless Steel Seat Material: M - Metal Coating: SB0 - Exterior: 4 mils minimum of Blue Epoxy DeZURIK with Standard (SP10) surface prep Actuator: X - Enter your modification here Weight (Approx): 272 lbs/ 124 kgs Max Temperature: 400 Degrees F. Additional Modification : LIMITORQUE ELECTRIC MOTOR MXb- <hr/> DEZURIK START UP | 6000.000ea | 6000.00 |
| | | Subtotal ----- | 65574.19 |
| | | Bid Total ----- | 65574.19 |
| | | Bid Amount ----- | 65574.19 |

Thank you for requesting a quotation from Consolidated Supply Co. ("Consolidated") for certain materials you need for the project identified in the attached or enclosed quotation document (the "Project"). The enclosed quotation to you is made subject to the following terms and conditions:

1. You must carefully review the quotation to confirm that it meets your requirements before using it for a bid. Unless you have provided Consolidated with a detailed bill of materials and specifications with your requirements (with any applicable addendums), this quotation is only a good-faith estimate of the material types and quantities that may be required for the Project. Building plans alone do not constitute a detailed bill of materials or specifications, particularly if more than one supplier or subcontractor may be involved in supplying plumbing and/or waterworks materials. You agree that all risk of loss arising from the use of this quotation for bidding purposes-including any loss relating to errors in scope, quantity, price, time, and place of delivery-is on you. Notwithstanding anything to the contrary in this paragraph, you are responsible to specify and select appropriate materials for your intended use. Consolidated provides no design, engineering, or other professional services and cannot recommend or warrant goods to be fit for your particular purposes.

2. If you place an order with Consolidated for work or materials for the Project, the resulting contract will be subject to Consolidated's General Terms and Conditions of Sale. If credit is provided by Consolidated, then that credit is provided on Consolidated's general credit terms and conditions. These terms and conditions are available to you upon request and can be viewed on our website at www.consolidatedsupply.com.

3. Delivery under this quotation is FOB Consolidated's OR manufacturer's facility. If the quotation includes delivery to a jobsite, Consolidated may use a method and carrier of Consolidated's choice, unless otherwise stated in the quotation, and Consolidated assumes that the location is legally and physically accessible to interstate freight carriers operating under ICC regulations. Unloading labor will be provided by purchaser. Additional charges may apply if these assumptions are incorrect or if multiple deliveries are required. Consolidated will make a good faith effort to meet delivery dates agreed to in writing, but cannot guaranty delivery dates for goods not in stock or for which the terms of delivery are outside our control.

4. Except as otherwise provided in Section 5 below, pricing in this quotation is based on unit amounts and is based on the expectation that goods will be ordered within 30 calendar days from the date of the quotation. Consolidated may extend quoted prices on a case-by-case basis beyond the 30-day period. Consolidated reserves the right to correct or withdraw this quotation in the case of clerical error. Any change in quantities ordered or time for delivery may result in a change of the quoted prices, including unit prices, unless otherwise agreed to by Consolidated in writing.

5. Due to the current unstable market and price conditions, Consolidated reserves the right, at any time after the date of this quotation and until the time of shipment, to adjust the delivery times and/or increase the prices set forth in this quotation to address price and availability factors, including but not limited to government regulations, tariffs, transportation, fuel and raw materials costs. Any material deliveries delayed beyond manufacturer lead times may be subject to applicable storage fees in effect at the time of shipment. This quotation is not a bid or a lump-sum quote, unless specifically stated in the quotation.



408 N Spokane Street
 Post Falls, ID 83854
 PH: (208) 777-4504

PURCHASE ORDER

PO Number: PO06489

Date: 12/07/2023

Requisition #: REQ07274

Vendor #: C360

ISSUED TO: Consolidated Supply Co.
 PO Box 5788
 Portland, OR 97228

SHIP TO: City of Post Falls
 Attn:Water Department
 2002 W Seltice Way
 Post Falls, ID 83854

| ITEM | UNITS DESCRIPTION | GL ACCT # | PROJ ACCT # | PRICE | AMOUNT |
|------|-------------------------------|--------------------|-------------|-----------|-----------|
| 1 | 1 knife gate valve for hopper | 650-463.3125.95520 | | 65,574.19 | 65,574.19 |

Authorized by:

| | |
|-------------------|-----------|
| SUBTOTAL: | 65,574.19 |
| TOTAL TAX: | 0.00 |
| SHIPPING: | 0.00 |
| TOTAL | 65,574.19 |

1. Original invoice with remittance slip must be sent to: City of Post Falls, 408 N Spokane Street, Post Falls, ID 83854.
2. Payment may be expected within 30 days of receipt of goods and invoice.
3. C.O.D. shipment will not be accepted.
4. Purchase Order numbers must appear on all shipping containers, packing slips and invoices. Failure to comply with the above request may delay payment.
5. All goods are to be shipped F.O.B. Destination unless otherwise stated.
6. All materials and services are subject to approval based on the description on the face of the purchase order or appendages thereof. Substitutions are not permitted without approval of the Requesting Department. Material not approved will be returned at no cost to the City.
7. All goods and equipment must meet or exceed all necessary city, state and federal standards and regulations.
8. Vendor or manufacturer bears risk of loss or damage until property received and/or installed.
9. Seller acknowledges that the buyer is an equal opportunity employer. Seller will comply with all equal opportunity laws and regulations that are applicable to it as a supplier of the buyer.
10. The City is exempt from all federal excise and state tax – ID# 82-6000245

Michael Conn

From: Adam Tate <atate@postfalls.gov>
Sent: Friday, December 15, 2023 1:51 PM
To: Michael Conn; Craig Borrenpohl
Cc: Rafael Estrada
Subject: [EXTERNAL] FW: Lead Time provided for #QUO057687

External Email - This Message originated from outside J-U-B ENGINEERS, Inc.

Just got this about the sludge hopper valves. Lead time is showing July delivery. Looks like the Limatorque actuators are the driver.

From: Kevin Swarner <kevin.swarner@consolidatedsupply.com>
Sent: Friday, December 15, 2023 1:42 PM
To: Adam Tate <atate@postfalls.gov>
Subject: FW: Lead Time provided for #QUO057687

WARNING: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Below is current lead time for valves.

Kevin Swarner | Water Works Senior Estimator
155 East Dalton Ave, Dalton Gardens, ID 83815
O: (208) 762-2568 | M: (208) 916-5702



Woman Business Enterprise, WBE181431

Lead Time for below lines from Quote #QUO057687 has been provided

| Line No. | Item | Item Desc | Quantity | Customer Requested Lead Time | Lead Time Comments | Status | Quoted Lead Time (In Weeks) |
|----------|---------|-----------------------------------|----------|------------------------------|--|-------------------|-----------------------------|
| 1 | 9736437 | KGC,16,ES,F1,S2,ASP,S2-M*X*A35581 | 4 | | The lead time is based on the arrival of the limiterorque. | Lead Time Entered | 30 |

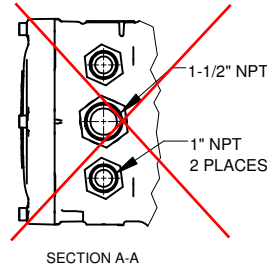
The City of Post Falls has changed our domain to [POSTFALLS.GOV](https://www.postfalls.gov). Please adjust your contacts/links.

Privileged / confidential information may be contained in this message. If you are not the addressee indicated in this message (or responsible for delivery of the message to such person), you may not copy or send this message to anyone. In such case, you should destroy this message and kindly notify the sender by reply e-mail. Although this email has been scanned for the possible presence of computer viruses prior to dispatch, we cannot be held responsible for any viruses or other material transmitted with, or as part of, this email without our knowledge.

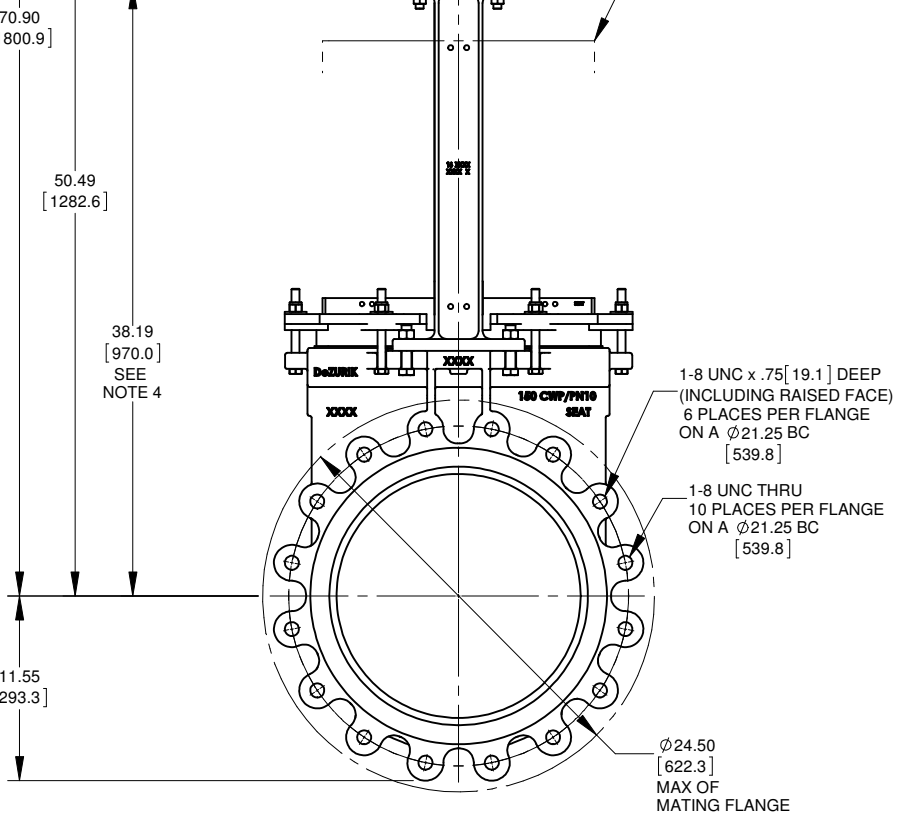
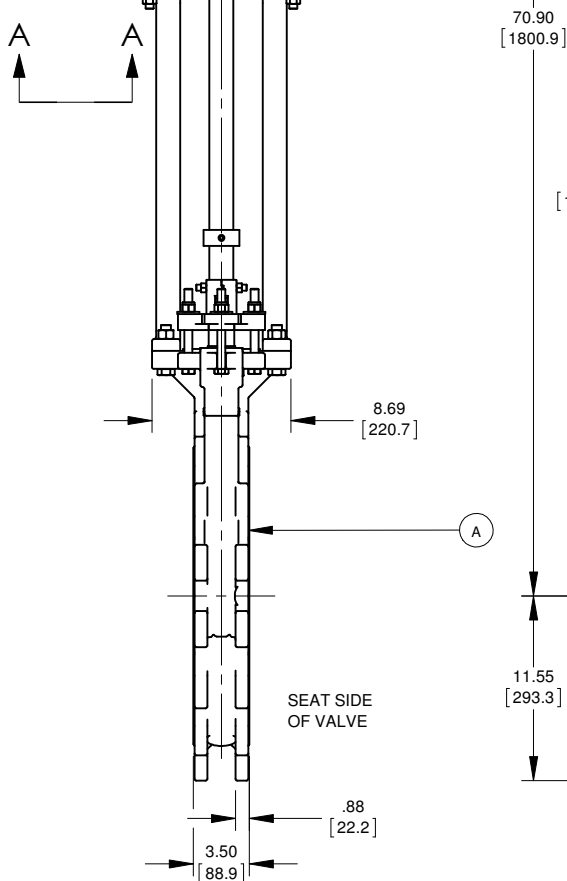
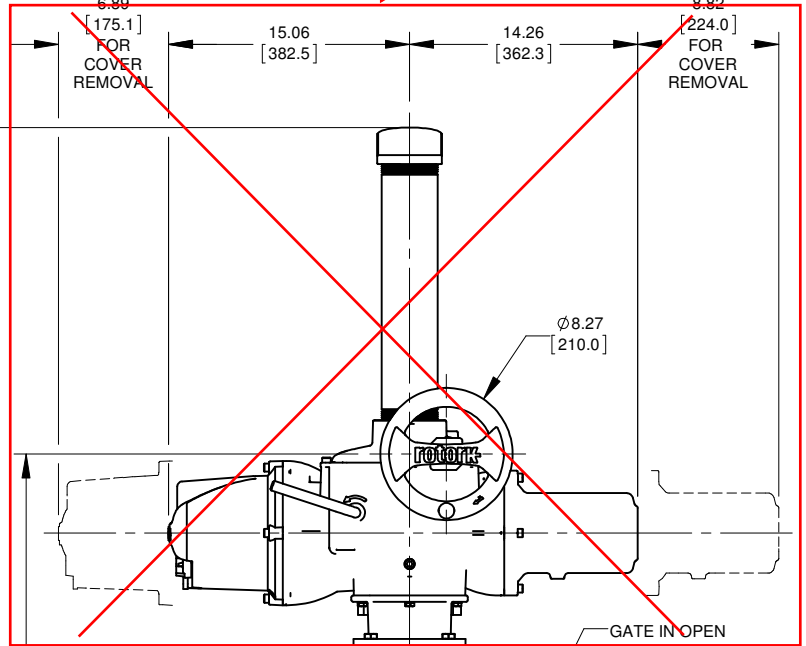
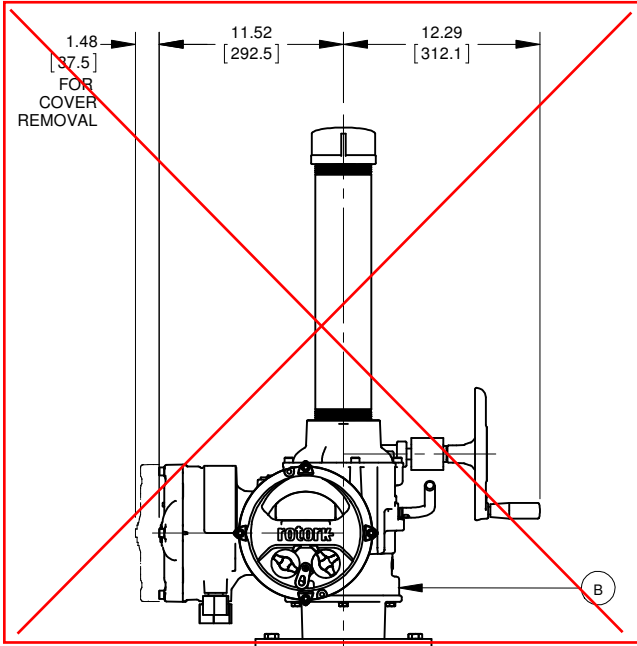
NOTE:

- VALVE IS SHOWN IN CLOSED POSITION.
- VALVES ORDERED WITH THRU BOLTING HAVE ALL HOLES, EXCEPT THOSE THAT ARE BLIND TAPPED, DRILLED TO ANSI STANDARDS CLASS 125 & 150.
- INSTALL THE VALVE WITH THE HIGHER PRESSURE AGAINST THE SIDE OPPOSITE THE SEAT WHEN THE VALVE IS CLOSED; EXCEPT AT THE BOTTOM OF DRY MATERIAL STORAGE VESSELS WHERE THE VALVE SHOULD BE INSTALLED WITH THE SEAT UPWARD.
- IF VALVE IS INSTALLED WITH MOTOR ACTUATOR IN OTHER THAN VERTICAL POSITION THE CUSTOMER MUST PROVIDE ADDITIONAL SUPPORT AT THE MOTOR ACTUATOR END OF THE YOKE. SEE DIMENSION.
- DRAWING SHOWS FLANGES TAPPED FOR USE WITH ANSI FLANGES, FOR USE WITH OTHER THAN ANSI FLANGES SEE A52587.

| No. | PART NAME |
|-----|-----------------------------------|
| A | VALVE |
| B | MOTOR ACTUATOR & CONNECTING PARTS |



See attached drawing for Limitorque MXb Actuator.



| | | | | | |
|--|--|-------------|-------------|---|--|
| CONFIDENTIAL & PROPRIETARY. This drawing and the information it contains are the property of DeZURIK and may not be used or disclosed except as permitted in writing by an authorized representative of DeZURIK. | | VALVE | | DeZURIK Sartell, MN USA 56377 www.dezurik.com | |
| THIRD ANGLE PROJECTION | | MATERIAL | | | |
| | | WEIGHT | 663.6 LBS | TITLE | KGC KNIFE GATE VALVE SIZE 16" WITH ROTORK MOTOR ACTUATOR |
| | | RAW PART NO | | DWG NO | K08522 |
| | | DRAFTER | AB 9/2/2014 | SIZE | C |
| | | APPROVER | DS 9/2/2014 | | |

| REV. | DESCRIPTION | DATE | APPROVED | DRAWN |
|-----------|-------------|------|----------|-------|
| REVISIONS | | | | |

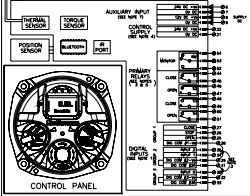
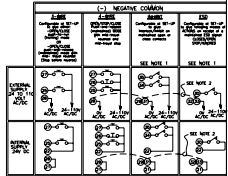


NOTES: (SEE INSTALLATION & OPERATION MANUAL VA0M000071 FOR DETAILS)
 CIRCUIT SHOWN WITH VALVE IN FULLY CLOSED POSITION AND 0% POWER DFT.

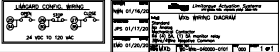
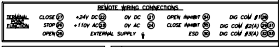
- REMOTE INPUTS**
 1. REMOTE INPUTS: 24VDC, 115V AC/DC
 2. REMOTE INPUTS: 24VDC, 115V AC/DC
 3. REMOTE INPUTS: 24VDC, 115V AC/DC
- REMOTE INPUT JUMMERS**
 1. REMOTE INPUT JUMMERS: 24VDC, 115V AC/DC
 2. REMOTE INPUT JUMMERS: 24VDC, 115V AC/DC
 3. REMOTE INPUT JUMMERS: 24VDC, 115V AC/DC
- DEFAULT SET SETTINGS**
 1. DEFAULT SET SETTINGS: 24VDC, 115V AC/DC
 2. DEFAULT SET SETTINGS: 24VDC, 115V AC/DC
 3. DEFAULT SET SETTINGS: 24VDC, 115V AC/DC

| OUTPUT SWITCH CONTACT DEVELOPMENT | | | |
|-----------------------------------|----------------|------|------------|
| OUTPUT SWITCH | VALVE POSITION | | FUNCTION |
| | TRIP | TRIP | |
| 1 | TRIP | TRIP | CLOSE LAFT |
| 2 | TRIP | TRIP | OPEN LAFT |
| 3 | TRIP | TRIP | CLOSE LAFT |
| 4 | TRIP | TRIP | OPEN LAFT |

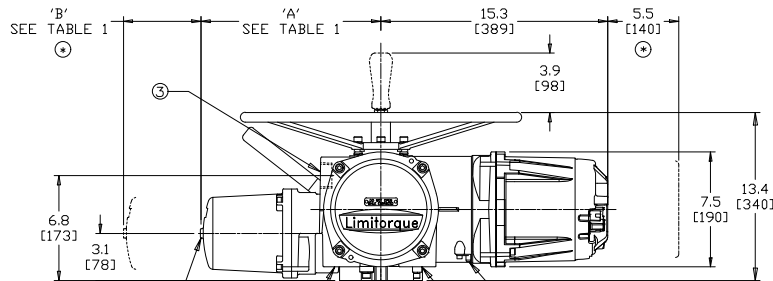
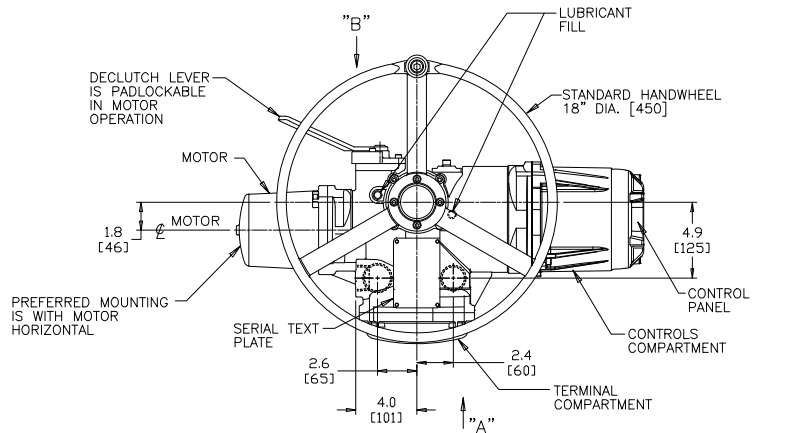
- MAXIMUM EXTERNAL LOAD**
 1. MAXIMUM EXTERNAL LOAD: 24VDC, 115V AC/DC
 2. MAXIMUM EXTERNAL LOAD: 24VDC, 115V AC/DC
 3. MAXIMUM EXTERNAL LOAD: 24VDC, 115V AC/DC
- CONTACT RATINGS**
 1. CONTACT RATINGS: 24VDC, 115V AC/DC
 2. CONTACT RATINGS: 24VDC, 115V AC/DC
 3. CONTACT RATINGS: 24VDC, 115V AC/DC
- FUSES**
 1. FUSES: 24VDC, 115V AC/DC
 2. FUSES: 24VDC, 115V AC/DC
 3. FUSES: 24VDC, 115V AC/DC



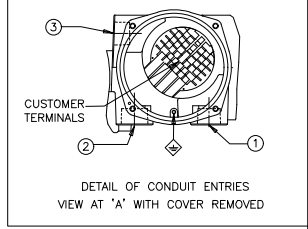
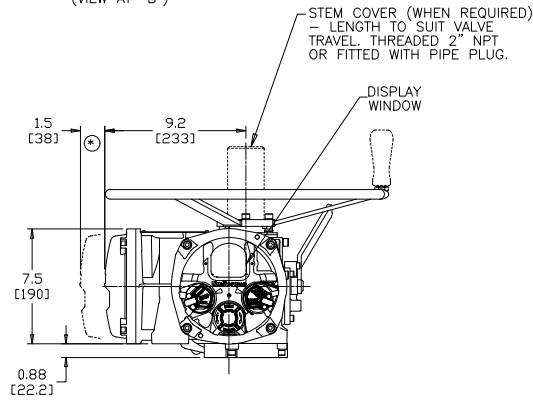
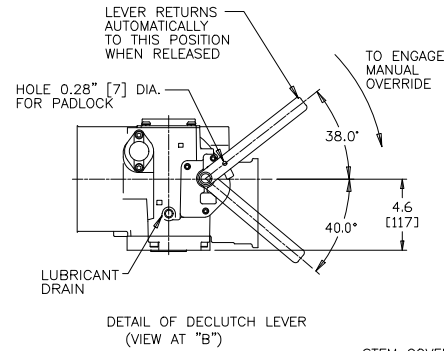
| TABLE TRANSFORMER WINDING OPTIONS | TERMINAL BLOCK | FUNCTION |
|-----------------------------------|----------------|------------|
| 1 | 120V | 115V AC/DC |
| 2 | 240V | 115V AC/DC |
| 3 | 480V | 115V AC/DC |



DATE: 01/16/20
 DRAWN BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]
 PROJECT: [Project Name]
 SHEET: [Sheet Number] OF [Total Sheets]



HOLE 0.22" [5.5] DIA.
X 0.43" [11] DEEP
FOR SELF-TAPPING
SCREW



| CONDUIT ENTRIES | | | |
|-----------------|-----------------|-----------------------|-----------------|
| POSITION | ① | ② | ③ |
| STANDARD | 1 1/4" NPT | 1 1/2" NPT | 1 1/4" NPT |
| OPTIONS | M32, M25 M20 | M40, M32, M25, M20 | M32, M25 M20 |
| | PG21 | PG29, PG21 | PG21 |

- ⊕ GROUND/EARTHING LUG
- ⊙ RECOMMENDED CLEARANCE FOR COVER REMOVAL
- ⊗ MOUNTING FACE FOR ATTACHING TO VALVE FLANGE

TABLE 1

| | 1 PHASE | 3 PHASE |
|---------|---------------|---------------|
| DIM 'A' | 14.7 [374] | 11.7 [297] |
| DIM 'B' | 4.0 [102] | 5.0 [127] |

SEE 03-615-0005-1 FOR
MOUNTING AND BORE INFORMATION

| | | | |
|---|--|----------------|--------|
| JOB NUMBER | FLOWSERVE 5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318 | | |
| DRW: KVR | DRAWING TITLE | | |
| DATE: 2-26-20 | MX-10 STANDARD UNIT | | |
| CKD: SVA | SIZE | DRAWING NUMBER | REV. |
| DATE: 2-26-20 | B | 03-653-0003 | |
| APV: MWR | SCALE | UNITS | SHEET |
| DATE: 3-10-20 | NONE | | 1 OF 1 |
| ALL DIMENSIONS ARE REFERENCE UNLESS OTHERWISE SPECIFIED | 3rd ANGLE | | |

| REV | CHG NO | DATE | REVD | CHKD | APVD |
|-----|--------|------|------|------|------|
| | | | | | |

DESC:

THIS PROPRIETARY AND/OR CONFIDENTIAL MATERIAL IS THE PROPERTY OF FLOWSERVE CORP. AND IS FURNISHED ONLY FOR THE PURPOSE INDICATED. FLOWSERVE RESERVES ALL RIGHTS IN THE MATERIAL, AND DOES NOT CONVEY PERMISSION TO MANUFACTURE OR USE THE CONFIDENTIAL OR PROPRIETARY INFORMATION CONTAINED HEREIN.

**SECTION 01650
STARTING OF SYSTEMS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Section includes overall coordination, scheduling, submittals and checklists for equipment and System Start-up, Owner programming and schedule considerations, Owner Training and Acceptance Testing to allow full commissioning of the project. The overall process generally includes:
 - 1. Initial starting and testing of systems
 - 2. Owner Training
 - 3. Owner Programming Period (and support through Acceptance Testing)
 - 4. Acceptance Testing
 - a. *Initial Acceptance Testing*: Closed-loop testing of individual unit processes
 - b. *Final Acceptance Testing*: Full-scale testing of interconnected unit processes
 - 5. Commissioning of Systems

1.2 RELATED SECTIONS

- A. Section 01014 – Work Sequence
- B. Section 01400 - Quality Control
- C. Section 01700 - Contract Closeout
- D. Section 01730 – Installation and Operation Maintenance Manuals
- E. Section 11000 – General Requirements for Equipment
- F. Section 11600 – Membrane Filtration Equipment Coordination and Installation
- G. Section 11800 – UV Disinfection Equipment Coordination and Installation
- H. Division 11, 15, 16

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 GENERAL

- A. Throughout the testing, demonstration, acceptance testing, training and commissioning activities discussed in this section, Contractor and Contractor's subcontractors (as deemed appropriate by Owner and Engineer) shall be present for repair, correction of incomplete work, alternation, or unscheduled/unforeseen adjustments to any equipment or systems.
- B. Contractor shall provide all labor, power, fuel, supervision, utilities, chemicals, maintenance, equipment, vehicles, or any other item necessary to proceed with the steps discussed in this section and other applicable portions of the Contract Documents.

3.2 INITIAL STARTING AND TESTING OF SYSTEMS

- A. Coordinate schedule for initial starting and testing of all equipment and systems in the project. Prepare and submit a separate detailed schedule for activities, including dates for activities, personnel involved, contact information for vendors, and other pertinent information.
- B. Notify Owner and Engineer seven days prior to Contractor's initial starting and testing of each item. Include startup and testing in the two-week schedule meetings.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage.
- D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Verify all instrumentation and controls are complete and have undergone testing in accordance with Division 16 requirements. The Contractor is responsible for performing a loop check on all installed wiring. The Contractor shall make a checklist confirming that each loop check has been performed per DIVISION 16 requirements. No further testing, programming or commissioning activities can be completed until all loop checks have been completed.
- G. Execute initial starting and testing under supervision of responsible manufacturer's representative and in accordance with manufacturers' instructions. Minimum time on-site and number of trips to site by manufacturers representative are shown in **Table 1** included in this Specification.

- H. Require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to initial starting and testing, and to supervise placing equipment or system in operation.
- I. Demonstrate operation of all equipment and systems to Engineer and Owner's personnel adequately prior to date of Substantial Completion and Owners Programming Period. To minimize overwhelming the Owner's operating staff, the Contractor shall undertake no more than two major components per week. Major components are defined by the Treatment Process Codes in the Drawings. Contractor shall schedule component startups accordingly to meet the specified Contract Times. Contractor shall provide 24-hours continuous run-time (or longer as required in individual specification sections) as part of the initial start-up and testing.
- J. Contractor shall provide temporary pump/piping to replicate design flows for the purpose of providing flow to system facilities for testing. Contractor is required to provide all equipment, fuel, controls, and necessary piping for suction and discharge from the pump(s) as necessary for start-up and testing purposes.
- K. Upon completion of Initial Starting and Testing of Systems, submit a certified report to Engineer (using the form inserted at the end of this specification and supplemented with manufacturer's checklists and forms) that the requirements are complete and that system is ready for Owner programming and subsequent acceptance testing. Certificate shall be signed by Contractor and Manufacturer/Supplier.
- L. Once all systems have been started, Contractor shall issue a letter to Engineer titled, "Request for Notice of Completed Installation". Engineer shall review the Contractor's request, and if all obligations have been fulfilled to the satisfaction of the Engineer, the Engineer shall issue a letter to the Contractor and Owner titled: "Notice of Completed Installation". Issuance of "Notice of Completed Installation" shall commence the beginning of "Operator Training" period.

3.3 OPERATOR/ OWNER TRAINING

- A. Operator training shall not commence until "Initial Starting and Testing of Systems" is complete and all systems are proven to operate satisfactorily. Contractor shall coordinate the training day and time with the Owner for an occasion when Owner's operating personnel are available. Notify Owner and Engineer seven days prior to intended start date of training. Contractor shall make every effort to provide training on Tuesdays, Wednesdays and Thursdays.
- B. Utilize operation and maintenance manuals as basis for instruction. A complete draft copy of the Equipment Operation and Maintenance (O&M) Manuals (see Section 01730) shall be available for each of the Owner's operating personnel who attend the training. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance. Operator training shall include the use of slides, videos, literature, diagrams, and/or oral presentations as necessary to present comprehensive, detailed instruction of operation and maintenance requirements of the equipment.

- C. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- D. The Owner/Engineer may record the training sessions. The recording produced shall be the sole property of the Owner and Engineer.
- E. The equipment representative shall provide a minimum number of trips with minimum duration of onsite services each trip as shown in **Table 1** included with this Specification. Training may be completed during the same trip to site as Initial Startup if identified as allowed in **Table 1**.
- F. Training shall be divided into two parts (Classroom and Field Training). Classroom training shall include Powerpoint™ (overhead projection) training materials and shall utilize the preliminary operation and maintenance manual as the basis of instruction. Upon satisfactory completion of the classroom training, continue training with a field training session utilizing the installed equipment. Equipment shall be run in all available control modules and sequences of operation.
- G. Owner training sessions (classroom and field) shall be provided during those trips as shown in **Table 1**. A preliminary Training Outline is included at the end of this section for the Contractor's reference.
- H. Upon completion of "Operator/Owner Training", submit a certified report to Engineer (using the form inserted at the end of this specification and supplemented with manufacturer's checklists and forms) that the requirements are complete and that system is ready for the start of the "Owner's Programming Period."

3.4 OWNER'S PROGRAMMING PERIOD

- A. Owner shall contract separately for SCADA programming for various portions of the plant equipment.
- B. Contractor is required to attend coordination meetings as required with SCADA Programmer, Owner, and Engineer at no additional cost to Owner.
- C. The installation of the equipment systems requires considerable coordination between the Owner, Owner's SCADA Programmer, and the Contractor. The Contractor will provide on-site assistance through testing of the SCADA Programming.
- D. Contractor shall provide on-site support during Owner's programming period to expedite system SCADA Programming and testing. Contractor shall provide skilled labor capable of troubleshooting and making modifications to the various Work trades, including but not limited to mechanical, electrical, and instrumentation systems as necessary and within the Contract Document requirements. The Contractor shall be responsible for making any adjustments and/or modifications to the installation process that may become necessary to ensure that all equipment is properly installed.

- E. Contractor shall provide support during the “Owner’s Programming Period” which shall commence upon “Notice of Completed Training”. It is anticipated that this period shall be no less than 10 calendar days. If Owner completes SCADA Programming in less than 10 calendar days, Contractor shall continue with startup and commissioning activities.
- F. Delays to Programmer caused by correction or troubleshooting of Contractor’s Work shall be grounds for an extension of the Owner’s Programming period a commensurate amount of time at no additional cost to the Owner.
- G. Upon completion of “Owner’s Programming Period”, Engineer shall issue a letter to Contractor titled: “Notice of Completed Owner Programming”. Upon Notice of Completed Programming, Contractor shall commence with “Acceptance Testing of Systems.”
- H. Owners programmer shall be available for troubleshooting and coordination with Contractor during Acceptance Testing period.

3.5 ACCEPTANCE TESTING OF SYSTEMS

- A. Following completion of Contractor’s Initial Starting and Testing Activities (Section 3.2), and Owners Programming Period (Section 3.3) “Acceptance Testing of Systems” may begin.
- B. Acceptance Testing is anticipated to be performed in two phases to minimize disruption toe the existing facility and to facilitate troubleshooting during testing.
 - 1. Initial Acceptance Testing shall be performed in a “closed-loop” at individual unit processes. Initial Acceptance Testing may be performed.
 - 2. Final Acceptance Testing shall be performed with “forward-flow” on the full scale facility and shall utilize forward plant flow to test and demonstrate operation and functionality of the system.
- C. Notify Owner and Engineer seven days prior to intended start date of Acceptance Testing of Systems.
- D. Duration of and Scheduling Testing Period(s):
 - 1. Duration of Initial Acceptance Testing Period shall be a minimum of 14 calendar days, 24-hour uninterrupted, automatic operation unless a longer period or more restrictive performance testing requirements are specified in a separate technical specification.
 - a. Schedule Initial Acceptance Testing sequentially among unit process to allow for Owner and Engineers involvement with each system. Initial Acceptance Testing may be scheduled “concurrent” with testing of another unit process, only upon written approval by Owner and Engineer.

2. Duration of *Final Acceptance Testing* Period shall be a minimum of 14 calendar days (and non-concurrent with Initial Acceptance testing), 24-hour uninterrupted, automatic operation unless a longer period or more restrictive performance testing requirements are specified in a separate technical specification.
 3. Time of beginning and ending of any Acceptance Testing (initial or final) will be agreed upon by Contractor, Owner, and Engineer in advance of initiating Acceptance Testing Period.
 4. Length of Acceptance Testing other than specified will be agreed upon by Contractor, Owner, and Engineer in advance of initiating Acceptance Testing.
 5. Contractor is required to provide all equipment, fuel, controls, and necessary piping for suction and discharge from the pump as necessary for start-up and acceptance testing purposes. Conduct the demonstration of functional integrity under full operational conditions.
- E. Demonstrate operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled times, at equipment location. Acceptance Testing period should be organized to provide a clear, concise summary of the equipment operation and maintenance.
- F. Demonstrate the functional integrity of the mechanical, electrical, and control interfaces of the respective equipment and components comprising the facility or system.
- G. If, during Acceptance Testing, the aggregate amount of time used for repair, correction of incomplete work, alteration, or unscheduled adjustments to any equipment or systems that render the affected equipment or system inoperative exceeds 4 hours of the scheduled Acceptance Testing period, the demonstration of functional integrity will be deemed to have failed. In the event of failure, a new Acceptance Testing Period will recommence after correction of the cause of failure. The new Acceptance Testing Period shall have the same requirements and duration as the Acceptance Testing Period previously conducted.
- H. Owner will provide operational personnel to provide process decisions affecting plant performance. Owner's assistance will only be available for process decisions. Contractor will perform all other functions, including, but not limited to, equipment operation and maintenance until successful completion of the Acceptance Testing.
- I. Owner and Engineer reserve the right to simulate operational variables, equipment failures, routine maintenance scenarios, etc. to verify the functional integrity of automatic and manual backup systems and alternate operating modes.
- J. Provide knowledgeable personnel to answer Owner's questions throughout the Acceptance Testing Period.

- K. Provide field instruction on systems and respond to any system problems or failures that may occur.
- L. Upon completion of Acceptance Testing, submit a certified report to Engineer (using the form inserted at the end of this specification and supplemented with manufacturer's checklists and forms) that the requirements are complete and that system is ready for Commissioning. Certificate shall be signed by Contractor and Manufacturer/Supplier.

3.6 COMMISSIONING OF SYSTEMS

- A. When adequate Training, Owner Programming, and successful Acceptance Testing is completed to the satisfaction of the Owner and Engineer, the systems may be Commissioned.
- B. Commissioning is defined as full integration of the equipment, including all electrical, controls, instrumentation, and all other support systems necessary for operation of the entire system as designed.
- C. Owner reserves the right to withhold payment on individual equipment items until such time as Commissioning may commence.
- D. Submit a certified report to Engineer (using the form inserted at the end of this specification and supplemented with manufacturer's checklists and forms) that all preceding requirements have been completed and that the system is ready for Commissioning by Owner. Certificate shall be signed by Contractor and Manufacturer/Supplier.

Table 1 – Manufacturer's Representative Minimum Onsite Requirements for Startup and Training

| Reference Technical Specification Section | Supervision, Inspection, and Startup for Equipment (Minimum Number 8-hour person-days) ^(a) | Classroom and Field Training (Minimum Number person-hours of training) | Minimum Number of Trips to Site |
|---|---|--|---------------------------------|
| Owner Furnished Equipment | <i>Coordinate with the requirements listed in the Pre-Procurement Contract</i> | | |
| ELECTRICAL SYSTEMS | PER DIV 16 | PER DIV 16 | PER DIV 16 |

(a) *Day shall be 8 hours onsite. If startup and training combined to a shall not be considered for “days” for training.*

(b) *Trips to site may require being on-site multiple days.*

CONTRACTOR & MANUFACTURER/ SUPPLIER CERTIFICATE OF STARTING OF SYSTEM

The following certificate shall be completed for each equipment item or system in accordance with Specification 01650 - Starting of Systems.

Project Name _____ Equip Item/ Tag _____
 Owner _____ Specification No. _____
 Engineer _____ Serial No. _____
 Contractor _____

Equip Mfg./ Supplier Start-up Representative and Contact Information:

Initial Starting and Testing of Systems (01650 - 3.2)

| Item No. | Description | Date Completed |
|----------|--|----------------|
| 1 | (3.2.B) Notify Owner and Engineer seven days prior to initial starting and testing | |
| 2 | (3.2.C) Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions that may cause damage | |
| 3 | (3.2.D) Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer | |
| 4 | (3.2.E) Verify wiring and support components for equipment are complete and tested. | |
| 5 | (3.2.F) Verify all instrumentation and controls are complete and have undergone testing in accordance with Division 16 requirements | |
| 6 | (3.2.G) Execute initial starting and testing under supervision of responsible manufacturer's representative and in accordance with manufacturers' instructions | |
| 7 | (3.2.H) Provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to initial starting and testing, and to supervise placing equipment or system in operation | |
| 8 | (3.2.K) Submit a certified report to Engineer that the requirements are complete and that system is ready for Demonstration | |

Observations/ Recommendations/ Comments:

 MANUFACTURER/ SUPPLIER SIGNATURE

 DATE

 CONTRACTOR SIGNATURE

 DATE

CONTRACTOR & MANUFACTURER/ SUPPLIER CERTIFICATE OF STARTING OF SYSTEM

The following certificate shall be completed for each equipment item or system in accordance with Specification 01650 - Starting of Systems.

Project Name _____ Equip Item/ Tag _____
Owner _____ Specification No. _____
Engineer _____ Serial No. _____
Contractor _____

Equip Mfg./ Supplier Start-up Representative and Contact Information:

Operator/Owner Training (01650 - 3.3)

| Item No. | Description | Date Completed |
|----------|--|----------------|
| 1 | (3.3.B) Provide a complete draft copy of the Equipment Operation and Maintenance (O&M) Manuals for each of the Owner's operating personnel who attend the training | |
| 2 | (3.3.B) Review contents of O&M manual with Owner's operating personnel in detail to explain all aspects of operation and maintenance | |
| 3 | (3.3.B) Include the use of slides, videos, literature, diagrams, and/or oral presentations as necessary to present comprehensive, detailed instruction of operation and maintenance requirements of the equipment | |
| 4 | (3.3.C) Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction | |
| 5 | (3.3.F) Upon satisfactory completion of the classroom training, continue training with a field training session utilizing the installed equipment. Equipment shall be run in all available control modes and sequences of operation. | |
| 6 | (3.3.H) Submit a certified report to Engineer that the requirements are complete and that system is ready for Commissioning | |

Observations/ Recommendations/ Comments:

MANUFACTURER/ SUPPLIER SIGNATURE

DATE

CONTRACTOR SIGNATURE

DATE

CONTRACTOR & MANUFACTURER/ SUPPLIER CERTIFICATE OF STARTING OF SYSTEM

The following certificate shall be completed for each equipment item or system in accordance with Specification 01650 - Starting of Systems.

Project Name _____

Owner _____

Engineer _____

Contractor _____

Notice of Completed Owner Programming (01650 - 3.4)

Observations/ Recommendations/ Comments:

OWNER SIGNATURE

DATE

CONTRACTOR & MANUFACTURER/ SUPPLIER CERTIFICATE OF STARTING OF SYSTEM

The following certificate shall be completed for each equipment item or system in accordance with Specification 01650 - Starting of Systems.

Project Name _____ Equip Item/ Tag _____
Owner _____ Specification No. _____
Engineer _____ Serial No. _____
Contractor _____

Equip Mfg./ Supplier Start-up Representative and Contact Information:

Acceptance Testing of Systems (01650 – 3.5)

| Item No. | Description | Date Completed |
|----------|---|----------------|
| 1 | (3.5.B) Notify Owner and Engineer seven days prior to demonstration | |
| 2 | (3.5.D) Demonstrate operation, control, adjustment, and shutdown | |
| 3 | (3.5.D) Demonstrate trouble shooting, servicing, maintenance | |
| 4 | (3.5.E) Demonstrate the functional integrity of the mechanical, electrical, and control interfaces of the respective equipment and components comprising the facility or system | |
| 5 | (3.5.G) Conduct the demonstration of functional integrity under full operational conditions | |
| 6 | (3.5.J) Provide knowledgeable personnel to answer Owner's questions throughout the Demonstration Period | |
| 7 | (3.5.K) Provide field instruction on systems and respond to any system problems or failures that may occur | |
| 8 | (3.5.L) Submit a certified report to Engineer that the requirements are complete and that system is ready for Operator Training | |

Observations/ Recommendations/ Comments:

MANUFACTURER/ SUPPLIER SIGNATURE

DATE

CONTRACTOR SIGNATURE

DATE

CONTRACTOR & MANUFACTURER/ SUPPLIER CERTIFICATE OF STARTING OF SYSTEM

The following certificate shall be completed for each equipment item or system in accordance with Specification 01650 - Starting of Systems.

Project Name _____ Equip Item/ Tag _____
Owner _____ Specification No. _____
Engineer _____ Serial No. _____
Contractor _____

Equip Mfg./ Supplier Start-up Representative and Contact Information:

Commissioning of Systems (01650 – 3.6)

| Item No. | Description | Date Completed |
|----------|--|----------------|
| 1 | (3.6.D) Submit a certified report to Engineer that all preceding requirements have been completed and that the system is ready for commissioning by Owner. | |

Observations/ Recommendations/ Comments:

Certification by Manufacturer/Supplier and Contractor

MANUFACTURER/ SUPPLIER SIGNATURE DATE

CONTRACTOR SIGNATURE DATE

Acceptance by Owner

OWNER'S SIGNATURE DATE

TRAINING OUTLINE

Below is a basic training outline that is to be provided with the training listed in Section 01650 Table 1: Manufacturer's Representative Minimum Onsite Requirements for Startup and Training.

A. General Description

A basic description of the overall equipment system function and operation. Identify the major components of the equipment system. (i.e., EQ Pump system: motor, drive, pump and controls). Provide a general description of equipment functional capacities (i.e., EQ Pump system: pumping capacity and maximum / minimum ranges and reverse operation if applicable, etc.).

B. Equipment System Components

Classroom: Identify by name and location of components that make up the equipment system. In the classroom use photos or videos that clearly identify the components. Provide a functional description of what each component does in the operation of the equipment system. (i.e., Proximity switch provides feedback for rotation of equipment by sensing a metal bar passing through the switch magnetic field). Describe each components inputs, outputs, normal and abnormal conditions, safety issues, routine maintenance and disassemble / reassemble of the component.

Field training: Repeat the classroom information in the field clearly identifying components by touching or pointing to them.

C. Equipment System Function & Operation

Classroom: Describe how each equipment system component contributes to the function and operation of the equipment system. Discuss equipment system checkout prior to operation, equipment startup, routine operation, abnormal operation, remote operation, equipment shut down and emergency conditions. Provide methods to obtain the most efficient equipment system operation. Troubleshooting abnormal operating conditions and typical solutions. Alarm conditions shall be describe as to the causes, solutions and effects on the equipment system.

Field Training: Repeat the classroom information applying it to the installed equipment. Direct the Owners personnel to the step by step procedures operate the equipment system properly. Perform normal operational checks to verify proper operation. Identify conditions and indications of improper operation. Provide training on how the automatic operating controls function and adjustments available to the operators.

D. Equipment System Maintenance

Classroom: Describe and discuss the routine and preventative maintenance activities procedures. Use the Preliminary O&M manual to identify the lubricants needed and their proper application. Use video or pictures to provide classroom training on equipment disassemble and resemble for the replacement of components. Discuss the equipment system spare parts needed and the sources for the spare parts.

Field training: Review the classroom information including disassemble and resemble of equipment system and its components. Disassemble and resemble equipment, which will not void the manufacturers warrantee.

E. Equipment System Safety

Classroom: Identify all safety issues with the equipment system: mechanical, electrical, chemical and any other safety items. Provide step by step procedures to control the safety hazards.

Field training: Review the classroom information for the equipment system mechanical, electrical, chemical and other safety items. Provide hands on training of step by step safety procedures.

END OF SECTION

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**SECTION 01700
CONTRACT CLOSEOUT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures
- B. Final cleaning
- C. Adjusting
- D. Project record documents

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been reviewed, and that Work is complete in accordance with Contract Documents and ready for Owners Representative's review.
- B. Submit Warranty certificates.
- C. Provide submittals to Owners Representative that are required by governing, funding or other authorities.
- D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

- A. Execute final cleaning prior to final review.
- B. Clean debris from drainage systems.
- C. Clean site; sweep paved surfaces.
- D. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

- B. Adjust all product to assure smooth and proper fit.

1.5 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other Modifications to the Contract
 - 5. Reviewed shop drawings, product data, and samples
 - 6. Manufacturers' instructions for assembly, installation, and adjusting
- B. Store Record Documents separate from documents used for construction.
- C. Record information concurrent with construction progress.
- D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 - 1. Manufacturer's name and product model and number
 - 2. Product substitutions or alternates utilized
 - 3. Changes made by Addenda and Modifications
- E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction, including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, 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.
 - 5. Submit final stamped Engineered Record/As-Built Drawings for Manufacturer provided Pre-Packaged Building Plans. Submit in 11x17 PDF format and Paper Copy.

F. Submit all documents noted above to Owner's Representative with claim for final Application for Payment.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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**SECTION 01730
INSTALLATION, OPERATION, AND MAINTENANCE MANUALS**

PART 1 GENERAL

1.1 DESCRIPTION

A. Description of Work

1. Provide INSTALLATION, PRELIMINARY, and FINAL Operation and Maintenance (O&M) Manuals for use by the Contractor and the Owner.
 - a. The term "Operation and Maintenance Manual" includes all product-related information and documents that are required for preparation of the Contractor's O&M Manual, and data that is required for inclusion by current regulations of any participating government agency or as a provision of a system warranty.
 - b. Required Delivery for O&M Manuals is as follows:
 - i. INSTALLATION Manuals are due 30 days before individual Goods are delivered to the project.
 - ii. PRELIMINARY O&M Manuals are due 30 days before Commissioning. No payment shall be made on an equipment item without a PRELIMINARY O&M Manual.
 - iii. FINAL O&M Manuals are due 30 days after the completion of Acceptance Testing. Final payment will not be made until all O&M Manuals are complete and approved.
 - c. The term component equipment supplier is used to describe a manufacturer's Goods purchased by the Contractor and incorporated into the project.
 - d. The O&M Manual shall include, but is not be limited to, the following:
 - i. Equipment description, equipment function, operating characteristics, limiting operating conditions (minimum, average and, maximum input, temperatures, speeds, production; etc.), operating instructions and procedures for startup, normal and emergency conditions, shutdown, and storage. Photos of equipment shall identify each component identification associated with equipment description and function information.
 - ii. Equipment safety considerations relating to installation, operation and maintenance procedures.
 - iii. Installation procedures.
 - iv. Calibration procedures.

- v. Routine and preventive maintenance instructions.
- vi. Procedures for disassembly, reassembly, alignment, adjustment, and inspection instructions. Instructions shall include photographs and/or video of the stages of the procedures. Photos of alignment and adjustment equipment locations.
- vii. Recommended spare parts list to maintain equipment in service.
- viii. Special Tools:
 - (a) For equipment, provide a list of special tools included and required for installation checking, testing, parts replacement, and maintenance.
 - (b) For component equipment, provide a list of special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance with current price information.
- ix. For component equipment provide name, address, and telephone number for local sources of equipment and/or replacement parts.
- x. Operational log sheets and maintenance schedules.
- xi. Material Safety Data Sheets (MSDSs) for any applicable item (chemicals, oils, lubricants, etc.) provided by the supplier.
- xii. Furnish lubricants of the type and grade necessary to meet the requirements of the equipment.
- xiii. Warranty Information, Bond(s), and Service contract(s), if applicable.
- xiv. Equipment Specific and Factory Test Report information shall include:
 - (a) Tag name, model, and serial number of the equipment provided
 - (b) Name, address, and phone number of manufacturer and manufacturer's local service representative
 - (c) Factory Test Reports where applicable
 - (d) Approved Shop Drawings (including equipment drawings, schematics, circuit diagrams)
- e. Routine and preventive maintenance instructions include all information and instructions required to keep equipment properly lubricated, adjusted, and maintained so that the item functions as intended throughout its full design life. Routine and preventive

maintenance instructions shall include, but are not be limited to, the following:

- i. Written explanations with illustrations for each preventive maintenance task.
 - ii. Recommended schedule for execution of preventive maintenance tasks.
 - iii. Lubrication charts shall include a table of alternative lubricants naming at least two alternate lubricant manufacturers, with applicable product numbers, for each application.
 - iv. Troubleshooting instructions.
 - v. List of required maintenance tools and equipment.
- f. Non-Project Equipment Deleted: Equipment information that contains non-project-related components, information, descriptions, or other reference information shall be deleted or crossed out as not applicable to the Project.

B. Coordination: The Contractor shall coordinate the delivery and incorporation of O&M Manuals prepared for this project from his component equipment suppliers. The Contractor shall develop an O&M Manual for the equipment and systems designed and provided by the Contractor under this contract.

C. Reference Specifications

- Division 2 – Site Work
- Division 3 – Concrete
- Division 6 – Wood and Plastics
- Division 7 – Thermal and Moisture Protection
- Division 8 – Windows and Doors
- Division 9 – Painting
- Division 10 – Specialties
- Division 11 – Equipment
- Division 12 - Furnishings
- Division 13 – Special Construction
- Division 14 – Conveying Systems
- Division 15 – Mechanical
- Division 16 – Electrical

D. The Contractor shall coordinate the delivery and incorporation of all O&M Data, Warranty Certificates for Closeout Data prepared for this project from his component equipment and Architectural component suppliers specified within these Contract Documents.

1.2 QUALITY CONTROL/QUALITY ASSURANCE (QA/QC)

Not used.

1.3 SUBMITTALS

A. General

1. Installation, Commissioning, Training of any process, or piece of equipment shall not be permitted until the respective INSTALLATION and PRELIMINARY Manuals have been received and approved by the Engineer as being sufficient in content to allow the completion of the work.
2. O&M Manuals shall be submitted in three ring binders with a table of contents and index tabs to identify the various items.
3. The table of contents shall reference the applicable specification section(s) for each item and shall be included in each volume of multi-volume manuals.
4. O&M Manuals shall use dividers and indexed tabs between major categories of information such as Operating Instructions, Preventive Maintenance Instructions, etc.
5. O&M Manuals shall use 8½-inch by 11-inch acid free paper of high rag content and quality. All text must be legible, type-written or machine printed originals or high quality copies.
6. Each page shall have a binding margin of approximately 1½ inches and be punched for placement in a three-ring “D” style loose-leaf binder, which shall be provided by the Contractor along with the submittal. Each binder shall be no more than 3 inches.
7. Drawings: Provide half-size black line (11 x 17) reproductions shall be provided for all project drawings. 11-inch x 17-inch drawings shall be bound in a separate binder. 11-inch x 17-inch drawings shall not be folded and placed in any project binder designed for 8½ inch x 11 inch pages.
8. Electronic File Format for CD:
 - a. All Contractor O&M Manual information shall be supplied to the Owner as electronic file format that it was originally developed and in condensed portable document format (PDF format). The specifications for PDF generation are as follows:
 - i. The acceptable format is Portable Document Format (PDF): Adobe Acrobat or Adobe Acrobat Exchange.
 - ii. The initial filename for the EOM submittal is provided with the request for FINAL O&M Manuals. The filename is posted near the top of the review form. Filenames use the “eight dot three” convention (XXXXX_YY.PDF) where XXXXX is the specification section number and YY is an ID number. If technical problems require Contractor to break the submittal into more than one file, then add a letter extension to the end of each filename. (example: 19876_01A.PDF) Keep the number of files to a minimum.

- iii. Scan images at a resolution of 400 dpi or greater. Perform Optical Character Recognition (OCR) capture on all images. Achieve OCR with the “original image with hidden text” option (as seen in Adobe Acrobat Exchange 4.05).
 - iv. Create one PDF document (PDF file) for each equipment O&M Manual. The entire manual is converted to a single PDF file via scanning or other method of conversion. Drawings or other graphics must be converted to PDF format and made part of one combined PDF document. Rotate pages that must be viewed in landscape to the appropriate position for easy reading. Word searches of the PDF document must operate successfully. (Proof of OCR.) Provide one copy of the Word document.
 - v. Create a bookmark in the navigation frame for each entry in the table of contents. The bookmark shall be three levels deep (i.e., “Chapter”, “Section”, “Subsection”) unless otherwise approved by the Owner.
 - vi. Generate thumbnails for each completed PDF file.
 - vii. Set the opening view for PDF files as follows:
 - (a) Initial view: Bookmarks and page
 - (b) Magnification: Fit in window
 - (c) Open to the cover page of the manual, with bookmarks to the left, and the first bookmark linked to the table of contents
- b. All component equipment manuals shall be provided in PDF format.
 - c. All project drawings shall be provided in PDF format.
9. Equipment Identification:
- a. Identify products and components by the Project's established tag and descriptive names. The use of cryptic model or catalog numbers or letters for identification shall not be acceptable.
 - b. Indicate all components of the equipment on catalog pages by bold markings or some other clearly definable medium for ease of identification. All markings shall be readable if photocopied.
 - c. For all tagged devices supplied, the Contractor shall develop a “Cross Reference Schedule” that matches (links) the tag to the appropriate equipment manual PDF file. The equipment schedule shall include the pertinent information associated with the equipment, including tag number, description, functional name location, component equipment model, part number, size, materials, accessories and range. The equipment cross-reference schedule shall be provided in the form of a Microsoft Excel (XLS) spreadsheet. Contractor may use the Equipment,

Valve, and Instrumentation Schedules included in the plans as an organizational starting point.

B. Letter of Transmittal

1. The Contractor shall provide a Letter of Transmittal with each submittal and include the following in the letter:
 - a. Date of submittal
 - b. Contract title and number
 - c. Contractor's name and address
 - d. A list of the attachments and the sections of the manual to which they relate
 - e. Reference to or explanation of related submittals already made or to be made at a future date

C. INSTALLATION Manuals shall be assembled for installation of the equipment by the Contractor.

1. The Contractor shall submit six copies marked "INSTALLATION" of each required O&M Manual to the Contractor. Distribution by Contractor shall be as follows:
 - a. The Contractor shall retain their necessary copies.
 - b. The Engineer shall receive two copies.
 - c. The Owner shall receive one copy.

D. PRELIMINARY O&M Manual

1. The Contractor shall submit three copies marked "PRELIMINARY" of each required O&M Manual and the training plan. Each manual shall include a CD containing the information contained in the manual, including XLS master sheet and individual PDF files as described in Section 1.3 A.
2. The Contractor shall organize the PRELIMINARY O&M Manuals as follows:
 - a. Contractor Equipment O&M Manual:
 - i. Includes O&M and Preventive Maintenance Instructions
 - ii. Includes Detailed Plan of Commissioning Activities
 - iii. Includes the Equipment Cross-Reference Schedule
 - iv. Includes all equipment Installation, Operation and Maintenance Manuals

E. After the commissioning has been completed and substantial completion achieved, the Contractor shall revise and resubmit the FINAL O&M Manuals for the project.

F. FINAL O&M Manual(s)

1. The Contractor shall submit copies marked "FINAL" of each required O&M Manual. Three copies of each of the required FINAL O&M Manuals shall be submitted. Each manual shall contain a CD containing the information contained in the manual. Additionally, six CDs shall be submitted.
2. The Contractor shall organize the FINAL O&M Manuals as follows:
 - a. Contractor Equipment O&M Manual:
 - i. This O&M Manual will be provided "as new in its entirety."
 - ii. Includes O&M and Preventive Maintenance Instructions.
 - iii. Includes an equipment cross-reference schedule.
 - iv. Includes equipment Installation, Operation and Maintenance Manuals.
 - v. Includes a FINAL CD.
 - vi. Commissioning Test Reports shall be included in the final manual, including:
 - (a) Results of all installation inspection, field calibration, and field testing reports prepared during the commissioning of the facility
 - (b) Results of Acceptance Testing
 - vii. Warranty Certificates: Copies of all Warranty Certificates shall be included with the FINAL O&M Manual.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

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**SECTION 04010
MAINTENANCE OF MASONRY**

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes water, steam and chemical cleaning of masonry surfaces; replacement of masonry units; sand blast cleaning of masonry surfaces; repointing mortar joints; and repair of damaged masonry.
- B. Related Sections:
 - 1. Division 1
 - 2. Division 3
 - 3. Division 4

1.2 REFERENCES

- A. American Concrete Institute:
 - 1. ACI 530 - Building Code Requirements for Masonry Structures.
 - 2. ACI 530.1 - Specifications for Masonry Structures.

1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal procedures.
- B. Product Data: Submit data on cleaning compounds and cleaning solutions.
- C. Manufacturer's Installation Instructions: Submit installation procedures for products selected for use, manufacturer's installation instructions, perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1 requirements.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Division 1: Product storage and handling requirements.
- B. Deliver masonry neatly stacked and tied on pallets. Store clear of ground with adequate waterproof covering.
- C. Store sand blasting, acid solution and restoration cleaner materials in manufacturer's packaging.
- D. Store mortar ingredients in manufacturer's packaging, or when delivered loose, with adequate weatherproof covering.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Division 1.
- B. Cold Weather Requirements: In accordance with ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: In accordance with ACI 530.1 when ambient temperature is greater than 100 degrees F or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 mph.

PART 2 PRODUCTS

2.1 COMPONENTS

- A. Cleaning Agent: Detergent, Solvent cleaner or Acid solution.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Division 1: Coordination and project conditions.
- B. Verify surfaces to be cleaned or restored are ready for work of this section.

3.2 PREPARATION

- A. Protect elements surrounding work of this section from damage or disfiguration.
- B. Immediately remove stains, efflorescence, or other excess resulting from work of this section.
- C. Protect roof membrane and flashings from damage.
- D. Provide dams to divert flowing water to exterior drains.

- E. Carefully remove and store fixtures, fittings, finishing hardware and accessories.
- F. Close off, seal, mask, and/or board up areas, landscaping, materials, and surfaces not receiving work of this section to protect from damage.
- G. Construct dust proof and weatherproof partitions to close off occupied areas.

3.3 INSTALLATION

A. Cleaning New Masonry:

1. Verify mortar is fully set and cured.
2. Clean surfaces and remove large particles with wood scrapers, brass or nylon wire brushes.
3. Scrub walls with detergent solution using stiff brush. Thoroughly rinse and wash off cleaning solution, dirt and mortar crumbs using clean, pressurized water.
4. Use acid solution mixed with water. Apply acid solution and scrub masonry with stiff fiber brushes. Do not scrub mortar joints.
5. Protect area below cleaning operation and keep masonry soaked with water and flushed free of acid and dissolved mortar continuously for duration of cleaning.
6. Before solution dries, rinse and remove acid solution and dissolved mortar, using clean, pressurized water.

3.4 CLEANING

- A. Section 01700 - Contract Closeout: Final cleaning.
- B. As work proceeds and on completion, remove excess mortar, smears, droppings.
- C. Clean surrounding surfaces.

END OF SECTION

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**SECTION 04100
MORTAR AND GROUT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Mortar and grout for masonry.

1.2 SUBMITTALS

- A. Samples: Submit two samples of mortar illustrating mortar color and color range to Engineer and Architect per Section 01300.

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 530 and ACI 530.1.

1.4 ENVIRONMENTAL REQUIREMENTS

- A. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.
- B. Cold Weather Requirements: IMIAC – Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Portland Cement: ASTM C150, Type I, gray color
- B. Mortar Aggregate: ASTM C144, standard masonry type
- C. Hydrated Lime: ASTM C207, Type S
- D. Mortar Color: Mineral oxide pigment; color as selected
- E. Grout Aggregate: ASTM C404
- F. Water: Clean and potable
- G. Bonding Agent: Epoxy type

2.2 MORTAR MIXES

- A. Mortar for Load Bearing Walls and Partitions: ASTM C270, Type S using the Property Method.
- B. Mortar for Reinforced Masonry: ASTM C270, Type S using the Property Method.
- C. Stain Resistant Pointing Mortar: One part Portland cement, 1/8 part hydrated lime, and two parts graded (80 mesh) aggregate, proportioned by volume. Add aluminum tristearate, calcium stearate or ammonium stearate equal to 2 percent of Portland cement by weight.
- D. Integral Water-Repellent Mortar Admixture:
 - 1. Integral liquid polymeric admixture for mortar added during mixing. Dry-Block Mortar Admixture manufactured by Grace Construction Products. Subject to compliance with requirements, equivalent products by the following manufacturers' are acceptable.
 - a. ACM Chemistries, Inc.: Rain Bloc for Mortar
 - b. BASF: Rheopel Mortar Admixture
 - c. Approved equal

2.3 MORTAR MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270.
- B. Add mortar color and admixtures in accordance with manufacturer's instructions.
- C. Do not use anti-freeze compounds to lower the freezing point of mortar.

2.4 GROUT MIXES

- A. Bond Beams, Lintels and Engineered Masonry: 2,000 psi strength at 28 days; 8-inches slump; mixed in accordance with ASTM C476 Fine Grout

2.5 GROUT MIXING

- A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C476 Fine grout.
- B. Do not use anti-freeze compounds to lower the freezing point of grout.

2.6 MIX TESTS

- A. Test mortar and grout in accordance with Section 01400 and the General Structural Notes in the Plans.
- B. Testing of Mortar Mix: In accordance with ASTM C780.
- C. Testing of Grout Mix: In accordance with ASTM C1019.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install mortar in accordance with ASTM C780. Install grout in accordance with ASTM C1019.
- B. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement.

END OF SECTION

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**SECTION 04300
REINFORCED UNIT MASONRY**

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Concrete masonry units.

B. Related Requirements:

1. Division 1
2. Division 3
3. Division 4
4. Division 5
5. Division 6
6. Division 7
7. Division 8
8. Division 9
9. Division 10

1.2 REFERENCE STANDARDS

A. American Concrete Institute:

1. ACI 530 - Building Code Requirements for Masonry Structures.
2. ACI 530.1 - Specification for Masonry Structures.

B. ASTM International:

1. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM A240 - Standard Specification for Chromium and Chromium Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
3. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

4. ASTM A580 - Standard Specification for Stainless Steel Wire.
5. ASTM A615 - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement.
6. ASTM A653 - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
7. ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
8. ASTM B370 - Standard Specification for Copper Sheet and Strip for Building Construction.
9. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
10. ASTM C27 - Standard Classification of Fireclay and High Alumina Refractory Brick.
11. ASTM C34 - Standard Specification for Structural Clay Load Bearing Wall Tile.
12. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
13. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
15. ASTM C1386 - Standard Specification for Precast Autoclaved Aerated Concrete (AAC) Wall Construction Units.
16. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
17. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 COORDINATION

- A. Division 2: Requirements for coordination.
- B. Coordinate Work of this Section with installation of window and door anchors.
- C. Direct and coordinate placement of metal anchors supplied to other Sections.
- D. Coordinate Work of this Section with installation of emergency key cabinets.

1.4 PREINSTALLATION MEETINGS

- A. Division 2: Requirements for pre-installation meeting.

1.5 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Requirements for submittals.
- B. Product Data:
 - 1. Submit data for masonry units, fabricated wire reinforcement, anchors and other accessories.
- C. Shop Drawings:
 - 1. Indicate bar sizes, spacing, laps, locations, reinforcement quantities, bending and cutting schedules, supporting and spacing devices for reinforcement, and accessories.
 - 2. Describe geometry of the masonry structure(s), location of any vertical or horizontal construction and/or control joints, penetrations, block-outs, anchor bolts, embedded electrical and instrumentation conduits and other embedded items.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Samples: For initial verification submit the following:
 - 1. Unit masonry samples in small-scale form showing colors and textures for each different exposed masonry unit indicated.
 - 2. Colored mortar samples showing full extend of colors available.
 - 3. Provide full size block samples of matching shape, size and color for the split-face, 4-rib, deep-flute block matching the existing buildings (CMU2 on sheet A-003)
- F. Data Sheet:
 - 1. Integral CMU and Mortar Water-Repellent Admixture.
 - a. Test Reports prepared by a qualified independent laboratory indicating compliance with the performance requirements for integral water-repellency as tested using:
 - 1) ASTM E 514, Extended to 72 hours.
 - 2) ASTM C 1357
 - 3) ASTM C 1314
 - 4) ASTM C 1148

1.6 QUALITY ASSURANCE

- A. Structural Tests and Special Inspections: Conform to International Building Code (IBC) Chapter 17 and IBC Chapter 21 for special inspections and quality assurance verification

testing of compressive strength of each unit masonry wythe using prism test method as tested to ASTM C1314.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Division 1: Requirements for transporting, handling, storing, and protecting products.

1.8 AMBIENT CONDITIONS

- A. Division 1: Requirements for ambient condition control facilities for product storage and installation.
- B. Cold Weather Requirements: Conform to ACI 530.1 when ambient temperature or temperature of masonry units is less than 40 degrees F.
- C. Hot Weather Requirements: Conform to ACI 530.1 when ambient temperature is greater than 100 degrees F, or ambient temperature is greater than 90 degrees F with wind velocity greater than 8 miles per hr.

PART 2 PRODUCTS

2.1 REINFORCED UNIT MASONRY ASSEMBLIES

- A. Concrete Unit Masonry Compressive Strength (f'm): Minimum 2,000 psi minimum net area compressive strength as determined by prism test method.

2.2 MATERIALS

- A. Hollow Load-Bearing Concrete Masonry Units (CMU): ASTM C90; medium weight.
- B. Concrete Masonry Unit Size and Shape: Furnish special units for 90-degree corners, bond beams, bases, lintels and fillers to match and complement block units. Nominal modular sizes:
 - 1. 12 inch by 8 inch by 16 inch nominal.
- C. Style: Color and textures to match existing structure. Interior walls are to be smooth face units.
- D. Color: Exterior and Interior CMU walls to be colored block to match existing structure.
- E. Integral CMU Water-Repellent:
 - 1. Integral liquid polymeric admixture mixed with the concrete during production of CMUs. Dry-Block Block Admixture manufactured by Grace Construction Products. Subject to compliance with requirements, equivalent products by the following manufacturers are acceptable.
 - a. ACM Chemistries, Inc.: Rain Bloc.

- b. BASF: Rheopel Plus.
 - c. Approved Equal.
 - 2. Water Permeance of Masonry: Capable of achieving a Class E Rating when evaluated using ASTM E 514 with the test extended to 72 hours, using the rating criteria specified in ASTM E 514-74.
 - 3. Bond strength as determined by ASTM E 72 shall not be reduced by the use of water repellent admixture.
- F. Painting: CMU is to be painted in accordance with Division 9 of this specification, and the drawings.

2.3 ACCESSORIES

- A. Reinforcing Steel: Deformed type, as specified in Section 03200 - Concrete Reinforcing, uncoated finish.
- B. Reinforcing Bar Positioners: Cold-drawn steel wire, 11 gage, ASTM A153, hot-dip galvanized ASTM A580, designed to prevent displacement of reinforcing steel and maintain adequate grout coverage within unit masonry cells.
 - 1. Vertical Bar: Fabricate for positioning each vertical bar lap splice.
 - 2. Horizontal Bar Positioners: Fabricate for positioning bar at top of bond beam.
- C. Anchor Rods: ASTM A307, Grade A (60 yield strength); J-shaped or L-shaped; complete with washers and heavy hex nuts; sized for minimum 15-in embedment; galvanized finish.
 - 1. Hot-Dip Galvanizing: ASTM A153.
 - 2. Mechanical Galvanizing: ASTM B695; Class 55.
- D. Mortar and Grout: As specified in Section 04100 - Masonry Mortar and Grouting.
- E. Control Joints:
 - 1. Standard Preformed Control Joints: Molded Rubber, Neoprene or Polyvinylchloride material; Durometer hardness 70 + 5 nominal, 3/8-inch thick. Furnish with corner and tee accessories; heat cement-fused joints.
 - 2. 3-Hour Fire Rated Control Joints: Reference notes and plans identified in Structural Details on the Structural Drawings.

- F. Cleaning Solution: Commercial masonry cleaner that is not harmful to masonry or adjacent materials. Conform to manufacturer instructions. Muriatic acid and other acidic solutions not permitted.
- G. Through-Wall Flashing.
 - 1. Material
 - a. Galvanized sheet steel of at least 20 gage.

2.4 SOURCE QUALITY CONTROL

- A. Division 1: Requirements for testing, inspection, and analysis requirements.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Division 1: Requirements for installation examination.
- B. Verify field conditions are acceptable and are ready to receive Work prior to beginning.
- C. Verify items provided by other Sections of Work are properly sized and located.
- D. Verify built-in items are in proper location and ready for roughing into masonry work.
- E. Verify masonry units free of cracks, spalling, disfigurements, face chips, or edge chips in excess of 1/4 inch in length or depth. Clean free of bond breakers and other foreign substances.

3.2 PREPARATION

- A. Section 01700 - Contract Closeout Requirements: Requirements for installation preparation.

3.3 INSTALLATION

- A. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.
- B. Establish lines, levels, and coursing indicated. Protect from displacement.
- C. Maintain masonry courses to uniform dimension. Form bed and head joints of uniform thickness.
- D. Align exposed exterior faces of masonry flush, allowing block thickness variations to appear on unexposed or interior face.
- E. Coursing of Concrete Masonry Units:
 - 1. Bond: Running.

2. Coursing: One unit and one mortar joint to equal 8 in.

3. Mortar Joints: Concave.

F. Placing and Bonding:

1. Lay hollow masonry units with face shell bedding on head and bed joints.

2. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

3. Remove excess mortar as Work progresses.

4. Interlock intersections and external corners.

5. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.

6. Perform job-Site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Lintels:

1. Install reinforced unit masonry lintels as indicated on the Drawings over openings where steel or precast concrete lintels are not scheduled or indicated.

2. Do not splice longitudinal reinforcing bars over openings.

3. Support and secure reinforcing bars from displacement.

4. Place and consolidate grout fill without displacing reinforcing.

5. Allow masonry lintels to attain specified strength before removing temporary supports.

6. Maintain minimum 8-inch minimum bearing on each side of opening

7. Grout lintels solid to a minimum depth of 16-inches or two courses of block. Grout solid to a greater depth where indicated on the drawings.

8. Standard open core blocks cannot be used as lintel blocks.

H. Grouted Components:

1. Reinforce bond beam with as indicated on the drawings.

2. Lap splices' bar diameters as required by code or indicated on the drawings.

3. Support and secure reinforcing bars from displacement.

4. Place and consolidate grout fill without displacing reinforcing.
5. At bearing locations, fill masonry cores with grout for minimum 12 inch either side of opening.

I. Reinforced Masonry:

1. Lay masonry units with cells vertically aligned and clear of mortar and unobstructed.
2. Place reinforcing, reinforcement bars, and grout as indicated on Drawings.
3. Splice reinforcement as indicated on the Drawings.
4. Support and secure reinforcement from displacement.
5. Place and consolidate grout fill without displacing reinforcing.
6. Place grout according to ACI 530.1

J. Control and Expansion Joints:

1. Install control and expansion joints as indicated on Drawings:
2. Do not continue horizontal joint reinforcement through control and expansion joints except as noted on the Drawings.
3. Install preformed control joint device in continuous lengths. Seal butt and corner joints.
4. Size control joint according to Section 07920 Joint Sealant for sealant performance.

K. Built-in Work:

1. As Work progresses, install built-in metal door frames, fabricated metal frames, window frames, anchor bolts, plates and other items to be built in the Work and furnished by other Sections.
2. Install built-in items plumb and level.
3. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout or mortar. Fill adjacent masonry cores with grout minimum 8 in from framed openings.
4. Do not build in materials subject to deterioration.

L. Cutting and Fitting:

1. Cut and fit for chases, pipes, conduit, sleeves, grounds and other items required. Coordinate with other Sections of Work to provide correct size, shape, and location.
2. Obtain Architect/Engineer's approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

M. Cleanouts at Solid-Grouted, Hollow-Core Masonry:

1. Locate at bottom course of each grout lift at each vertical reinforcing bar with maximum 32 in o.c. at solid grouted walls for grout pours exceeding 5 ft in height, according to ACI 530.1.
2. Make cleanout by removing and reinstalling entire face of masonry unit at exterior wall surfaces.
3. Clean grout space prior to grouting to remove mortar droppings, mortar projections larger than 1/2 in, and other foreign matter.
4. Seal cleanouts after inspection and before grouting.

N. Repairs and Infill in Existing Masonry

1. Provide matching block and mortar (no water repellent admixture). Apply CMU water repellent per Division 9.
2. Submit shop drawings and samples for masonry units to match existing structures.

3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Requirements for tolerances.
- B. Maximum Variation from Unit to Adjacent Unit: 1/16 in.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 in per story, non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

- G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 in.
- H. Maximum Variation for Steel Reinforcement:
 - 1. Install reinforcement within the tolerances specified in ACI 530.1 for foundation walls.
 - 2. Plus or minus 1/2 in when distance from centerline of steel to opposite face of masonry is 8 in or less.
 - 3. Plus or minus 1 in when distance is between 8 and 24 in.
 - 4. Plus or minus 1-1/4 in when distance is greater than 24 in.
 - 5. Plus or minus 2 in from location along face of wall.

3.5 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements specifies requirements for inspecting and testing.
- B. Test each type of concrete masonry units according to ASTM C140.
- C. Cut out damaged and defective work, reconstruct with new masonry materials, and repoint with mortar.
- D. Remove excess mortar on masonry and adjacent surfaces.

3.6 CLEANING

- A. Section 01700 - Project Closeout Requirements: Requirements for cleaning.
- B. Remove excess mortar and mortar smears as Work progresses.
- C. Promptly remove excess wet mortar containing integral water repellent mortar admixture from the face of the masonry as work progresses. Refer to admixture manufacturer for proper cleaning procedures.
- D. Replace defective mortar. Match adjacent Work.
- E. Clean soiled surfaces with cleaning solution.
- F. Use non-metallic tools in cleaning operations.
- G. Remove efflorescence from masonry wall exposed in the finished work in accordance with manufacturers' recommendations and NCMA TEK Bulletin #8-#A.

3.7 CMU WATER REPELLENT

- A. Immediately after final cleaning. Apply CMU water repellent to exterior and interior surfaces as called out in Room Finish Schedule. See Section 07191 – CMU Water Repellents.

3.8 PROTECTION

- A. Section 01700 - Project Closeout Requirements: Requirements for protecting finished Work.
- B. Hot and Cold Weather Construction: Perform Work according to ACI 530.1, 1.8.
- C. Protect exposed external corners subject to damage.
- D. Protect base of walls from mud and mortar splatter.
- E. Protect masonry and other items built into masonry walls from mortar droppings and staining caused by mortar.
- F. Protect tops of masonry work with waterproof coverings secured in place without damaging masonry. Provide coverings where masonry is exposed to weather when Work is not in progress.
- G. Protect Work from rain by performing Work under protective cover.

END OF SECTION

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**SECTION 05041
HOT DIP GALVANIZING**

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section specifies hot-dip galvanizing for all miscellaneous and structural steel exposed to the weather, moisture, or corrosive atmosphere including but not limited to the following:
 - 1. Structural steel where indicated on the Drawings and in these Specifications.
 - 2. Items identified in other Sections of these Specifications.
- B. Definitions
 - 1. Hot-Dip Galvanizing: The dipping of steel members and assemblies into an alloy of molten special high-grade zinc and other earthly materials for lasting long-term protection.
 - 2. The resultant zinc alloys with the base metal.

1.2 REFERENCE STANDARDS

- A. Comply with applicable portions of the following reference standards:
 - 1. American Galvanizers Association Inc. (AGA): Publication entitled "Inspection Manual for Hot-Dip Galvanized Products."
 - 2. American Society for Testing and Materials (ASTM):
 - a. A123 - Zinc (Hot Galvanized) Coating on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, and Hardware.
 - b. A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
 - c. A143 - Safeguarding Against Embrittlement.
 - d. A384 - Safeguarding Against Warpage.
 - e. A385 - Providing High Quality Zinc Coatings.
 - f. A780 - Repair of Hot-Dip Galvanizing.

1.3 SUBMITTALS

- A. Certificate of Compliance from Galvanizer: Submit notarized Certificate of Compliance with application for payment for galvanizing, signed by galvanizer, indicating compliance

with requirements of specifications. Include scope of services provided, and quantity and itemized description of items processed.

- B. Visual Stamp: The galvanizer shall mark all lots of material with a clearly visible stamp or tag indicating the name of the galvanizer, the weight of the zinc coating, and the applicable ASTM Specification Numbers.

1.4 QUALITY ASSURANCE

- A. Coordination Between Fabricator and Galvanizer: Prior to fabrication, direct fabricator to submit approved shop drawings to the galvanizer for all fabrications. Direct galvanizer to review fabricator's shop drawings for suitability of materials for galvanizing and coatings and coordinate any required modifications to fabrications required to be done by the fabricator.
- B. Steel Materials: For steel to be hot-dip galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: Carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
 - 1. To prevent unnecessary damage to the galvanized coating by field welding, provide slip fit method of connecting pipe railings. Fabricate pipe railing from mechanical steel tubing internally vented with holes 3/4 the size of the pipe's internal diameter. For other fabrications, bolted connections shall be used wherever possible.
 - 2. Assemblies: Where size of assembly is too large for galvanizing kettle, galvanize components prior to fabrication and assemble after galvanizing.
- C. Engage the service of a galvanizer who has demonstrated a minimum of five (5) years experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein. The Authority has the right to inspect and approve or reject the galvanizer/ galvanizing facility.
- D. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program acceptable to the Authority which has been in effect for a minimum of five years and shall provide the Authority with process and final inspection documentation.
- E. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.

- F. In process paint application shall be monitored with a wet film gage and the measurements recorded. Dry film thickness measurement shall be by Tooke Gage and Magnetic Coating Thickness gage.
- G. Provide and apply materials complying with environmental requirements of authority having jurisdiction. All materials shall be delivered to the galvanizer with label or product data sheet affixed to the manufacturer's containers showing the manufacturer's name, batch number, type of paint, stock number, label analysis of solids and vehicle, reducing and thinning instructions, drying and recoat time, MSDS sheets, recommended application procedures and environmental restrictions. Paint materials shall be stored in an acceptable location reserved only for such materials and related equipment in compliance with applicable local health and fire regulations and OSHA requirements.
- H. The galvanizer/galvanizing facility must have a dedicated, on premise painting and curing facility for the exclusive use of coating galvanized steel. Said facility shall utilize the following:
 - 1. Recording hygrometer to measure air temperature and humidity.
 - 2. A spray booth confirming OSHA regulations with filtered exhaust.
 - 3. A convection hot air curing system with solvent vapor removal liability.
 - 4. The curing booth shall be heated using an indirect thermostat-controlled gas fired forced hot air blower. The booth shall be protected with a sprinkler system complying with NFPA 15. The air in the curing booth shall be continuously monitored by a lower explosive limit (LEL) monitoring device connected to the ventilation system. The booth shall be capable of reaching 150°F with a sustained capability of 100°F.

PART 2 PRODUCTS

2.1 HOT-DIP GALVANIZING

- A. Provide coating for iron and steel fabrications applied by the hot-dip process, Comply with ASTM A123 for fabricated products and ASTM A 153 for hardware. Provide thickness of galvanizing specified in referenced standards. The galvanizing bath shall contain special high-grade zinc.
- B. If, for any reason, the galvanizing item is to be primed (for future field painting or finish coated), the coatings shall be applied by the galvanizer at same facility, within 12 hours of galvanizing, in accordance with Section 09910.
- C. Field priming of hot dip galvanizing will not be permitted.
- D. Safeguard against embrittlement in conformance with ASTM A143.
- E. Warpage or Distortion Prevention:

1. To safeguard against warpage or distortion of steel members, in conformance with ASTM A384, steel fabricator shall submit shop drawings of non-standard fabrications, all tubular fabrications, all fabrications involving any dimension which exceeds the size of the galvanizer's kettle, and any fabrication involving materials of different thicknesses.
 2. Submit these drawings to the galvanizer before fabrication to determine the suitability of the material for galvanizing.
- F. To prevent unnecessary damage to the finished coating by field welding, use bolted connections for field connections wherever possible.
- G. To ensure a smooth even coating, pipe rails should be fabricated from mechanical steel tubing with "slip fit" type connections.

PART 3 EXECUTION

3.1 APPLICATION OF GALVANIZING AND METAL COATINGS

- A. Galvanize materials in accordance with referenced standards and this specification.
- B. Galvanizing shall provide an acceptable substrate for applied coatings.
- C. The dry kettle process shall be used to eliminate any flux inclusions on the surface of the galvanized material. Prior to galvanizing, the steel shall be immersed in a pre-flux solution (zinc ammonium chloride). The pre-flux tanks must be 12o to 14o Baume' and contain less than .4% iron. The wet kettle process shall be prohibited.
- D. To provide the galvanized surface required, the following procedures shall be implemented:
1. A monitoring recorder shall be utilized and inspected regularly to observe any variances in the galvanizing bath temperature.
 2. The pickling tanks shall contain hydrochloric acid with a constant rang between 10-14%, iron content less than 8% and zinc content less than 3%. Titrations shall be taken weekly at a minimum.
 3. Rinse tanks, for the removal of cleaning chemicals, shall contain water.
 4. Water quenching of galvanized steel shall be prohibited.
- E. Installation: Comply with fabricator's and galvanizer's requirements for installation of materials and fabrications, including use of nylon slings or padded cables for handling factory-primed or factory-finished materials.
- F. Touch-Up and Repair: For damaged and field-welded metal coated surfaces, clean welds, bolted connections and abraded areas.

1. At galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A780. Galvanizing repair paint shall have 95 percent zinc by weight, ZIRP by Duncan Galvanizing. Thickness of applied galvanizing repair paint shall be not less than coating thickness required ASTM A123 or A153 as applicable. Touch-up of galvanized surfaces with aerosol spray, silver paint, bright paint, brite paint, or aluminum paints is not acceptable.
2. At factory-primed or factory-finished surfaces, touch-up finish in conformance with manufacturer's recommendations. Provide touch-up such that repair is not visible from a distance of 6 feet.
3. The galvanizer/galvanizing facility must have an ongoing touch-up and repair program acceptable to the Authority which has been in effect for a minimum of five years.
4. A touch-up repair kit shall be provided with each order.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT

- A. Measurement for hot-dip galvanizing will be measured as being included in the contract lump sum or unit price for said item.

4.2 PAYMENT

- A. Hot-Dip galvanizing will be paid for at the Contract price as specified above.

END OF SECTION

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**SECTION 05120
STRUCTURAL STEEL**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Structural shapes
- B. Channels and angles
- C. Hollow structural sections
- D. Structural pipe
- E. Structural plates and bars
- F. Floor plates
- G. Fasteners, connectors, and anchors
- H. Grout

1.2 RELATED SECTIONS

- A. Division 1
- B. Division 3
- C. Division 4
- D. Division 5
- E. Division 9

1.3 REFERENCES

- A. American Institute of Steel Construction
 - 1. AISC Code of Standard Practice for Steel Buildings and Bridges
 - 2. AISC Seismic Provisions for Structural Steel Buildings
 - 3. AISC Specification for Allowable Stress Design of Single-Angle Members
 - 4. AISC Specification for the Design of Steel Hollow Structural Sections
 - 5. AISC Specification for Structural Steel Buildings Allowable Stress Design, and Plastic Design

B. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM A193/A193M - Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
6. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
7. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
8. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
9. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
11. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts
12. ASTM A786/A786M - Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
13. ASTM A992/A992M - Standard Specification for Structural Steel Shapes
14. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
15. ASTM E94 - Standard Guide for Radiographic Examination
16. ASTM E164 - Standard Practice for Ultrasonic Contact Examination of Weldments
17. ASTM E165 - Standard Test Method for Liquid Penetrant Examination
18. ASTM E709 - Standard Guide for Magnetic Particle Examination
19. ASTM F436 - Standard Specification for Hardened Steel Washers
20. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

- C. American Welding Society:
 - 1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination
 - 2. AWS D1.1 - Structural Welding Code - Steel
- D. Research Council on Structural Connections:
 - 1. RCSC - Specification for Structural Joints Using ASTM A325 or A490 Bolts
- E. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual
 - 2. SSPC Paint 15 - Steel Joist Shop Paint
 - 3. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic)
 - 4. SSPC SP 3 - Power Tool Cleaning
 - 5. SSPC SP 6 - Commercial Blast Cleaning
 - 6. SSPC SP 10 - Near-White Blast Cleaning

1.4 SUBMITTALS

- A. Submit under provision of Section 01300.
- B. Shop Drawings:
 - 1. Indicate profiles, sizes, spacing, location of structural members, openings, attachments, and fasteners.
 - 2. Connections.
 - 3. Cambers.
 - 4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with the following:
 - 1. AISC Code of Standard Practice for Steel Buildings and Bridges.

1.6 QUALIFICATIONS

- A. Fabricator: Company specializing in performing Work of this section with minimum five years experience.

- B. Erector: Company specializing in performing Work of this section with minimum five years experience.
- C. Shop Painter: Company specializing in performing Work of this section with minimum five years experience.
- D. Welders and Welding Procedures: AWS D.1 qualified within previous 12 months.

1.7 COORDINATION

- A. Coordinate work with all effected trades.

PART 2 PRODUCTS

2.1 STRUCTURAL STEEL

- A. Structural W-Shapes: ASTM A992; Grade 50
- B. Structural T-Shapes: Cut from structural W-shapes
- C. Channels and Angles: ASTM A36
- D. Square and Rectangular Hollow Structural Sections: ASTM A500, Grade B
- E. Structural Pipe: ASTM A53/A53M, Grade B
- F. Structural Plates and Bars: ASTM A36
- G. Floor Plates: ASTM A786/A786M; raised pattern

2.2 FASTENERS, CONNECTORS, AND ANCHORS

- A. High Strength Bolts: ASTM A325; Type 1
 - 1. Finish: Unfinished
- B. Nuts: ASTM A563 heavy hex type, Grade DH
 - 1. Finish: Unfinished
- C. Washers: ASTM F436; Type 1, circular. Furnish clipped washers where space limitations require
 - 1. Finish: Unfinished
- D. Anchor Rods: (Bolts set into concrete) ASTM F1554; Grade 55
 - 1. Shape: Straight-Headed
 - 2. Nuts for anchor rods to be ASTM A563, Grade A, Heavy Hex.

2.3 WELDING MATERIALS

- A. Welding Materials: AWS D1.1; type required for materials being welded

2.4 ACCESSORIES

- A. Grout for Steel Bearing Plates: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing minimum compressive strength of 7,000 psi.
- B. Shop and Touch-Up Primer and Paint: Per Division 9.

2.5 FABRICATION

- A. Continuously seal joined members by continuous welds. Grind exposed welds smooth.
- B. Fabricate connections for bolt, nut, and washer connectors.
- C. Develop required camber for members.

2.6 FINISH

- A. Prepare structural component surfaces in accordance with SSPC SP 3.
- B. Painting and Coatings: Per Division 9. Do not prime surfaces that will be field welded, in contact with concrete, or high strength bolted.

2.7 SOURCE QUALITY CONTROL AND TESTS

- A. Section 01400 - Quality Control: Construction observation and testing laboratory service.
- B. Shop test bolted and welded connections as specified for field quality control tests.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify bearing surfaces are at correct elevation.
- B. Verify anchors rods are set in correct locations and arrangements with correct exposure for steel attachment.

3.2 PREPARATION

- A. Furnish templates for installation of anchor rods and embedments in concrete and masonry work.

3.3 ERECTION

- A. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.
- B. Field weld components indicated on shop drawings.
- C. Field connect members with threaded fasteners; torque to required resistance.
- D. Do not field cut or alter structural members without approval of Architect/Engineer.
- E. After erection, touch up welds and abrasions to match shop finishes.

3.4 GROUT INSTALLATION

- A. Grout under base plates in accordance with Section 03300.
- B. Remove forms after grout is set. Trim grout edges to form smooth surface, splayed 45 degrees.
- C. Tighten anchor bolts after grout has cured for a minimum of 3 days.

3.5 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: $\frac{1}{4}$ inch per story, non-cumulative.
- C. Maximum Offset from Alignment: $\frac{1}{4}$ inch.

3.6 FIELD QUALITY CONTROL

- A. Section 01400 - Quality Requirements.
- B. Bolted Connections: Inspect in accordance with AISC specifications.
 - 1. Visually inspect all bolted connections.
- C. Welding:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Visually inspect all welds.
- D. Correct defective bolted connections and welds.

END OF SECTION

**SECTION 05500
METAL FABRICATIONS**

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes shop fabricated metal items.
 - 1. Bollards
 - 2. Ladders
 - 3. Miscellaneous piping and duct support frames.
 - 4. Structural supports for miscellaneous attachments.
 - 5. Entry Canopies
 - 6. Window Shades
 - 7. Roof Access Ladders
 - 8. Exterior Fire Extinguisher Support (*at Bulk Chemical Storage*)
 - 9. Miscellaneous metal items and fabrications not otherwise covered in the plans or specifications.
 - 10. Anchors for Equipment.
 - 11. Garage door shelf angle and anchors.

- B. Related Sections:
 - 1. Division 1
 - 2. Division 3
 - 3. Division 4
 - 4. Division 5
 - 5. Division 9

1.2 REFERENCES

- A. Aluminum Association:
 - 1. AA DAF-45 - Designation System for Aluminum Finishes

- B. American Architectural Manufacturers Association:
 - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum

- C. ASTM International:
 - 1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel

2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
4. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
5. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
6. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.
7. ASTM A297/A297M - Standard Specification for Steel Castings, Iron-Chromium and Iron-Chromium-Nickel, Heat Resistant, for General Application
8. ASTM A283/283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
9. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
10. ASTM A312/A312M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes
11. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
12. ASTM A354 - Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
13. ASTM A479/A479M - Standard Specification for Stainless Steel Bars and Shapes for Use in Boilers and Other Pressure Vessels
14. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
15. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
16. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing
17. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts
18. ASTM A572/A572M - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
19. ASTM A992/A992M - Standard Specification for Structural Steel Shapes
20. ASTM B26/B26M - Standard Specification for Aluminum-Alloy Sand Castings
21. ASTM B85 - Standard Specification for Aluminum-Alloy Die Castings
22. ASTM B177 - Standard Guide for Chromium Electroplating on Steel for Engineering Use

23. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 24. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
 25. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Bar, Rod, and Wire
 26. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
 27. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
 28. ASTM F436 - Standard Specification for Hardened Steel Washers
 29. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
- D. American Welding Society:
1. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination
 2. AWS D1.1 - Structural Welding Code - Steel
 3. AWS D1.6 - Structural Welding Code - Stainless Steel
- E. National Ornamental & Miscellaneous Metals Association:
1. NOMMA Guideline 1 - Joint Finishes
- F. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual
 2. SSPC SP 1 - Solvent Cleaning
 3. SSPC SP 10 - Near-White Blast Cleaning
 4. SSPC Paint 15 - Steel Joist Shop Paint
 5. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic)

1.3 SUBMITTALS

- A. Section 01300 - Submittal Procedures: Submittal requirements.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Division 1: Product storage and handling requirements.

- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

1.5 FIELD MEASUREMENTS

- A. Verify field measurements are as indicated on drawings.

PART 2 PRODUCTS

2.1 MATERIALS - STEEL

- A. Steel Sections: ASTM A992; Grade 50.
- B. Steel Plate: ASTM A36.
- C. Hollow Structural Sections: ASTM A500, Grade B.
- D. Steel Pipe: ASTM A53, Grade B Schedule 40.
- E. Sheet Steel: ASTM A653, Grade 33 Structural Quality with galvanized coating.
- F. Bolts: ASTM A307; Grade A or B.
 - 1. Finish: Hot dipped galvanized.
- G. Nuts: ASTM A563 heavy hex type.
 - 1. Finish: Hot dipped galvanized.
- H. Washers: ASTM F436; Type 1.
 - 1. Finish: Hot dipped galvanized.
- I. Welding Materials: AWS D1.1; type required for materials being welded.
- J. Shop and Touch-Up Primer: SSPC Paint 15, Type 1, red oxide.
- K. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20 Type I Inorganic zinc rich.

2.2 MATERIALS - STAINLESS STEEL

- A. Bars and Shapes: ASTM A276; Type 316.
- B. Tubing: ASTM A269; Type 316.
- C. Pipe: ASTM A312/A312M, seamless; Type 316.
- D. Plate, Sheet and Strip: ASTM A167; Type 316.
- E. Bolts, Nuts, and Washers: ASTM A354.

F. Welding Materials: AWS D1.6; type required for materials being welded.

2.3 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221, Alloy 6063, Temper T5.

B. Sheet Aluminum: ASTM B209, Alloy 6063, Temper T5.

C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, Alloy 6063, Temper T6.

D. Aluminum-Alloy Bars: ASTM B211, Alloy 6063, Temper T6.

E. Bolts, Nuts, and Washers: Stainless steel.

F. Welding Materials: AWS D1.1; type required for materials being welded.

2.4 MATERIALS – BLIND SIDE FASTENERS

A. Where bolted connections are indicated to be made to HSS shapes or other places where access is unavailable to the back side of the fastener provide Type HB - Holo-Bolt by Lindapter or approved equal.

B. Bolt size shall be as indicated on the plans for the thickness of materials to be joined as indicated. Install bolts per the manufacturer's specifications. Provide stainless steel fasteners for all exterior applications and where indicated.

2.5 COORDINATION:

A. BOLLARDS

1. Bollards: Steel pipe, concrete filled, crowned cap, 6-inches diameter, length as indicated on Drawings; prime paint plus one coat of high-visibility yellow paint. Coordinate with typical bollard detail 02160 (CD-04).
2. Concrete Fill: Mix number M2500-GFM per General Concrete Notes on the project drawings and as referenced/specified in Section 03300.
3. Anchors: Concealed type as indicated on Drawings.

B. LADDERS

1. Fixed Ladders shall be in conformance with American National Standards Institute (ANSI) Standard A14.3 – Safety Requirements for Fixed Ladders; and Occupational Safety and Health Administration (OSHA) Regulation 1910.27 – Standards for Fixed Ladders.
2. Fixed Ladder: Stainless Steel or Aluminum, welded construction:
3. Side Rails: 3/8" x 2" minimum side rails spaced at 16-inches clear, minimum.
4. Rungs: Minimum one-inch diameter solid rod with gritted surface or manufactured rungs with safety gripping surface, uniformly spaced 12-inches on center.

5. Mounting: Space rungs a minimum of 7-inches clear from wall surfaces; with mounting brackets and attachments.
 6. Finish: Stainless Steel, Mill finish. Aluminum, Clear anodized finish.
 7. Ladder Walk-through Extensions: Where indicated on the plans or required by Safety Codes provide walk-through ladder rail extensions in conformance with ANSI and OSHA regulations. Same material and finish as ladder.
- C. Miscellaneous piping and duct support frames.
1. Provide where indicated on the drawings or required to provide safe/stable support to piping and ducting for both gravity, dynamic and seismic loads.
 2. Steel per Article 2.1 of this Specification.
 3. Hot-dip galvanized where noted on the Drawings.
 4. Three coat paint system per Section 09900 – High Performance Coatings, where not otherwise indicated on the Drawings.
- D. Garage door shelf angle.
1. All stainless steel construction.

2.6 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.7 FACTORY APPLIED FINISHES - STEEL

- A. Galvanizing: ASTM A123/A123M; minimum 2.0 oz/sq ft coating thickness; galvanize after fabrication.
 1. Galvanizing for Fasteners, Connectors, and Anchors:
 2. Hot-Dipped Galvanizing: ASTM A153/A153M.

- B. Painted: Provide three coat paint system per Section 09900 – High Performance Coatings, where finish is not otherwise indicated on the Drawings.

2.8 FACTORY APPLIED FINISHES - STAINLESS STEEL

- A. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.

2.9 FACTORY APPLIED FINISHES - ALUMINUM

- A. Finish coatings to conform to AAMA 2603. Comply with AA DAF-45.
- B. Exterior Aluminum Surfaces: AAMA A41 anodized, prepared with chemical pre-treatment, anodized to clear color.

2.10 FABRICATION TOLERANCES

- A. Squareness: 1/8-inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16-inch.
- C. Maximum Misalignment of Adjacent Members: 1/16-inch.
- D. Maximum Bow: 1/8-inch 48-inches.
- E. Maximum Deviation from Plane: 1/16-inch in 48-inches.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Division 1: Coordination and project conditions.
- B. Verify field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Clean and strip galvanized steel items to bare metal where site welding is required. After welding coat affected surfaces with a cold galvanizing compound.
- B. Supply steel items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.

- C. Field weld components only as indicated on Drawings.
- D. Perform field welding in accordance with AWS D1.1.
- E. Obtain approval of Engineer prior to site cutting or making adjustments not scheduled.
- F. After erection, touch up welds, abrasions, and damaged finishes with galvanizing repair paint to match shop finishes.

3.4 ERECTION TOLERANCES

- A. Section 01400 - Quality Requirements: Tolerances.
- B. Maximum Variation from Plumb: $\frac{1}{4}$ -inch per story or for every 12 ft in height whichever is greater, non-cumulative.
- C. Maximum Offset from Alignment: $\frac{1}{4}$ -inch.
- D. Maximum Out-of-Position: $\frac{1}{4}$ -inch.

END OF SECTION

**SECTION 09900
HIGH-PERFORMANCE COATINGS**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Furnishing and applying protective coatings of paint to all surfaces indicated on the Drawings or specified herein, including all surface preparation and related work.
- B. Architectural coatings are specified in Section 09910 and as shown on the Architectural Finish Schedules.

1.2 EXCLUSIONS

- A. Painting is not required for the following surfaces or items unless otherwise shown on the Drawings, specified in other sections, or specified herein:
 - 1. Stainless steel, aluminum (except where in contact with concrete), chrome, fiberglass, copper instruments, pressure gauge tubing, and structural FRP. (unless noted on plans or finish schedules.)
 - 2. Electrical panels, motor control centers, pumps, and motors having a factory finish. The factory finish shall be approved by the Engineer. Non-approved factory finishes shall be painted as specified hereinafter.
 - 3. Surfaces hidden from view such as piping, ducts, structural wood, and insulation.

1.3 REFERENCES

- A. The following is a list of standards that may be referenced in this section:
 - 1. American National Standards Institute (ANSI)
 - a. Standard Colors for Color Identification and Coding
 - b. A13.1, Scheme for the Identification of Piping Systems
 - 2. American Water Works Association (AWWA)
 - a. C203, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot-Applied
 - b. C210, Liquid Epoxy Coating System for the Interior and Exterior of Steel Water Pipelines
 - c. C214, Tape Coating Systems for the Exterior of Steel Water Pipelines
 - 3. NSF International (NSF): 61 Drinking Water System Components-Health Effects
 - 4. National Association of Corrosion Engineers (NACE): Manual for Painter Safety

5. Occupational Safety and Health Act (OSHA)
6. Steel Structures Painting Council (SSPC)
 - a. QP1, Standard Procedure for Evaluating Qualifications of Painting Contractors
 - b. QP2, Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint
 - c. SP 1, Surface Preparation Specification No. 1, Solvent Cleaning
 - d. SP 2, Hand Tool Cleaning
 - e. SP 3, Power Tool Cleaning
 - f. SP 5, White Metal Blast Cleaning
 - g. SP 6, Commercial Blast Cleaning
 - h. SP 7, Brush-Off Blast Cleaning
 - i. SP 8, Pickling
 - j. SP 10, Near-White Blast Cleaning
 - k. SP 11, Power Tool Cleaning to Bare Metal
 - l. SP 12, High Pressure Water Jetting
 - m. SP 13, Surface Preparation of Concrete
 - n. SP 16, Brush off Blast Cleaning of Non-Ferrous Metals.
 - o. PA1, Best Practices for Paints and Coatings Application
 - p. PA2, Measurement of Dry Coating Thickness with Magnetic Gauges
 - q. PA17, Determining Conformance to Steel Profile/Surface Roughness
 - r. Guide No. 3, PA, Guide to Safety in Paint Applications
7. National Association of Pipe Fabricators (NAPF)
 - a. 500-03-01, Solvent Cleaning
 - b. 500-03-02, Hand Tool Cleaning
 - c. 500-03-03, Power Tool Cleaning
 - d. 500-03-04, Abrasive Blast Cleaning for Ductile Iron Pipe
 - e. 500-03-05, Abrasive Blast Cleaning for Ductile Iron Fittings
8. International Concrete Repair Institute (ICRI)
 - a. 310.2, Surface Preparation of Concrete
 - b. CSP, Concrete Surface Profile
9. NACE International (NACE)
 - a. SP-0188-06, Discontinuity (Holiday) Testing of Protective Coatings
10. ASTM International (ASTM)
 - a. ASTM D 16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
 - b. ASTM D 4258, Standard Practice for Surface Cleaning Concrete for

- Coating.
- c. ASTM D 4259, Standard Practice for Abrading Concrete.
 - d. ASTM D 4261, Standard Practice for Surface Cleaning Concrete Unit Masonry for Coating.
 - e. ASTM D 4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
 - f. ASTM D 4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - g. ASTM D 4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.
 - h. ASTM D 4541, Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
 - i. ASTM D 7091 - Standard Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals.
 - j. ASTM D 3359 Standard Test Methods for Rating Adhesion by Tape Test

1.4 SUBMITTALS

A. Shop Drawings

1. Data Sheets, including catalog cuts and color charts.
 - a. Material Safety Data Sheets (MSDS), the manufacturer's Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system.
 - b. Submit required information on a system-by-system basis.
 - c. Furnish copies of paint system submittals to the coating applicator.
 - d. Indiscriminate submittal of manufacturer's literature only is not acceptable.
2. Detailed chemical and gradation analysis for each proposed abrasive material.
3. System Application Process (for each coating system):
 - a. Contractor shall indicate surface preparation, primer, stripe coat, finish coat, and quality control parameters as indicated in Section 3.7.
 - b. Submittal shall include a detailed pre-installation packet with on-site photographs of each edge and transition termination around pipes, gates, frames, edge of coating etc. Drawings on the photographs shall indicate the termination method to be used, in conformance with the coating system manufacturer's recommendations.
 - c. Submittals shall be approved by the coating manufacturer, the applicator and the General Contractor that is specific to each application system.

B. Quality Control Submittals

1. Applicator's Qualification: List of references substantiating experience.
2. Factory-Applied Coatings: Manufacturer's certification stating factory-applied coating system meets or exceeds requirements specified.
3. If the manufacturer of finish coating differs from that of shop primer, provide both manufacturers' written confirmations that materials are compatible.
4. Manufacturer's written instructions and special details for applying each type of paint.
5. Manufacturer's written verification that submitted material is suitable for the intended use.

C. Extended Warranty Certificates

D. Contract Closeout Submittals: Extended Warranty Certificate

1.5 QUALITY CONTROL

A. Qualifications of Applicator: Minimum 5 years' experience in application of specified products.

B. Contractor's Responsibilities

1. The Contractor shall perform first-line, in-process QC inspections and testing in accordance with the level of quality control specified for each coating system.
2. The Contractor shall use the "Daily Coating Inspection Report" found at the end of this specification to record the results of quality control inspections and tests. The completed reports shall be turned in to the Engineer before work resumes the following day.
3. The Contractor shall supply all necessary equipment to perform the QC tests. The instruments shall be calibrated by the Contractor's personnel according to the equipment manufacturer's recommendations and the Contractor's QC Program. All inspection equipment shall be made available to the Engineer for QA observations on an as-needed basis.
4. Equipment shall include the following at a minimum:
 - a. Recording thermometer.
 - b. Hygrometer.
 - c. Recording or comparable equipment for the recording of dew point and continuous recording of relative humidity.

- d. Surface temperature thermometer.
- e. Hypodermic Needle Pressure Gage for determining blasting pressure at the nozzle.
- f. Visual Standard for abrasive blast cleaning.
- g. Testex Press-O-Film Replica Tape and Spring Micrometer.
- h. Wet Film Thickness Gage.
- i. Blotter paper and plate glass for compressed air cleanliness checks.
- j. Magnetic Dry Film Thickness Gage with calibration standards.
- k. Holiday Detector: Non-destructive wet sponge-type detector. Operating test voltage shall be per NACE RO-02-74 or as recommended by the Coating Manufacturer's representative.
- l. A non-sudsing-type wetting agent such as Kodak Photo-Flo, or equal, shall be added to the water prior to wetting the detector sponge.

C. Quality Assurance (QA) Observations by Engineer

1. The Engineer will conduct QA observations of any or all phases of the work. The presence or activity of Engineer observations in no way relieves the Contractor of the responsibility to provide all necessary daily QC inspections of his/her own and to comply with all requirements of this Specification.
2. Hold Points: Work that requires a specific inspection upon completion is designated as a Hold Point. The Contractor shall provide the Engineer with a minimum one-day notification before a Hold Point inspection will be reached. Permission to proceed beyond a Hold Point without a QA inspection will be granted solely at the discretion of the Engineer, and only on a case-by-case basis.
3. The Engineer has the right to reject any work that was performed without adequate provision for QA observations.
4. The Engineer will issue a Non-Conformance Report when work is found to be in violation of the specification requirements and is not corrected to bring it into compliance before proceeding with the next phase of work.
5. Inspection Access and Lighting
 - a. The Contractor shall facilitate the Engineer's observations as required, including allowing ample time to view the work. The Contractor shall furnish, erect, and move scaffolding or other mechanical equipment to permit close observation of all surfaces to be cleaned and painted. This equipment shall be provided during all phases of the work.
 - b. When the surface to be inspected is more than 1.8 m (6 ft) above the ground or water surface, the Contractor shall provide the Engineer with a safety harness and a lifeline according to OSHA regulations.

- c. The Contractor shall provide artificial lighting in areas where natural light is inadequate, as determined by the Engineer, to allow proper cleaning, inspection, and painting. Illumination for inspection shall be at least 325 LUX (30-foot candles). Illumination for cleaning and painting, including the working platforms, access, and entryways shall be at least 215 LUX (20-foot candles).

1.6 SUBSTITUTIONS

- A. Products of manufacturers other than those specified, and equal in type and quality to those specified, may be considered acceptable if said products are offered by the Contractor with satisfactory data on past performance, composition and directions for use. No request for substitution will be approved which decreases the film thickness specified and/or number of coats to be applied, or which offers a change from the generic type of paint and coating system specified.

1.7 DELIVERY, STORAGE AND HANDLING

- A. All paint shall be delivered to the job site in the manufacturer's original, sealed and labeled containers and shall be subject to inspection and approval by the Engineer prior to use.
- B. Shipping
 - 1. Where pre-coated items are to be shipped to the site, protect coating from damage. Batten coated items to prevent abrasion.
 - 2. Use non-metallic or padded slings and straps in handling.
- C. Storage
 - 1. Store products in a protected area that is heated or cooled to maintain temperatures within the range recommended by paint manufacturer.
 - 2. Primed surfaces shall not be exposed to weather for more than two months before being topcoated, or less time if recommended by coating manufacturer.

1.8 SERVICES OF MANUFACTURER

- A. For submerged and severe service coating systems, the Contractor shall require the paint manufacturer to furnish the following services:
 - 1. The manufacturer's representative shall provide technical support to resolve field problems associated with the surface preparation requirements and application and curing of the manufacturer's products.

1.9 ENVIRONMENTAL REQUIREMENTS

- A. Provide tenting, dehumidification, heating, and other environmental controls necessary to meet the preparation, application, and curing requirements of the coatings used.

1.10 EXTENDED WARRANTIES

- A. When specified, provide manufacturer's and contractor's extended warranty for materials and workmanship with Owner named as beneficiary, and shall commence at the time of Substantial Completion.

1.11 PROTECTION OF EXISTING PAINTED STRUCTURES

- A. The painting on existing structures and equipment shall be protected. Any damage caused by the Contractor's operation shall be repaired or restored to a condition equal to or better than before it was damaged.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer used as the basis of design: Product names used herein refer to materials manufactured and/or supplied by Tnemec Co. and are used as the basis of quality for design and bidding.
 - 1. Approved Manufacturers – Paint
 - a. Tnemec
 - b. Sherwin Williams
 - c. or pre-approved "or-equals" in accordance with Instructions to Bidders Article 11 and listed below:
 - i. N/A
- B. All paint materials selected for each system for each type of surface shall be the product of a single manufacturer. The type of paint material to be used and the number of coats to be applied are listed in the coating systems specified below.
- C. All paint materials and equipment shall be compatible in use. Finish coats shall be compatible with prime coats. Prime coats shall be compatible with the surface to be coated. All tools and equipment shall be compatible with the coating to be applied.
- D. Coal tar epoxy and products containing coal tar pitch will not be allowed.
- E. Special systems as specified for surface conditions by the manufacturer specified; substitution only upon affidavit of alternate manufacturer that product will meet conditions and label for surface use.

2.2 COLORS

- A. Alternating coats shall be contrasting but complimentary to finish coating.
- B. All colors and glosses shall be as selected by the Owner.
- C. Colors and painting schemes shall match existing colors at project for similar surfaces.

2.3 ABRASIVE MATERIALS

- A. Select abrasive type and size to produce a surface profile that meets coating manufacturer's recommendations.
- B. Abrasive blast cleaning shall be performed using either expendable abrasives (other than silica sand) or recyclable steel grit abrasives. Expendable abrasive shall be used one time and disposed of. Abrasive suppliers shall certify that the expendable abrasives meet the requirements of SSPC-AB1 and that recyclable steel grit abrasives meet AB3. The Contractor shall verify that recycled abrasives meet the requirements of SSPC-AB2 during use. All surfaces prepared with abrasives not meeting the SSPC-AB1, AB2, or AB3 requirements, as applicable, shall be solvent cleaned or low pressure water cleaned as directed by the Engineer, and re-blast cleaned at the Contractor's expense.

2.4 THINNERS, CLEANERS, DRIERS, AND OTHER ADDITIVES

- A. As recommended by manufacturer of the particular coating.

2.5 VISUAL STANDARD

- A. When specified and to facilitate inspection, Contractor shall, on the first day of sandblasting operations, sandblast metal plates to the surface preparation standards specified. Plates shall measure 8½ inches by 6 inches. Plates shall be approved by the Engineer. Plates shall be coated with a clear, non-yellowing finish. One of these plates shall be prepared for each type of sandblasting and shall be used as the comparison standard throughout the project.

PART 3 EXECUTION

3.1 SURFACE PREPARATION, GENERAL

- A. Prior to all surface preparation and painting operations, completely mask, remove or otherwise adequately protect all hardware, accessories, machined surfaces, plates, lighting fixtures, equipment, and similar items in contact with painted surfaces but not scheduled to receive paint.
- B. All surfaces to be painted shall be in the proper condition to receive the specified paint before said paint is applied. Surface preparation shall be done in a workmanlike manner with the objective of obtaining a clean and dry surface. No more surface preparation

than can be coated in a normal working day shall be permitted. No coating shall be applied before the prepared surfaces are approved by the Engineer.

- C. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly-painted surfaces.
- D. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.
- E. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. For process piping, mask bolt threads to allow nuts to be removed for maintenance.
- F. Mask openings in motors to prevent paint and other materials from entering the motors.
- G. Protect all surfaces adjacent to or downward of work area from overspray. Contractor shall be responsible for any damage resulting from overspray.

3.2 SURFACE PREPARATION DESIGNATIONS

- A. General:
 - 1. The following designations for surface preparation shall be utilized in the coating systems specified. In no case shall the surface preparation be less than that specified by the Paint Manufacturer. In case of conflict, the more restrictive requirement shall apply.
 - 2. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of paint manufacturer whose product is to be applied. The more stringent requirements shall apply.
 - 3. Position diesel- or gasoline-powered equipment in a manner to prevent deposition of combustion contaminants on any part of the structure.
 - 4. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85 percent or whenever surface temperature is less than 5° F above dew point of ambient air.
 - 5. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly-painted surfaces.
 - 6. No more surface preparation than can be coated in a normal working day shall be permitted.
 - 7. No coating shall be applied before the prepared surfaces are approved by the Engineer.
- B. Concrete and Masonry: All surfaces shall be cleaned of all dust, mortar splatter, curing compounds, grease and other foreign matter. Prepare concrete surfaces per SSPC-

SP13, ICRI 310.2 with the appropriate concrete surface profile (CSP) as suggested by the coatings manufacturer. Surface preparation shall conform to the following table:

| CONCRETE AND MASONRY SURFACE PREPARATION | |
|--|---|
| Designation | Description |
| CM-1 | Solvent Cleaning: Solvent cleaning is a method for removing all visible oil, grease, soil, and other soluble contaminants. Low pressure (1500 – 4000 psi) high volume (3-5 gal/min) water washing with appropriate cleaning chemicals. |
| CM-2 | Acid Etch: Clean and etch with 10% muriatic acid solution, scrub thoroughly, neutralize acid, rinse thoroughly, and allow to dry. If curing compound has been used on concrete, clean curing compound off with solenoid prior to acid etching. |
| CM-3 | Abrasive Blasting |

- C. Metal: All surfaces shall be cleaned of all rust, scale, dust and other foreign matter. Sharp edges, burrs and weld spatter shall be removed. Surface preparation shall conform to the following table and shall be in accordance with the Steel Structures Painting Council (SSPC). Ductile Iron Pipe surface preparation requirements are detailed elsewhere.

| METAL SURFACE PREPARATION | |
|---------------------------|--|
| Designation | Description |
| SSPC-SP1 | Solvent Cleaning: Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Low-pressure (1500 - 4000 psi) high volume (3 - 5 gal/min.) water washing with appropriate cleaning chemicals is a recognized "solvent cleaning" method. All surfaces should be cleaned per this specification prior to using hand tools or blast equipment. |
| SSPC-SP2 | Hand Tool Cleaning: Hand Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that this process remove adherent mill scale, rust and paint. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before hand-tool cleaning, remove visible oil, grease, soluble welding residues and salts by the methods outlined in SSPC-SP1. |
| SSPC-SP3 | Power Tool Cleaning: Power Tool Cleaning removes all loose mill scale, loose rust and other detrimental foreign matter. It is not intended that this process remove adherent mill scale, rust and paint. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife. Before power tool cleaning, remove visible oil, grease, soluble welding residues and salts by the methods outlined in SSPC-SP1. |

| METAL SURFACE PREPARATION | |
|----------------------------------|--|
| Designation | Description |
| SSPC-SP5 | White Metal Blast Cleaning: A White Metal Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods. |
| SSPC-SP6 | Commercial Blast Cleaning: A Commercial Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter, except for staining. Staining shall be limited to no more than 33% of each square inch of surface area and may consist of light shadows, slight streaks or minor discoloration caused by stains of rust, stains of mill scale or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods. |
| SSPC-SP7 | Brush-Off Blast Cleaning: A Brush-Off Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust and loose paint. Tightly adherent mill scale, rust and paint may remain on the surface. Mill scale, rust and coating are considered adherent if they cannot be removed by lifting with a dull putty knife after abrasive blast cleaning has been performed. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods. |
| SSPC-SP10 | Near-White Blast Cleaning: A Near-White Blast Cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products and other foreign matter, except for staining. Staining shall be limited to no more than 5 percent of each square inch of surface area and may consist of light shadows, slight streaks or minor discoloration caused by stains of rust, stains of mill scale or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1 or other agreed upon methods. |
| SSPC-SP11 | Power Tool Cleaning to Bare Metal: Metallic surfaces that are prepared according to this specification, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxide corrosion products and other foreign matter. Slight residues of rust and paint may be left in the lower portions of pits if the original surface is pitted. Prior to power tool surface preparation, remove visible deposits of oil or grease by any of the methods specified in SSPC-SP1, Solvent Cleaning, or other agreed upon methods. |
| SSPC-SP13 | Surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems. |
| SSPC-SP16 | Brush-Off Blast Cleaning of Non-Ferrous Metals SP 16 is intended for brush-off blast cleaning of coated or uncoated metal surfaces other than carbon steel prior to the application of a protective coating system. Surface preparation using this standard is intended to roughen and clean coated and uncoated non-ferrous metal substrates, including, but not limited to, galvanized surfaces, stainless steel, copper, aluminum, and brass. SP 16 requires the cleaned surface to be free of loose contaminants and loose coating as determined by visual inspection. A minimum surface profile of 19 micrometers (0.75 mil) on the bare metal surface is required. Intact coatings are required to be roughened to the degree specified in the project specification. |

- D. Wood: Wood surfaces shall be thoroughly cleaned and free of all foreign matter. Surface preparation shall conform to the following table:

| WOOD SURFACE PREPARATION | |
|--------------------------|--|
| Designation | Description |
| W-1 | Clean with mineral spirits, scraping or wire-brushing. Properly fill cracks, nail holes and other defects. Wipe clean of dust. |

- E. PVC Pipe: PVC pipe shall be clean and dry. Surface preparation shall conform to the following table:

| PVC PIPE SURFACE PREPARATION | |
|------------------------------|--|
| Designation | Description |
| P-1 | Sand lightly and wipe clean with xylol or toluol solvent. Allow to dry completely. |

- F. Ductile Iron Pipe and Fittings: Prepare per Prepare per NAPF 500-03.

- A. Per 500-03-01:

- a. Solvent cleansing is a method which shall result in the surface being free of all oil, small deposits of asphalt paint, grease, soil, drawing and cutting compounds and other soluble contaminants from iron surfaces. It is intended that solvent cleaning, when necessary, be used prior to the application of special coating/lining and in conjunction with surface preparation methods specified for the removal of rust, annealing oxide, or mold coating.

- B. Per 500-03-02:

- a. Hand tool cleaning is a method of preparing iron surfaces by the use of non-power hand tools which shall result in the surface being free of all loose annealing oxide, loose rust, loose mold coating and other loose detrimental foreign matter. It is not intended that adherent annealing oxide, mold coating and rust be removed by this process. Annealing oxide, mold coating, and rust are considered adherent if they cannot be removed by lifting with a dull putty knife. All asphalt paint must be removed prior to hand tool cleaning.

- C. Per 500-03-03:

- a. Power tool cleaning is a method of preparing iron surfaces by the use of power assisted hand tools which shall result in the surface being free of all loose annealing oxide, loose rust, loose mold coating and other loose detrimental foreign matter. It is not intended that adherent annealing oxide, mold coating and rust be removed by this process. Annealing oxide, mold coating, and rust are considered adherent if they cannot be

removed by lifting with a dull putty knife. All asphalt paint must be removed prior to power tool cleaning.

D. Per 500-03-04:

- a. Abrasive Blast Cleaning – **External** Pipe Surfaces is a method of preparing the exterior of ductile iron pipe surfaces which, when viewed without magnification, shall result in the surface being free of all visible dirt, dust, loose annealing oxide, loose rust, loose mold coating and other foreign matter. All oils, small deposits of asphalt paint and grease shall have been removed by solvent cleaning (see NAPF 500-03-01). After the entire surface to be coated is struck by the blast media, tightly adherent annealing oxide, mold coating and rust staining may remain on the surface provided they cannot be removed by lifting with a dull putty knife.
- b. Abrasive Blast Cleaning - **Internal** Pipe Surfaces is a method of preparing the interior of ductile iron pipe surfaces which, when viewed without magnification, shall result in the surface being free of all visible dirt, dust, loose annealing oxide, loose rust, loose mold coating and other foreign matter. Internal pipe surface preparation requirements shall be specified by the pipe manufacturer or pipe fabricator as well as the lining manufacturer and shall be based upon testing of a specific lining applied to ductile iron pipe exposed to a specific environment.

E. Per 500-03-05:

- a. Abrasive Blast Cleaning - Cast Ductile Iron Fittings. Internal and External Surfaces is a method of repairing the interior and exterior of cast ductile iron fittings surfaces which, when viewed without magnification, shall result in the surface being free of all visible dirt, dust, loose annealing oxide, loose rust, loose mold coating and other foreign matter. All oils, small deposits of asphalt paint and grease shall have been removed by solvent cleaning (see NAPF 500-03-01). Four degrees of abrasive blast cleaning for fittings are available, depending on the type of service for which the fitting is intended and upon the type of coating/lining specified.

3.3 APPLICATION

A. General

1. The application of all coatings shall be in strict accordance with the Manufacturer's Instructions and shall be performed in a manner satisfactory to the Engineer. Painting shall be done at such times as the Contractor and Engineer may agree upon in order that dust-free and neat work be obtained.

2. On metal surfaces, each coat shall be applied at the rate specified by the Manufacturer to achieve the dry mil thickness specified herein. If material has thickened or must be diluted for application by spray gun, the coating shall be built up to the same film thickness achieved with undiluted material. Deficiencies in film thickness shall be corrected by the application of additional coats of paint.
3. On masonry or wood, application rates will vary according to surface texture; however, in no case shall the Manufacturer's stated coverage rate be exceeded. On porous surfaces, it shall be the Contractor's responsibility to achieve a protective and decorative finish, either by decreasing the coverage rate or by applying additional coats of paint.
4. Additional coats of paint shall not be applied until the preceding coat has dried as evidenced by tests with a moisture meter. Drying time shall be construed to mean an interval under normal conditions and shall be increased to allow for adverse weather or drying conditions.
5. Thinning, when required, shall be done in strict accordance with the Manufacturer's recommendations using the Manufacturer's thinner, or that recommended by the Manufacturer, with knowledge and approval of the Engineer.
6. Use skilled craftsmen and experienced supervision.
7. Apply coating to produce an even film of uniform thickness. Give special attention to edges, corners, crevices, and joints. Ensure thorough cleaning and an adequate thickness of coating material. Apply coatings to produce finished surfaces free from runs, drips, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Effect complete hiding so that the addition of another coat would not increase the hiding. Give special attention to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas. Apply a brushed stripe coat to all edges and welds after priming submerged or severe service areas.
8. Coordinate cleaning and coating so that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.
9. Prime surfaces within 12 hours after they are blasted. Re-blast surfaces that have started to rust before they are painted.
10. No paint shall be applied in fog, snow, rain, or to wet or damp surfaces or when air temperatures are below 40° F.
11. Surface temperature shall be at least 5° F above the dew point during final surface preparation and painting.
12. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
13. Coat units or surfaces to be bolted together or joined closely to structures or to one another prior to assembly or installation.

14. On pipelines, terminate coatings along pipe runs to 1 inch inside pipe penetrations.
15. Keep paint materials sealed when not in use.
16. Where more than one coat of a material is applied within a given system, alternate color to provide a visual reference that the required number of coats have been applied.
17. The Contractor shall be responsible for ensuring that the shop prime coating is compatible with the finish coating. Materials and application as specified herein shall govern regardless of whether coatings are factory-applied or field-applied. After installation, any damaged areas in prime or finish coatings shall be repaired as directed by the Engineer.

B. Stripe Coating

1. Stripe coat all field welds, edges, angles, fasteners, and other irregular surfaces.
2. Stripe coat shall consist of one coat, brush applied, to the coating thickness specified.
3. Apply stripe coat between primer and intermediate coats.
4. Stripe coat color shall contrast with prime coat to allow visual verification of application.

3.4 FACTORY-APPLIED COATINGS AND TOUCH-UP

- A. Except where factory or shop application of finish coatings is permitted elsewhere in these Specifications, or by the Engineer in writing, all items shall be finish-painted after installation with the color selected or approved by the Engineer. Shop priming shall be permitted in all cases. The Contractor shall be responsible for insuring that the shop prime coating is compatible with the finish coating. Materials and application as specified herein shall govern regardless of whether coatings are factory-applied or field-applied. After installation, any damaged areas in prime or finish coatings shall be repaired as directed by the Engineer.

3.5 INSPECTION

- A. Do not apply additional coats until completed coat has been inspected and approved by the Engineer. Only inspected and approved coats of paint shall be considered in determining the number of coats applied.

3.6 CLEANUP

- A. Prevent accidental spilling of paint materials and, in the event of such a spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill, and wash the surfaces to their original, undamaged condition.

- B. Upon completion of painting, visually inspect all surfaces and remove all paint and traces of paint from surfaces not specified to be painted.

3.7 QUALITY CONTROL TESTING

- A. Contractor shall perform and document quality control testing as specified for each coating system.
 - 1. Level 1 – Minimum required QC test requirements for all painting and coating:
 - a. Weather conditions – every 4 hours
 - b. Ambient temperatures – every 4 hours
 - c. Surface temperature – every 4 hours
 - d. Wet film thickness – every ½ hour
 - e. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges. DFT's shall be measured in accordance with SSPC-PA2.
 - 2. Level 2 – Testing requirements in addition to Level 1 requirements:
 - a. Continuous ambient temperature (recording thermometer)
 - b. Relative humidity – every 4 hours
 - c. Dew point – every 4 hours
 - d. Compressed air cleanliness – prior to using compressed air for abrasive blast cleaning, blowing down the surfaces, and painting with conventional spray, the Contractor shall verify that the compressed air is free of moisture and oil contamination according to the requirements of ASTM D4285. The tests shall be conducted at least one time each shift for each compressor system in operation. If air contamination is evident, the Contractor shall change filters, clean traps, add moisture separators or filters, or make other adjustments as necessary to achieve clean, dry air. The Contractor shall also examine the work performed since the last acceptable test for evidence of defects or contamination caused by the compressed air. Affected work shall be repaired at the Contractor's expense.
 - e. Blast pressure at nozzle – every 4 hours
 - f. Visual standard for abrasive blast cleaning
 - g. Surface profile – every 4 hours

- h. Surface pH of concrete surfaces
 - i. Dry film thickness with magnetic dry film thickness gauge
 - j. Holiday testing by high voltage discontinuity (spark) testing – entire surface
- B. Where specifically noted, Contractor shall perform adhesion testing per ASTM D4541 – 17. Pass/fail test pressure, curing conditions required prior to testing, and test location(s) shall be per the coating system manufacturer.
- C. Where specifically noted, contractor to perform adhesion testing per ASTM D 3359-17. Curing conditions required prior to testing shall be per coating system manufacturer. Engineer shall witness adhesion testing and contractor shall submit testing report. For Test Method A-X – cut Tape Test of ASTM D 3359-17, only tests resulting in a SA rating are acceptable, and considered as passing. For Test Method B – Cross-cut Tape Test of ASTM D 3359-17, only tests resulting in a 5B rating are acceptable, and considered as passing.

3.8 PIPING COLOR CODE AND IDENTIFICATION

- A. General:
- 1. Unless required otherwise by the Engineer, all exposed process and building piping and accessories shall be identified and painted as specified herein and in conformance with this specification.
 - 2. The following piping materials need not be painted with the basic identification color except for colored bands.
 - a. Stainless steel
 - b. chrome-plated piping
 - c. Interior HDPE Chemical Piping
 - d. Interior PVC/CPVC Chemical Piping
 - 3. Where piping is to be identified with colored bands, a three-band system shall be used. The background color, as identified on the pipe schedule, shall appear in the left and right-most bands, with the secondary color located in the center.
 - 4. PVC Piping that extends to the exterior of buildings/structures (i.e., exposed to UV/sunlight) shall be painted completely. Submit to coordinate color with process identification and architectural elements.
 - 5. The entire exposed surface of all other piping and accessories shall be painted according to the color codes indicated in the pipe schedule.
- B. Identification Labels:

1. Identify all exposed piping and all piping on each side of each valve; on each side of a branch; on both sides and adjacent to each wall and floor penetrations and not more than 15 feet on center.
2. All chemical piping shall be identified a minimum of two (2) times in each interior room.
3. Identification Tag Requirements:
 - a. Name of service as shown on Plans
 - b. Flow direction arrows
 - c. Position identification so that it is readily visible from eye level.
 - d. Block letters neatly stenciled on the finished insulation or pipe with flat black or white enamel contrasting the background pipe color. Label/Text size shall be as noted below. In some instances, as an alternative to painting of identification, an adhesive decal pipe identification system may be approved upon review by the Engineer. Contractor shall submit product information for review by Owner and Engineer as an alternative to painted identification.

| SIZE OF LETTERS / ARROWS | |
|---|-------------------------------------|
| Outside Diameter of Pipe or Covering | Height of Stencil Letter |
| ¾" to 1¼" | ½" |
| 1½" to 2" | ¾" |
| 2½" to 6" | 1¼" |
| 8" to 10" | 2½" |
| Over 10" | 3½" |

3.9 COATING SYSTEMS

A. **Architectural Finishes Including:** (see Section 09910 Architectural Paints and Coatings):

1. NA

- B. **General:** Surface preparation, prime coatings and finish coatings for the various surfaces and items to be painted are specified below. Prime coatings shall be contrasting but complimentary to finish coat.

Table 1: Coating System Application Area Descriptions, includes general descriptions of a systems and a corresponding letter (for example: "A") to be the designator throughout the rest of the document. Table 2: Applicable Manufacturer Products, includes approved manufacturers and materials for each system. The following pages each correspond to a single system (for example: "A") and include some details that are necessary for installation. There is also a section labelled Notes at the bottom of each page. These notes can include requirements and reviews of how the systems have performed.

Table 1: Coating System Application Area Descriptions

| COATING SYSTEM APPLICATION AREA DESCRIPTIONS | |
|---|---|
| System A-1 | <p>Exterior Metal and Piping, Non-Submerged (unless specified elsewhere) Includes, but not limited to, machinery, structural steel beams, columns, bracing, open web steel bar joists, and ancillary structural elements, pumps, pipe hangers, ductile iron pipe, cast iron pipe, galvanized steel pipe, copper pipe, fabrications, PVC pipe, and electrical conduit; <u>excludes others specifically noted or specified elsewhere</u>. "Non-submerged" is defined as those items located one (1) foot or more above the maximum water level.</p> |
| System B-1 | <p>Interior Metal and Piping (unless specified elsewhere) Includes, but not limited to, machinery, pumps, pipe hangers, ductile iron pipe, cast iron pipe, galvanized steel pipe, steel pipe, copper pipe, fabrications, PVC pipe, and electrical conduit; <u>excludes others specifically noted or specified elsewhere</u>.</p> |
| System B-2 | <p>Interior Structural Components (unless specified elsewhere) Includes, but not limited to, structural steel beams, columns, bracing, open web steel bar joists, and ancillary structural elements; <u>excludes others specifically noted or specified elsewhere</u>. SEE NOTES 1, 2 and 3 in System B-2</p> |
| System C-1 | <p>Submerged and Intermittently Submerged Metal (unless specified elsewhere) "Submerged" is defined as all items below one (1) foot above the maximum water level, including submerged elements. Also includes all metal surfaces, structural steel, and metal fabrications in proximity noted above.</p> |
| System D-1 | <p>Metal, Concrete Encased (unless specified elsewhere) All metal surfaces, encased in concrete, such as pipes, wall pipes, thimbles, pipe sleeves, gate guides. Excludes reinforcing steel, stainless steel, and galvanized metals.</p> |
| System D-2 | <p>Aluminum in Contact with Concrete (unless specified elsewhere)</p> |

Table 2: Applicable Manufacturer Products

| System Designation | Manufacturer | Filler | Primer Coat(s) | Stripe Coat(s) | Intermediate Coat(s) | Finish Coat(s) |
|---------------------------|---------------------|---------------|-----------------------|-----------------------|-----------------------------|-----------------------|
| A-1 | Sherwin-Williams | N/A | Corothane I Mio-Zinc | Macropoxy 5500LT | Macropoxy 5500LT | Acrolon Ultra |
| | Tnemec | N/A | Series 1 | Series 66 | N/A | Series 73 |
| | | | Omnithane | | | |
| B-1 | Sherwin-Williams | N/A | Corothane I Mio-Zinc | Macropoxy 5500LT | Macropoxy 5500LT | Macropoxy 5500LT |
| | Tnemec | N/A | Series 1 | Series 66 | N/A | Series 66 |
| | | | Omnithane | | | |
| B-2 | Sherwin-Williams | N/A | Shercryl 1300 | Shercryl HPA | N/A | Shercryl HPA |
| | Tnemec | N/A | 115 Unibond | Series 1029 | N/A | Series 1029 |
| C-1 | Sherwin-Williams | N/A | N/A | Macropoxy 5500LT | Sher-Glass FF | Sher-Glass FF |
| | Tnemec | N/A | Series 1 | Series 66 | N/A | Series 69 |
| | | | Omnithane | | | |
| D-1 | Sherwin-Williams | N/A | Macropoxy 5500LT | N/A | N/A | Macropoxy 5500LT |
| | Tnemec | N/A | N/A | N/A | N/A | Series 69 |
| D-2 | Sherwin-Williams | N/A | Macropoxy 5500LT | N/A | N/A | Macropoxy 5500LT |
| | Tnemec | N/A | Series 66 | N/A | N/A | Series N69 |

The following pages include the System Application Data Sheets and their corresponding details.

System: A-1

| | TNEMEC | SHERWIN-WILLIAMS |
|--|---|---|
| Surface Preparation: | <ol style="list-style-type: none"> 1. Bare Metal (Steel). SSPC-SP6 or as approved by the Engineer 2. Primed Metal (Ductile or Cast Iron). SSPC-SP1 and SSPC-SP7 (or SP3) 3. PVC per this specification | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> • Modified Aromatic Polyurethane | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Intermediate Coat: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Generic Type Finish: | <ul style="list-style-type: none"> • Acrylic Polyurethane | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> • Per Manufacturer recommendations | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Surface/Filler: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Primer Thickness: | <ul style="list-style-type: none"> • 3.0 to 4.0 MDFT | <ul style="list-style-type: none"> • N/A |
| Intermediate Coat Thickness: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • 4.0 to 6.0 MDFT |
| Finish Coat Thickness: | <ul style="list-style-type: none"> • 2.0 to 5.0 MDFT | <ul style="list-style-type: none"> • 2.0 to 3.0 MDFT |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> • Stripe coat shall be used as necessary to insure proper dry film thickness and a pin-hole free surface. | <ul style="list-style-type: none"> • Same as Tnemec |
| Surface/Filler Thickness: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Quality Control: | <ul style="list-style-type: none"> • Level 1 and 2 | <ul style="list-style-type: none"> • Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> • Three (3) Years. At the completion of the work, stencil the date on the structure/machine in 2-inch-high capital letters containing the following wording: "PAINTED (insert month and year in which painting was completed)". | <ul style="list-style-type: none"> • Same as Tnemec |

Notes:

System: B-1

| | TNEMEC | SHERWIN-WILLIAMS |
|--|---|---|
| Surface Preparation: | <ol style="list-style-type: none"> 1. Bare Metal (Steel). SSPC-SP6 2. Primed Metal (Ductile or Cast Iron). SSPC-SP1 and SSPC-SP7 (or SP3) 3. Galvanized Metal. SSPC-SP1 and SSPC-SP3 4. PVC. P-1 | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> • Modified Aromatic Polyurethane | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Intermediate Coat: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Generic Type Finish Coat: | <ul style="list-style-type: none"> • Polyamide epoxy | <ul style="list-style-type: none"> • Polyamidoamine |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> • Polyamide epoxy | <ul style="list-style-type: none"> • Polyamidoamine |
| Generic Type Surface/Filler: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Primer Thickness: | <ul style="list-style-type: none"> • 3.0 to 4.0 MDFT | <ul style="list-style-type: none"> • |
| Intermediate Coat Thickness: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • 3.0 to 4.0 MDFT |
| Finish Coat Thickness: | <ul style="list-style-type: none"> • 3.0 to 4.0 MDFT | <ul style="list-style-type: none"> • Same as Tnemec |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> • 3.0 to 4.0 MDFT. Stripe coat shall be used as necessary to insure proper dry film thickness and a pin-hole free surface as necessary. | <ul style="list-style-type: none"> • Same as Tnemec |
| Surface/Filler Thickness: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Quality Control: | <ul style="list-style-type: none"> • Level 1 and 2 | <ul style="list-style-type: none"> • Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> • Three (3) Years. At the completion of the work, stencil the date on the structure/machine in 2-inch-high capital letters containing the following wording: "PAINTED (insert month and year in which painting was completed)". | <ul style="list-style-type: none"> • Same as Tnemec |

Notes:

1. All bituminous coated metals shall be sealed prior to the application of the prime coat to prevent bleeding. Sealer shall be compatible with other coatings.
2. Fabrications and elements that are not Factory Shop-Coated in conformance with this specification with Primer, Stripe and Finish Coats shall be prepared and field coated (or shop coated) per this specification prior to erection on-site. Following erection of structural steel elements, coatings shall be touched-up in the field to repair damaged areas per this specification.

System: B-2

| | TNEMEC | SHERWIN-WILLIAMS |
|----------------------------------|---|--|
| Surface Preparation: | <ol style="list-style-type: none"> 1. Bare Metal: SSPC-SP6 2. Primed Metal SSPC-SP7 | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> • Self-crosslinking Hydrophobic Acrylic | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Finish Coat: | <ul style="list-style-type: none"> • HDP Acrylic Polymer | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> • HDP Acrylic Polymer | <ul style="list-style-type: none"> • Same as Tnemec |
| Primer Thickness: | <ul style="list-style-type: none"> • 2 to 4 MDFT | <ul style="list-style-type: none"> • Same as Tnemec |
| Finish Coat Thickness: | <ul style="list-style-type: none"> • 2 to 4 MDFT | <ul style="list-style-type: none"> • Same as Tnemec |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> • 2 to 4 MDFT Stripe coat shall be used to ensure proper coverage on all edges. | <ul style="list-style-type: none"> • Same as Tnemec |
| Quality Control: | <ul style="list-style-type: none"> • Level 1 and Level 2 | <ul style="list-style-type: none"> • Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> • Three (3) Years. At the completion of the work, stencil the date on the structure/machine in 2-inch-high capital letters containing the following wording: "PAINTED (insert month and year in which painting was completed)". | <ul style="list-style-type: none"> • Same as Tnemec |

Notes:

1. All bituminous coated metals shall be sealed prior to the application of the prime coat to prevent bleeding. Sealer shall be compatible with other coatings.
2. STRUCTURAL STEEL fabrications and elements that are not Factory Shop-Coated in conformance with this specification with Primer, Stripe and Finish Coats shall be prepared and field coated (or shop coated) per this specification prior to erection on-site. Following erection of structural steel elements, coatings shall be touched-up in the field to repair damaged areas per this specification.
3. Bar joist factory hold priming and dip priming shall not be considered in conformance with this specification and shall be removed and re-coated per these specifications on-site or at Contractors facility.

System: C-1

| | TNEMEC | SHERWIN-WILLIAMS |
|-------------------------------------|---|--|
| Surface Preparation: | <ol style="list-style-type: none"> 1. Bare Metal. SSPC-SP10 2. Primed Metal. SSPC-SP1 and SSPC-SP3, scarify the surface | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> • Modified Aromatic Polyurethane | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Finish Coat: | <ul style="list-style-type: none"> • Polyamidoamine Epoxy | <ul style="list-style-type: none"> • Polyamidoamine |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> • Polyamide Epoxy | <ul style="list-style-type: none"> • Same as Tnemec |
| Generic Type Surface/Filler: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Primer Thickness: | <ul style="list-style-type: none"> • 3.0 to 5.0 MDFT | <ul style="list-style-type: none"> • Same as Tnemec |
| Finish Coat Thickness: | <ul style="list-style-type: none"> • Two (2) coats, 8.0 to 10.0 MDFT/coat | <ul style="list-style-type: none"> • Same as Tnemec |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> • Stripe coat shall be used as necessary to insure proper dry film thickness and a pin-hole free surface. | <ul style="list-style-type: none"> • Same as Tnemec |
| Surface/Filler Thickness: | <ul style="list-style-type: none"> • N/A | <ul style="list-style-type: none"> • N/A |
| Quality Control: | <ul style="list-style-type: none"> • Level 1 and 2 | <ul style="list-style-type: none"> • Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> • Three (3) Years. At the completion of the work, stencil the date on the structure/machine in 2-inch-high capital letters containing the following wording: "PAINTED (insert month and year in which painting was completed)". | <ul style="list-style-type: none"> • Same as Tnemec |

SECTION 09900 - 27

HIGH-PERFORMANCE COATINGS

System: D-1

| | TNEMEC | SHERWIN-WILLIAMS |
|--|---|--|
| Surface Preparation: | <ul style="list-style-type: none"> Bare Metal (Steel). SSPC-SP6 | <ul style="list-style-type: none"> Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Generic Type Intermediate Coat: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Generic Type Finish Coat: | <ul style="list-style-type: none"> Polyamidoamine Epoxy | <ul style="list-style-type: none"> Same as Tnemec |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> Polyamidoamine Epoxy | <ul style="list-style-type: none"> Same as Tnemec |
| Generic Type Surface/Filler: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Primer Thickness: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Intermediate Coat Thickness: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Finish Coat Thickness: | <ul style="list-style-type: none"> Two (2) coats, 8.0 to 10.0 MDFT/coat | <ul style="list-style-type: none"> Same as Tnemec |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> Stripe coat shall be used as necessary to insure proper dry film thickness and a pin-hole free surface. | <ul style="list-style-type: none"> Same as Tnemec |
| Surface/Filler Thickness: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Quality Control: | <ul style="list-style-type: none"> Level 1 and 2 | <ul style="list-style-type: none"> Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> None | <ul style="list-style-type: none"> Same as Tnemec |

System: D-2

| | TNEMEC | SHERWIN-WILLIAMS |
|--|---|--|
| Surface Preparation: | <ul style="list-style-type: none"> SSPC-SP1 and SSPC-SP16 (Scarify, degloss and provide 1 mil profile) | <ul style="list-style-type: none"> Same as Tnemec |
| Generic Type Primer: | <ul style="list-style-type: none"> Polyamide Epoxy | <ul style="list-style-type: none"> Polyamidoamine |
| Generic Type Intermediate Coat: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Generic Type Finish Coat: | <ul style="list-style-type: none"> Polyamidoamine Epoxy | <ul style="list-style-type: none"> Same as Tnemec |
| Generic Type Stripe Coat: | <ul style="list-style-type: none"> Polyamide Epoxy | <ul style="list-style-type: none"> Polyamidoamine |
| Generic Type Surface/Filler: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Primer Thickness: | <ul style="list-style-type: none"> 3-5 MDFT | <ul style="list-style-type: none"> Same as Tnemec |
| Intermediate Coat Thickness: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Finish Coat Thickness: | <ul style="list-style-type: none"> 6 to 8 MDFT | <ul style="list-style-type: none"> Same as Tnemec |
| Stripe Coat Thickness: | <ul style="list-style-type: none"> Stripe coat shall be used to insure proper coverage on all sharp edges. | <ul style="list-style-type: none"> Same as Tnemec |
| Surface/Filler Thickness: | <ul style="list-style-type: none"> N/A | <ul style="list-style-type: none"> N/A |
| Quality Control: | <ul style="list-style-type: none"> Level 1 | <ul style="list-style-type: none"> Same as Tnemec |
| Extended Warranty: | <ul style="list-style-type: none"> None | <ul style="list-style-type: none"> Same as Tnemec |

END OF SECTION

Paint Inspection: Daily Coating Inspection Report

Project/Client: _____
 Location: _____
 Description: _____
 Requirements: _____
 Contractor: _____

Date: / / M T W Th F S Su Pg. Of
 Project #: _____ COPY To:
 Inspector: _____ QC Mgr Owner
 Contr _____
 Attachments:
 DFT Sheet NCR/CAR

 Spec # _____ Revision # _____

Description of Areas & Work Performed

Hold Point Inspections Performed

1 Pre Surface Prep/Condition & Cleanliness
 2 Surface Preparation Monitoring
 3 Post Surface Preparation/Cleanliness & Profile
 4 Pre Application Prep/Surface Cleanliness
 5 Application Monitoring/Wet Film Thickness (WFT)
 6 Post Application/Application Defects
 7 Post Cure/Dry Film Thickness (DFT)
 8 Nonconformance/Corrective Actions Follow-up
 9 Final Inspection

Approved By: _____

Surface Conditions

New Maint Primer/Paint Age/Dry/Cure _____
 Steel Galvanize Concrete Other _____
 Hazard _____ Sample Report # _____
 Degree of contamination: _____
 Test: Cl _____ $\mu\text{g}/\text{cm}^2$ / ppm Fe _____ ppm pH _____
 Degree of Corrosion: _____
 Scale Pitting/Holes Crevices Sharp Edges
 Weld _____ Moisture Oils Other _____
 Painted Surface Condition: _____
 Dry to: Touch Handle Recoat
 Dry/Over Spray Runs/Sags Pinholes Holidays
 Abrasion Fall Out Other _____

Ambient Conditions

| | | | | |
|---|---|---|---|---|
| Time (Indicate AM or PM) | : | : | : | : |
| Dry Bulb Temp ^o (C/F) | : | : | : | : |
| Wet Bulb Temp ^o (C/F) | : | : | : | : |
| % Relative Humidity | % | % | % | % |
| Surface Temp ^o (C/F) Min/Max | / | / | / | / |
| Dew Point Temp ^o (C/F) | : | : | : | : |
| Wind Direction/Speed | : | : | : | : |
| Weather Conditions: | : | : | : | : |

Surface Preparation

Start Time: _____ Finish Time: _____ Est Sq/ft: _____
 Solvent Clean Hand Tool Power Tool
 HP Wash PSI _____ Other _____
 Abrasive Blast Abrasive Type _____ Sample
 Blast Hose Size _____ Nozzle Size / PSI _____
 Air Supply CFM _____ Air Supply Cleanliness
 Water/Oil Trap Check Equipment Condition Check

Application

Start Time : _____ Finish Time : _____ Est. Sq/ft. _____
 Primer Intermediate Topcoat Touch-up
 Generic Type: _____ Qty Mixed: _____
 Manuf.: _____ Mix Ratio: _____
 Prod Name: _____ Mix Method: _____
 Prod #: _____ Strain/Screen: _____
 Color: _____ Material Temp: _____ ^oF
 Kit Sz/Cond.: _____ Sweat-in Time: _____ Min/Hrs
 Shelf Life: _____ Pot Life: _____ Min/Hrs

Surface Cleanliness & Profile Measurement

Job Specification SSPC/NACE - SP- _____
 SSPC/NACE Spec / Visual Stds _____
 Profile Check: _____ Disc Tape Gauge
 Specified _____ mils avg. / Achieved _____ mils
 Surface effect on DFT Gauge/BMR _____ mils

Batch #'s

(A) _____ Reducer #: _____
 (B) _____ Qty Added: _____ Pt/Oz/Gal
 (C) _____ % by Vol: _____ %
 Specified WFT Avg: _____ Mils
 Achieved WFT Avg: _____ Mils

Reducer: _____
 Airless/Conv. Spray Brush Roller Other _____

Pump Pot _____ Hose Dia. _____ Air Check _____
 Ratio/Size _____ Hose Lng. _____ SEP/Trap _____
 GPM/CFM _____ Spray Gun _____ Filter _____
 PSI _____ Tip Sz. _____ Agitator _____

Dry Film Thickness

| Gage Type / Model | Gage Serial # | Gage Calib. Verified | Spec Avg. DFT | Total Avg DFT | DFT Last Coat | DFT This Coat |
|-------------------|---------------|----------------------|---------------|---------------|---------------|---------------|
| | | | | | | |
| | | | | | | |

Inspector's Signature _____ Date _____



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**SECTION 11000
GENERAL REQUIREMENTS FOR EQUIPMENT**

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Scope: This section specifies general requirements which are applicable to all mechanical equipment. Division 15 - Mechanical and Division 16 - Electrical, (electrical equipment provided with mechanical equipment) also specify general requirements for mechanical equipment. The Contractor is responsible for insuring that all mechanical equipment meets the requirements of those sections in addition to the specific requirements of the individual equipment specification section. In the event of a discrepancy between the minimum requirements of this section and the individual equipment specification, the more stringent requirements shall take precedence.
- B. This specification applies to all equipment specified in Divisions 11 through 15.
- C. Equipment Lists: Equipment lists presented in these Specifications are included for the convenience of the Contractor and may not represent a complete and precise listing of all equipment, devices, and material to be provided under this Contract. The Contractor agrees to rely upon his own material and equipment takeoff lists as necessary to meet the requirements of the Contract Documents.
- D. All equipment and appurtenances shall be rated for the area classification assigned to the location in which they will be installed.

1.2 RELATED SECTIONS

Section 01025 – Measurement and Payment
Section 01300 – Submittals
Section 01400 – Quality Control
Section 01650 – Starting of Systems
Section 01730 – Operation and Maintenance Data
Section 03300 – Cast-in-place Concrete
Section 09900 – High Performance Coatings
Section 11000 – General Requirements for Equipment
Section 15060 – Process Pipe and Pipe Fittings
Section 15100 – Hydraulic Process Valves
Section 15111 – Aluminum Slide Gates
Division 16 – Electrical

1.3 QUALITY ASSURANCE

- A. Arrangement: The arrangement of equipment on the Drawings is based upon information available to the Owner at the time of design and is not intended to show exact dimensions peculiar to a specific manufacturer. The Drawings are, in part, diagrammatic, and some

features of the illustrated equipment installation may require revision to meet actual equipment installation requirements. Structural supports, foundations, connected piping and valves, electrical and instrument equipment connections shown may have to be altered to accommodate the equipment provided. No additional payment will be made for such revisions and alterations. Substantiating calculations and drawings shall be submitted prior to beginning the work.

B. References: This section contains references to the following documents (the most current version shall apply). They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the most restrictive requirements shall prevail.

| Reference | Title |
|----------------|---|
| ABMA Std 9 | Load Ratings and Fatigue Life for Ball Bearings |
| ABMA Std 11-78 | Load Ratings and Fatigue Life for Roller Bearings |
| ANSI B1.1 | Unified Inch Screw Threads |
| ASME B1.20.1 | Pipe Threads, General Purpose (Inch) |
| ASME B16.1 | Grey Iron Pipe Flanges and Flanged Fittings, Classes 25, 125 and 250 |
| ASME B18.2.1 | Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series) |
| ASME B18.2.2 | Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series) |
| ASME B31.3 | Process Piping Guide |
| NFPA 70 | National Electrical Code (NEC) |
| NFPA 820 | Standard for Fire Protection in Wastewater Treatment and Collection Facilities |
| IBC | International Building Code |
| UPC | Uniform Plumbing Code |
| UMC | Uniform Mechanical Code |

1. All applicable Federal, State, and local codes shall apply.

C. Unit Responsibility: Equipment systems made up of two or more components shall be provided as a unit by the responsible manufacturer. The responsible manufacturer shall select all components of the system to assure compatibility, ease of construction and efficient maintenance. The responsible manufacturer shall coordinate selection and design of all system components such that all equipment furnished and/or provided under the specification for the equipment system, including equipment specified elsewhere but referenced in the specification, is compatible and operates properly to achieve the performance requirements specified. Unless otherwise specified, the responsible manufacturer shall be the manufacturer of the driven equipment. Agents, representatives or other entities who are not a direct component of the manufacturing corporation will not be acceptable as a substitute for the manufacturer's corporation in meeting this requirement. This requirement for unit responsibility shall in no way relieve the Contractor of his responsibility to the Engineer for performance of all systems. Contractor is responsible to the Owner for testing and guarantee of all systems.

- D. Identification of Listed Products: Electrical equipment and materials shall be listed for the purpose for which they are to serve, by an independent testing laboratory. Three such organizations are Underwriters Laboratories (UL), Canadian Standards Association (CSA), and Electrical Testing Laboratories (ETL). Independent testing laboratory shall be acceptable to the inspection authority having jurisdiction. 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 a special inspection at the manufacturer's place of assembly. All costs and expenses incurred for such inspections shall be included in the original contract price.
- E. Factory Tests: Where specified in the individual product specification section, factory tests shall be performed at the place of fabrication and performed upon completion of manufacture or assembly. Factory tests shall be included in the original contract price.

1.4 FIELD TESTING

- A. Equipment testing and plant startup in accordance with Section 01650 are requisite to satisfactory completion of the Contract and, therefore, shall be completed within the Contract time. Except where otherwise provided, all work specified in this section shall be performed at no additional cost to the Owner.
- B. Where specified in the individual product specification section, the Contractor shall provide the services of an experienced and authorized representative of the manufacturer or supplier who shall visit the site of the work and inspect, check, adjust if necessary, and approve the equipment installation. The representative shall inspect and verify location of anchor bolts, placement, leveling, alignment, field erection of equipment, and controls operation. The representative shall make all necessary adjustments and settings to the controls to achieve proper sequence of operation as intended by the design. In each case, the Contractor shall arrange to have the equipment supplier's representative re-visit the job site as often as necessary until any and all trouble is corrected, and the equipment installation and operation are satisfactory to the Engineer.
- C. The Contractor shall require that each equipment supplier's representative furnish/provide to the Engineer a written report addressed to the Owner certifying that the equipment has been properly installed and lubricated, is in accurate alignment, is free from any undue stress imposed by connecting piping or anchor bolts, and has been operated satisfactorily under full-load conditions.
- D. The Contractor shall be responsible for scheduling all operations testing. The Contractor is advised that the Engineer and the Owner's operating personnel will witness operations testing and that the equipment supplier's representative shall be required to instruct the Owner's operating personnel in correct operation and maintenance procedures. Such instruction shall be scheduled at a time arranged with the Owner at least two (2) weeks in advance, and shall be provided while the respective representative's equipment is fully operational. On-site instruction shall be given by qualified persons who have been made familiar in advance with the equipment and systems in the plant. The Contractor shall have previously furnished/provided the technical manuals required under Section 01300 and

01730. The Contractor shall notify the Engineer at least three (3) days in advance of each equipment test.

- E. The Contractor shall furnish/provide all personnel, chemicals, fuel, oil, grease and all other necessary equipment, facilities and services required for conducting the tests.
- F. Perform the following field-testing services for all pump systems.
 - 1. The manufacturer's representative shall analyze the complete pump and piping system and recommend such supports and modifications as necessary to eliminate harmonics and vibration in the system when operated over the operational speed range. Pump bases and foundations, as well as piping and supports as shown on the plans shall be modified and enlarged as necessary to provide adequate support and vibration control.
 - 2. The installed pumping units shall operate without excessive vibration. Balance of rotating parts shall be maintained throughout the pumps rated performance curve, which will include shut-off points. Vibration amplitude shall not exceed Hydraulic Institute limits, at any operating point along pump curve. If requested by Engineer, Contractor shall provide for an independent vibration analysis at no cost to the Owner to verify vibration requirements are met. Contractor shall be responsible to make required adjustments to ensure vibration is less than the maximum allowable amount. Excessive vibration will be defined as that which exceeds the limits outlined by the Hydraulic Institute for this type of pump.
 - 3. Perform hydraulic testing for each pump verifying performance on the pump curve. Data shall include flow measurement and discharge pressure at 3 different operation points for each pump. Data shall also include voltage, amperage, and motor speed for each pump taken at each of the recorded operating points.

1.5 SUBMITTALS

- A. Submittals shall be made as described in this section and as may be supplemented for each equipment item or group of related equipment items. Submittals shall be in accordance with Section 01300 and shall identify the equipment by the number listed in the specification section, manufacturer and type designation.
- B. Product data submittals including the following:
 - 1. Descriptive literature, brochures, and/or catalogs of the equipment.
 - 2. Motor characteristics and performance information.
 - 3. Gear reducer data, including service factor, efficiency, torque rating, and materials, as applicable
 - 4. Parts list, including a list of recommended spare parts.
 - 5. Control philosophy provided in both written and schematic form.
 - 6. Compliance with electrical area classification requirements for all equipment and appurtenances.

7. Anchor bolt sizing and seismic restraint calculations per this Specification; and as required in individual equipment submittals.
- C. Shop drawing submittals, including the following:
1. Manufacturer's installation drawings showing equipment dimensions, weights, materials of construction and assembly, and lifting points.
 2. Elevation of main operator control station showing panel mounted devices. Provide details of power distribution and full load current draw of panel. Provide list of all terminations required to receive inputs or transmit inputs to the main control panel.
 3. Marked-up specification and Contract Document P&IDs indicating conformance or exception.
 4. Wiring and schematic diagrams.
 5. Nameplate data of each electric motor.
 6. Failure to include all drawings applicable to the equipment specified in this section will result in rejection of the entire submittal with no further review.
- D. Quality Assurance/Control Submittals
1. Submit a copy of the equipment specification section, with addendum updates included, with each paragraph clearly-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. If deviations from the specifications are indicated and, therefore requested by the Contractor, the submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy of the marked-up specification sections, along with justification for any requested deviations to the specification requirements, with the submittal shall be cause for rejection of the entire submittal with no further consideration. The Owner retains the right to reject any proposed deviations in favor of this specification, as written.
 2. Design Data, Test Reports: Submit equipment testing reports, per this section. Submit proposed testing procedures and protocol.
 3. Submit manufacturer's shop test reports of electrical and control panels prior to shipment of equipment.
 4. Qualification statements
 5. Installation reference list
 6. Manufacturer's installation instructions
 7. Recommendations for short- and long-term storage
 8. A copy of manufacturer's field reports

- E. Closeout Submittals
 - 1. Operations and Maintenance Manual per Section 01730.
 - 2. Provide written copies of manufacturer's warranties on products described in this specification section.

1.6 PROTECTION DURING SHIPMENT

- A. Shipping: Equipment shall be shipped in sealed, weathertight, enclosed conveyances and protected against damaging stresses during transport.

Bearing housings shall be wrapped or otherwise sealed to prevent contamination by grit and dirt; and ventilation and other types of openings shall be taped closed.

Damage shall be corrected to conform to the requirements of the Contract before the assembly is incorporated into the work. The Contractor shall bear the costs arising out of dismantling, inspection, repair and reassembly.

- B. Factory Applied Coatings: Each item of equipment shall be shipped to the site of the work with either the manufacturer's shop-applied prime coating or shop-applied finish coating. Manufacturer's shop-applied prime coating shall be compatible with the field-applied finish coating. The prime coating shall be applied over clean dry surfaces in accordance with the paint manufacturer's recommendations. The prime coating will serve as a base for field-applied finish coats. All factory finishes shall be approved by the Engineer. Non-approved finishes shall be painted as specified in Section 09900.

PART 2 PRODUCTS

2.1 FLANGES AND PIPE THREADS

- A. Flanges on equipment and appurtenances provided under this section shall conform in dimensions and drilling to ANSI B16.1, Class 125. Pipe threads shall conform in dimension and limits of size to ANSI B1.1, coarse thread series, Class 2 fit. Threaded flanges shall have a standard taper pipe thread conforming to ANSI B1.20.1. Unless otherwise specified, flanges shall be flat faced. Flange assembly bolts shall be heavy pattern, hexagonal head, carbon steel machine bolts with heavy pattern, hot pressed, hexagonal nuts conforming to ANSI B18.2.1 and B18.2.2. Threads shall be Unified Screw Threads, Standard Coarse Thread Series, Class 2A and 2B, ANSI B1.1.

2.2 BEARINGS

- A. Unless otherwise specified, equipment bearings shall be oil or grease lubricated, ball- or roller-type, designed to withstand the stresses of the service specified. Each bearing shall be rated in accordance with the latest revisions of AFBMA Methods of Evaluating Load Ratings of Ball and Roller Bearings. Unless otherwise specified, equipment bearings shall have a minimum L-10 rating life of 50,000 hours. The rating life shall be determined using the maximum equipment operating speed.

- B. Grease lubricated bearings, except those specified to be factory sealed and lubricated, shall be fitted with easily accessible grease supply, flush, drain and relief fittings. Extension tubes shall be used when necessary. Grease supply fittings shall be standard hydraulic alemite-type.
- C. Oil lubricated bearings shall be equipped with either a pressure lubricating system or a separate oil reservoir-type system. Each oil lubrication system shall be of sufficient size to safely absorb the heat energy normally generated in the bearing under a maximum ambient temperature of 60° C and shall be equipped with a filler pipe and an external level indicator gauge.

2.3 V-BELT ASSEMBLIES

- A. V-belt assemblies shall be Dodge Dyna-V belts with matching Dyna-V sheaves and Dodge Taper-lock bushings, Wood's Ultra V-belts with matching Ultra-V sheaves and Wood's Sure-Grip bushings, or equal. Where stationary control variable pitch sheaves are specified, they shall be dry lubricated, and shall have locking collars to clamp all movable parts securely in place to eliminate relative motion between sheave parts. The sheaves shall be adjustable only when the unit is stopped and the sheaves are unloaded.

Sheaves and bushings shall be statically balanced. Additionally, sheaves and bushings which operate at a peripheral speed of more than 5500 feet per minute shall be dynamically balanced. Sheaves shall be separately mounted on their bushings by means of three pull-up grab or cap tightening screws. Bushings shall be key seated to the drive shaft.

Belts shall be selected for not less than 150% of rated driver horsepower and, where two sheaves sized are specified, shall be capable of operating with either set of sheaves. Belts shall be of the antistatic-type where explosion-proof equipment is specified.

2.4 SEALS

- A. Mechanical: Unless otherwise specified, rotating shafts shall be provided with mechanical seals and stuffing boxes tapped for flushing seal faces. Seals shall be factory installed. Seals shall be internal, single or double as specified, and unbalanced, except balanced seals shall be provided when shaft speed is greater than 3600 rpm for variable speed pumps, or when pressures are greater than shown in the following. Mechanical seals for variable speed pump applications shall be specifically designed to accommodate shaft deflection incurred under specified operating conditions.

| Limits for Unbalanced Seals | | |
|------------------------------------|--------------------------|--------------------------------|
| Seal Inside Diameter (in) | Shaft Speed (rpm) | Sealing Pressure (psig) |
| <2 to 2 | Up to 1800 | 100 |
| | 1801 to 3600 | 50 |
| Over 2 to 4 | Up to 1800 | 50 |
| | 1801 to 3600 | 25 |

Single unbalanced seals shall be Crane 8-1, Durametallic RO, or equal. Single balanced seals shall be Chesterton 880, Crane 8B-1, or equal. Double seals shall be Chesterton 241, Durametallic RO/RD, or equal.

To maintain the necessary minimum or maximum pressure across the seal faces, spring pressure shall be uniformly distributed to the sealing faces by a coil spring or multiple springs. The rotating seal element shall be clamped to the shaft and provided with an O-ring seal. The stationary seal element shall be sealed with O-ring or gasket material.

Seal faces shall be either tungsten carbide, carbon, silicon carbide or ceramic. Elastomeric materials shall be Viton. Metal parts shall be Type 316 stainless steel.

- B. Shaft Packing: Where shaft packing is specified, stuffing boxes shall be tapped to permit introduction of seal liquid and shall hold a minimum of five rows of packing. Unless otherwise specified, lantern rings shall be bronze, packing shall be die-molded packing rings of non-asbestos material suitable for the intended service and as recommended by the manufacturer, and glands shall be bronze, two-piece split construction. Lantern rings shall be of two-piece construction and shall be provided with tapped holes to facilitate removal. Lantern rings shall be drilled and tapped 3 NC-20. Threaded lantern ring removal tools shall be provided with spare parts for each pump.

2.5 COUPLINGS

- A. Unless otherwise specified in the particular equipment sections, equipment with a driver greater than 2 HP, and where the input shaft of a driven unit is directly connected to the output shaft of the driver, shall have its two shafts connected by a flexible coupling which can accommodate angular misalignment, parallel misalignment and end float, and which cushions shock loads and dampens torsional vibrations. The flexible member shall consist of a tire with synthetic tension members bonded together in rubber. The flexible member shall be attached to flanges by means of clamping rings and cap screws, and the flanges shall be attached to the stub shaft by means of taperlock bushings which shall give the equivalent of a shrunk-on fit. There shall be no metal-to-metal contact between the driver and the driven unit. Each coupling shall be sized and provided as recommended by the coupling manufacturer for the specific application, considering horsepower, speed of rotation and type of service. Contractor shall provide a mill-wright for final alignment of equipment and couplings once installed on-site.
- B. Where torque or horsepower capacities of couplings of the foregoing type is exceeded, Thomas-Rex, Falk Steel Flex, or equal, couplings will be acceptable, provided they are sized in accordance with the equipment manufacturer's recommendations and sizing data are submitted. They shall be installed in conformance to the coupling manufacturer's instructions. Contractor shall provide a mill-wright for final alignment of equipment and couplings once installed on-site.

2.6 GUARDS

- A. Exposed moving parts shall be provided with guards which meet the requirements of OSHA. Guards shall be fabricated of 14-gauge steel, 1/2-13-15 expanded metal screen to provide visual inspection of moving parts without removal of the guard. Guards shall be

galvanized after fabrication and shall be designed to be readily removable to facilitate maintenance of moving parts. Reinforced holes shall be provided. Provisions shall be made to extend lube fittings through guards.

2.8 PRESSURE TAPS, TEST PLUGS AND GAUGES

- A. Pressure taps shall be provided on the suction and discharge sides of pumps, blowers and compressors. Pressure and vacuum test plugs and gauges shall be provided where specified. Test plugs and gauges shall be as specified in Division 15.

2.9 EQUIPMENT SIGNAGE

A. Bridge Cranes, Jib Cranes and Hoists

1. Every bridge crane or jib crane shall be provided with a sign indicating the lifting capacity in pounds or tons with the words "Lifting Capacity".
2. Every hoist shall have a lifting capacity painted on the hoist in 3-inch-high letters.

B. Equipment and Instrument Nametags

1. A stainless steel plate shall be attached to all equipment with lettering embossed into the plate. Lettering shall be the equipment number in the contract documents.
Method of attachment shall be as recommended by the signage supplier.
2. Large equipment may have lettering stenciled directly onto the equipment, in letter size and color determined by the ENGINEER. Furnish the proposed wording to the ENGINEER for approval.
3. All components within a packaged equipment system, including valves, instruments, and motors, shall be physically tagged with a 1½-inch- diameter minimum stainless steel tag. Each tag shall be keyed to a valve, instrument, or equipment schedule designating the function and location of the item. The number and letters shall be on block-type, ¼" high, and stamped thereon.

- C. Valve and Gate Nametags: Each valve and gate shall be provided with a 1½-inch-diameter minimum stainless steel tag. Each tag shall be keyed to a valve schedule designating the function and location of the valve or gate. For exposed valves and gates, the tags shall be attached to the operator with key rings so that the tag cannot be removed. For buried valves, permanently attached SST valve designator to valve box interior with sheet metal screw, and 1/8" SST cable and crimp ferrules. Cable length shall allow tag to be pulled completely out of the valve box for reading. The number and letters shall be on block-type, ¼" high, and stamped thereon. The valve and gate numbers shall be provided by the Engineer during construction.

2.10 LUBRICANTS

- A. The Contractor shall provide for each item of mechanical equipment a supply of the lubricant required for the commissioning period. Lubricants shall be of the type

recommended by the equipment manufacturer and shall be products of the Owner's current lubricant supplier. The Contractor shall limit the various types of lubricants by consolidating them, with the equipment manufacturer's approval, into the least number of different types. Not less than ninety (90) days before the date shown in his construction schedule for starting, testing and adjusting equipment, the Contractor shall provide the Owner with three (3) copies of a list showing the required lubricants, after consolidation, for each item of mechanical equipment. The list shall show estimated quantity of lubricant needed for a full year's operation, assuming the equipment will be operating continuously.

2.11 PRODUCT DATA

- A. Information shall be provided for each item of equipment as specified under individual specification sections. This information shall be identified by the equipment number listed in the Specifications and Drawings.

2.12 SPARE PARTS

- A. Spare parts, wherever required by detailed specification sections, shall be stored in accordance with the provisions of this paragraph. Spare parts shall be tagged by project equipment number and identified as to part number, equipment manufacturer and subassembly component (if appropriate). Spare parts subject to deterioration, such as ferrous metal items and electrical components, shall be properly protected by lubricants or desiccants and encapsulated in hermetically sealed plastic wrapping. The quality of protection shall be equal to that required for shipment overseas and storage in humid, tropical climates. Spare parts with individual weights less than 50 pounds and dimensions less than 2 feet wide, 18 inches high, and 3 feet in length shall be stored in a heavy wooden box with a hinged wooden cover. Hinges shall be heavy-duty strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words "spare parts." A neatly typed inventory of spare parts shall be taped to the underside of the cover.

A.13 ANCHOR BOLTS

- A. Anchor bolts shall be designed for lateral forces for both pullout and shear for all equipment items.
- B. Manufacturer shall perform and submit calculations for anchor bolts and seismic restraint for their equipment and shall be signed and sealed by a Registered Structural Professional Engineer Licensed in the State of Idaho. Calculations shall be based upon local American Society of Civil Engineers (ASCE) 7 (current edition) considerations for seismic design criteria.
- C. Anchor Bolts: Provide stainless steel bolts complying with ASTM A 320, Type 316.

2.14 EQUIPMENT LIFTING PROVISIONS

- A. All equipment shall be equipped with a single point lifting bale/eye to allow picking of the equipment and/or motor combination from a single lifting point.

PART 3 EXECUTION

3.1 GENERAL

- A. Equipment shall be provided and tested within the tolerances recommended by the equipment manufacturer where indicated in the individual mechanical specification sections. Certain sections may also require that equipment additionally be installed and tested under the direction of installers who have been factory-trained by the equipment manufacturer. This requirement, however, shall not be construed as relieving the Contractor of his overall responsibility for this portion of the work.

END OF SECTION

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**SECTION 15850
REMOVABLE INSULATION SYSTEM FOR EQUIPMENT**

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This section specifies removable thermal insulation covers for screw conveyors.

1.2 RELATED SECTIONS

Section 01025 – Measurement and Payment
Section 01300 – Submittals
Section 01400 – Quality Control
Section 01650 – Starting of Systems
Section 01730 – Operation and Maintenance Data
Section 09900 – High Performance Coatings
Section 11000 - General Requirements for Equipment
Division 16 – Electrical

1.3 SUBMITTALS

- A. General: Submit in accordance with Section 01300.
- B. Product Data and Shop Drawings.

1.4 WARRANTY

- A. The insulation system will be covered by a non-prorated ten (10) year warranty against defects in materials and workmanship that shall include 100% parts and labor. This is in addition to the Contractors guarantee/warranty that shall be for a minimum period of one (1) year from substantial completion per the General Conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements within this section, manufacturers offering insulation products that may be incorporated in the work include, but are not limited to, the following:

**SECTION 15850 - 1 REMOVABLE INSULATION SYSTEM
FOR EQUIPMENT**

Hudson Bay Insulation, or approved equal
 Contact: Peter Bethmann 509-891-7110 or 509-891-4956
 11616 East Montgomery Drive, Suite 12 Spokane Valley, WA 99206

2.2 CONSTRUCTION

- A. Removable sections shall be no more than 5 feet in length.

2.3 INSULATING MATERIALS

- A. **Jacket and Liner:** Silicone-impregnated fiberglass fabric designed to provide resistance to flame, abrasion, flexing, tearing, puncture, and direct sunlight with the following characteristics:

| Characteristic | Method | English |
|------------------------|------------------------|---|
| Weight | ASTM-D-3776-96 | 17.5 OZ/SY ±10% |
| Thickness | ASTM-D-1777-96 | 0.018" ±.001" |
| Tensile Strength | ASTM-D-5034-95 | Warp – 300 lb/in Fill – 225 lb/in |
| Tear Strength | ASTM-D-5587-96 | Warp 0 50 lb Fill – 50 lb |
| Burst Strength | ASTM-D-3786-87 | 600 psi |
| Flame Resistance | FED 191/5903.2 | Char Length – 1/16 in max Afterglow – 1 sec max Flame Out – 1 sec max |
| Temperature Resistance | FED SPEC HHB-100B | Cold – 67°F Hot - +500°F |
| Base Fabric and Weave | Fiberglass/Satin Weave | |
| Color and Coating | Gray Silicone | |

- B. **Insulation:** Insulation shall conform to the requirements of Military Specification MIL-1-16411 Type II and Coast Guard Specification for Incombustible Materials #164.009 and MIL-I-24244:

| | |
|--------------------------|---|
| Thickness..... | 2-layer, each layer 1" thick |
| Type..... | L-5 Utilicore fiberglass insulation as manufactured by Owens Corning, or approved equal |
| Weight..... | 15 oz/SF |
| Density | 11 lb/CF |
| Service Temperature..... | Up to 1,200°F |

SECTION 15850 - 2 REMOVABLE INSULATION SYSTEM FOR EQUIPMENT

- C. **Fastening:** Insulation shall be fastened in place using 2-inch straps with Nomex Velcro, stainless steel D-rings, 3/16-inch braided Kevlar drawstrings, 12ga Stainless Steel Lace Hooks and Quilt Pins and sewn with Kevlar/SS thread.

PART 3 EXECUTION

3.1 MANUFACTURER'S SERVICES

- A. Provide field measuring services to accurately measure the equipment to be insulated.

END OF SECTION

**SECTION 15850 - 3 REMOVABLE INSULATION SYSTEM
FOR EQUIPMENT**

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**SECTION 15850 - 4 REMOVABLE INSULATION SYSTEM
FOR EQUIPMENT**

| | |
|--------------|--|
| DATE: | January 9, 2024 |
| CLIENT: | J-U-B Engineers, Inc. |
| PROJECT: | Post Falls WRF Biosolids Hopper Improvements |
| ENGINEER(S): | Matthew L Barker, P.E. |

| Section | Title |
|------------|--|
| 16012 | Electrical General |
| 16119 | Conductors and Cables |
| 16126 | Grounding and Bonding |
| 16129 | Hangers and Supports |
| 16133 | Raceways and Boxes |
| 16153 | Identifications for Electrical Systems |
| 16430 | Enclosed Switches and Circuit Breakers |
| 16670 | Electrical Testing |
| 16858 | Heat Trace |
| 16926 | Control Systems |
| APPENDIX A | LCP-SL Drawings |

The technical specification sections listed above have been prepared under the direction of the Professional Engineers, licensed in the State of Idaho, whose seals and signatures appear above:

1/9/24



Matthew L. Barker

**SECTION 260100
ELECTRICAL GENERAL**

RELATED DOCUMENTS

- PART 1 GENERAL
- 1.1 A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Reference Division 09 for Finishes including paints and coatings.

SUMMARY

- 1.2 A. This section covers general conditions and requirements of the electrical work.

DEFINITIONS

- 1.3 A. The words "plans" and "drawings" are used interchangeably in this specification and in all cases shall be interpreted to mean "drawings".
- B. The word "provide" shall be interpreted to mean furnish and install.
- C. "Owner" shall be City of Post Falls.
- D. "Contractor" is the party who furnishes and installs all tools, materials and equipment. This includes the Prime Contractor, the Electrical Contractor, Control System Integrator, and all other Contractors and Sub Contractors.
- E. "Control System Integrator" (CSI) also referred to as the System Integrator or Integrator is the Party that furnishes all control components and designs the detailed control wiring diagrams plus the layout and assembly of the custom control panels.
- 1.4 F. "Control System" includes all equipment, instruments and wiring for control and monitoring of all operating pumps and equipment. This includes custom control panels, motor control center, packaged control panels, and control equipment furnished with other systems and mechanical equipment. All sensing, transmitting, indicating, control and recording of all functions as specified and shown are also included in the control system.

SUBMITTAL REQUIREMENTS

- A. Submittals shall comply with the requirements of specification Section 01330 in addition to the requirements in this Section and other Division 16 Sections.
- B. The Contractor shall prepare and submit to the Engineer a Schedule of Submittals prior to the approval of material submittals. The Schedule of Submittals shall comprise a

comprehensive list of all submittals required to be submitted by the Contractor for the project and a rough outline of the days that those submittals will be received. The submittal schedule shall be organized by specification section and broken down into Action, Informational and Closeout submittals.

C. Shop Drawings and Samples:

Where required by these Specifications, the Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with Section 01330 and other Division 16 Sections. Each submittal will be identified as Engineer may require.

1.

Shop Drawings

- a.
 - 1) Shop drawings shall be submitted in electronic PDF format or physical copies on non-folded sheets no larger than 11"x17". PDF submittals shall be clear and legible. If submitting physical copies, submit number of copies specified in the respective specification section.
 - 2) Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 1.4.E.

b.

Samples

- 1)
 - 1) Submit number of Samples specified in the Specifications or as requested by the Engineer.
 - 2) Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require enabling Engineer to review the submittal for the limited purposes required by Paragraph 1.4.E.

- 2.
 - 1) Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineers review and approval of the pertinent submittal shall be at the sole expense and responsibility of Contractor.

D. Submittal Procedures

Before submitting each Submittal, Shop Drawing or Sample, Contractor shall have determined and verified the following:

All field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto.

a. The suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work.

b. All information relative to Contractor's responsibilities for means, methods, techniques, sequences, procedures of construction, and safety precautions and programs incident thereto.

c. Contractor has reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

d.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Submittal, Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be indicated both as a written communication separate from the Shop Drawing or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

4.

5. Provide cut sheets for all products with a Bill of Materials showing quantity, manufacturer, catalog number, and the supplier name and phone number and relevant spec. paragraph number. Number each item in the bill of materials and relate the bill of materials to the submitted product index.

6. Identify on the cut sheets the exact model number, including any options, and the intended use of each item. Identification shall be by tag number of the equipment as shown on the drawings or a description of where it will be used. Submittals that are not clear as to the intended use of each item it contains will be rejected.

a.

b. All Submittals and Shop Drawings shall be reviewed, signed and dated prior to Engineers review by:

c.

General Contractor.

Electrical Contractor.

Control System Integrator.

E. Engineer's Review

The Engineer will provide timely review of Submittals, Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 1.4.D.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 1.4.D.1.

F. Resubmittal Procedures

Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Submittals and Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

1.5

SUBMITTALS

1. A. Schedule of Submittals organized by specification section and including the following:
 2. Action, Informational and Closeout submittal subcategories for each specification section.
 3. Unique submittal number.
 4. Name of submittal.
 5. Anticipated date of submission.
 - Summary of submittal content.
- B. Project Schedule in Gantt chart format that outlines the project work tasks with duration, start and finish dates.

C. OPERATION AND MAINTENANCE MANUALS

The Contractor shall prepare and assemble detailed operation and maintenance manuals in accordance with the project general requirements and other requirements in Section 01782. The manuals shall be bound in a 3-ring binder and tabbed with an index, in general the O&M manual format shall meet that of the submittal data in Division 16 sections. The manuals shall include, but not be limited to, the following:

1.
 - Catalog data and complete parts list for all equipment and devices.
 - All cut sheets of equipment and components.
 - a. Preventative maintenance procedures
 - b. Trouble-shooting
 - c. Calibration
 - d. Testing
 - e. Replacement of components
 - f. Automatic mode operation
 - g. Manual mode operation
 - h. System schematics / shop drawings and record drawings.
 - i. As-built wiring diagrams of cabinet and enclosure contained assemblies
 - j. As-built wiring diagrams of overall system
 - k. Listing of recommended spare parts
 - l. Listing of recommended maintenance tools and equipment.

D. Operations and Maintenance Training Outline:

2. Submit Training Outlines once prior to conducting required training. Outlines shall be submitted at least two weeks in advance of conducting the required training.

Submit Training Outlines signed by each person instructed after the completion of the required training.

GENERAL WORK REQUIREMENTS

- 1.6
- A. The Contractor shall provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and these specifications.
 - B. Complete the wiring to, connection to, adjustment and calibration of, testing of equipment having electric motors and/or built-in or furnished electrical components. Install electrical components that are furnished with mechanical equipment.
 - C. Complete the procurement, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical devices, components, accessories and equipment which is not shown or specified but which is nonetheless required to make the systems shown and specified function properly.
 - D. The Contractor shall install and make all connections to the equipment furnished by the Owner.
 - E. Provide the size, type and rating of motor control devices, equipment and wiring necessary to match the ratings of motors furnished with mechanical equipment.
 - F. Provide adequate space for the electrical installation, including but not limited to, determination of access-ways and doorways, shipping sections, wall and floor space, and space occupied by mechanical equipment. Provide electrical equipment that fits in the areas shown on the drawings. All equipment shall be readily accessible for maintenance, shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.
 - G. Check electrical equipment prior to installation so that defective equipment is not installed. Acceptance testing for electrical equipment shall be performed as discussed in Sections 16670 and 16928.
 - H. Provide start-up, follow-up and training of the Owner's personnel for electrical systems. Make all corrective measures required during start-up. See specific requirements for training and start-up in other specification sections.
 - I. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up of operation of the equipment, and to correct any problems, which occur during start-up.
 - J. Provide circuit breakers, conduit, wire and installation for all items, which require 120 VAC power.
 - K. Contractor shall attend an On-Site pre-submittal meeting with the General Contractor, Electrical Contractor, Control Systems Integrator, Owner and Engineers prior to submittals.

PROJECT DESCRIPTION

- A. The project consists of installing four motor operated valves into an existing hopper system, relocation of a conveyor system and upgrading the conveyor heat trace system.
- 1.7 B. It is the intent of these documents to describe the work required to complete this project in sufficient detail to secure comparable bids. All parts or work not specifically mentioned which are necessary in order to provide a complete installation shall be included in the bid and shall conform to all Local, State and Federal requirements.
- C. Provide electrical upgrades, additions and modifications as indicated on the drawings.

PROJECT CONDITIONS

- 1.8 A. Do not install electrical or control equipment and hardware that are wet, moisture damaged, or mold damaged.
- B. Environmental Limitations: Do not deliver or install electrical distribution, motor control, control panels, and other electrical apparatus until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- C. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit work to be performed according to manufacturer's written instructions and warranty requirements.
- 1.9 D. Field Measurements: Verify actual dimensions of openings and available space by field measurements before fabrication.

AREA CLASSIFICATIONS

- A. The following classification of areas shall be used as a reference in determining application of material covered in Division 16 Sections unless specifically shown otherwise on the drawings. Areas which fall under two or more of the following classifications shall conform to the minimum requirements of all area classifications listed for that area. Hazardous area classifications shall be defined by NFPA 70, NFPA 1. 820 and the Area Classification plan sheets included in the Contract Documents.
- B. Hazardous Areas (reference area classification drawing):
 - 1. Sludge Loading building.
- C. Outdoor Wet and/or Damp Areas:
 - All outdoor areas.

D. Indoor Wet and/or Damp Areas:

None.

E. Corrosive Areas:

None.

1.
F. General Purpose Areas:

1. Sludge Loading area electrical room.

COORDINATION

1.
A. Equipment Coordination

1.10

The Contractor is responsible to coordinate the equipment supplied from various manufacturers. This includes but is not limited to:

1.
 - a. Obtaining specific information on equipment ratings and sizes and verifying the electrical components supplied meet, or match the requirements such as voltage, phase, frequency, starter types, etc.
 - b. Verifying the equipment supplied will fit within the space allocated.
 - c. Coordination of equipment and the electrical power and control requirements. Provided in all sections of the specifications and drawings.
 - d.
 - e. Providing power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.
2. Providing all necessary control wiring and components for any special requirements from an equipment manufacturer.
 - a.
 - b. The Contractor shall verify as a minimum:
 - c. Correct voltage, phase and frequency
 - d. Size and space requirements
 - e. Mounting requirements

Correct motor starter type

Proper coordination with the controls and control system Integrator.

Any discrepancies between the electrical and other equipment shall be brought to the immediate attention of the Engineer.

- The Contractor shall assure that no instrumentation or control interferences are created by the variable frequency controllers (VFC's) or load wiring. The Contractor shall coordinate with the VFC manufacturer to provide necessary separation of conductors or shielding and/or filtering equipment as required by the VFC manufacturer. If interferences do occur, the Contractor shall be responsible to take corrective action at no additional cost to the Owner.
- 3.
 - 4.

ELECTRICAL WORK SEQUENCE

- 1.11
- A. The Contractor shall submit a detailed plan for the Work, portions of which are listed herein, for general review and consideration by the Owner and Engineer. In all cases, operation of existing plant equipment and processes must be maintained to maintain compliance with the Owner's NPDES Permit.
 - B. Some work elements may be done simultaneously. Not all construction activities are noted. Coordinate construction schedule to incorporate the listed Major Work Elements items as a minimum.
 - C. Planned Outages:
 1. Contractor shall notify the Owner and Engineer in writing at least two weeks in advance of any requested planned outage, unless otherwise noted.
 2. The treatment plant manager, or designated representative, shall have the right to cancel or terminate an outage at no cost to the Owner when in his opinion the potential for a safety hazard or violation of the discharge permit exists. However, this does not relieve the Contractor of the responsibility to maintain a safe working environment and to maintain treatment plant operations.
 3. If requested by the Owner or Engineer, the Contractor shall send a representative to meet with plant and Engineer's staff to plan activities during the requested outage.
 4. Outages shall not be permitted on Fridays, weekends, or Holidays.
 5. Shutdowns shall not occur on consecutive days unless previously approved by the Engineer and accepted by the Owner.
 - D. Contractor's schedule shall include critical work elements generally noted herein and a sequence to:
 1. Ensure the availability of adequate electrical power.
 2. Always ensure the availability of water distribution system during the completion of this contract.

FINAL ACCEPTANCE

- 1.12
- A. Prior to final acceptance the Engineer will perform one or more site observation trips to develop a “punch list” of items deemed incomplete. The Electrical Contractor and Control System Integrator shall be present while these inspections are taking place and shall be available for opening cabinets and operating and adjusting the system as is necessary for the Engineer to verify all equipment is installed and operates to the requirements of the contract documents. The contractor shall anticipate a minimum of 16 hours to complete the final acceptance testing.
 - B. Prior to the Contractor calling for this observation, the Contractor shall have completed all items of work, including wire markers, nameplates, final tests and final test reports. All equipment shall be checked for proper operation and all signals verified for correct calibration and wiring.
 - C. Final acceptance will not be given until:
 - All work is complete.
 - 1. All punch-lists are checked off and returned to the Engineer.
 - 2. All test reports are received.
 - 3.
 - 4. All O&M manuals are received.
 - 5. All spare parts are received.
 - 6. All instrument test forms are received.
 - 7. All project record drawings are received.
 - D. Punch Lists
- 1.13
- Each punch list item shall be completed by the Contractor and checked off the punch list. When all items on the list are completed or commented on, the list shall be signed by the Contractor and returned to the Engineer for verification.

PROJECT RECORD DRAWINGS

- A. A set of drawings shall be maintained at the job site (by the Electrical Contractor) showing any deviations in the electrical systems from the original design.
- B. This set of drawings shall be readily available for inspection by the Engineer at all times. The Engineer will check the Red-Lined As-Built drawings after each project meeting.
- C. Another complete set of drawings shall be marked up in the office showing the changes made on the field set of drawings. All changes shall be clearly marked in red on the drawings. Drawings shall be submitted to the Engineer at the completion of the project.

- D. A set of electrical drawings marked in red to indicate the routing of conduit runs, shall be submitted to the Engineer for review at the completion of conduit rough-in and prior to cover or pouring of concrete.

GUARANTEE

- 1.14 A. The Contactor shall guarantee his work and all components thereof, excluding incandescent and fluorescent lamps for a period of 1 year from date of acceptance of installation. The Contractor shall remedy any defects in workmanship and repair or replace any faulty equipment that shall appear within the guarantee period without additional cost to the Owner.

CLEANUP

- 1.15 A. The premises must be kept free of accumulated materials, rubbish and debris at all times. Surplus material, tools and equipment must not be stored at the job site. At the completion of the job, all equipment and fixtures shall be left clean and in proper condition for their intended use.
- B. All motor control centers (MCC's), Panelboards, and control panels shall be cleaned inside and out at the completion of the project.

1.16 TESTS

- 1.17 A. Testing for installed feeder cables and motors is required as specified in Sections 16670, 16519, and 16555. Instrumentation devices and wiring shall be tested as specified in Sections 16670, 16523 and 16928. Test reports shall be submitted to the Engineer prior to final acceptance. All tests shall be performed in accordance with the applicable sections of NETA.

MAINTAINED OPERATION REQUIREMENTS

- 1.18 A. This is an existing and operating facility. The existing systems must remain operational during construction.

OPERATION AND MAINTENANCE TRAINING (OWNER INSTRUCTION)

- A. General:

- 1. The Contractor and appropriate factory-trained representatives shall instruct the Owner's representative in the proper operation and maintenance of all electrical and control systems, equipment, and shall explain all warranties.

- B. Training Agenda Outline:

Prior to instruction of Owner Personnel, the Contractor shall prepare a typed outline, listing the subjects that will be included in this instruction, and shall

submit the outline for review by the Engineer at least 2 weeks prior to the time of the training.

C. Training Requirements:

Training shall be provided per the specific requirements in other sections of these specifications. In addition to training required in other sections of the specifications, the Contractor shall conduct specifically organized training sessions in the overall operation and maintenance of the electrical and control system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in operations and maintenance of all components of the electrical system outside the training requirements in the other Sections.

1.

Training shall include, but not be limited to, the following:

- 2. Preventative maintenance procedures
 - a. Trouble-shooting
 - b. Calibration
 - c. Testing
 - d. Testing
 - e. Replacement of components
 - f. Equipment operation

3.

At a minimum, 1 training session, each at least 1 hours in duration, shall be conducted at the facility after start-up of the electrical and control systems. The Contractor shall prepare and assemble specific instruction materials for each training session and shall supply such materials to the Owner at least 2 weeks prior to the time of the training.

1.

D. Certification:

At the conclusion of the instruction period, the Contractor shall obtain the signature of each person being instructed on each copy of the approved training outline to signify that the personnel has a proper understanding of the operation and maintenance of the systems and resubmit the signed outlines.

1.

E. Other Requirements:

Refer to other Division 16 Sections for additional Operator Training requirements for specific pieces of equipment or specific systems.

The Contractor shall coordinate the Operator Training requirements listed above with the Owner Instruction requirements of Division 01.

DELIVERY, STORAGE, AND HANDLING

- 1.19
- A. Deliver equipment to the job site at the appropriate time for installation. Equipment items shall be crated or affixed to pallets with protective wrappings. Exercise care to prevent damage from handling. Store mechanical and electrical components and conductors off the ground in weathertight enclosures. Keep equipment and all electrical components dry at all times.
 - B. Conductors shall be protected from damage at all times.
 - Conductors shall not be in contact with Earth.
 - Conductors shall be protected from foot traffic.
 - 1. Any conductor deemed damaged by the engineer shall be replaced.
 - 2.
 - 3. Reference Division 1.

PART 2 PRODUCTS
NOT USED

2.1

PART 3 EXECUTION

3.1 NOT USED

END OF SECTION

**SECTION 16119
CONDUCTORS AND CABLES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Copper building wire rated 600 V or less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. RoHS: Restriction of Hazardous Substances.
- B. VFC: Variable-frequency controller.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.
- C. Qualification Data: For testing agency.
- D. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
- B. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

- C. Comply with NFPA 70.

PART 2 PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alpha Wire Company.
 - 2. American Bare Conductor.
 - 3. Belden Inc.
 - 4. Cerro Wire LLC.
 - 5. Encore Wire Corporation.
 - 6. General Cable Technologies Corporation.
 - 7. Okonite Company (The).
 - 8. Service Wire Co.
 - 9. Southwire Company.
 - 10. WESCO.
- C. Standards:
 - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 - 2. RoHS compliant.
 - 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 and ASTM B496 for stranded conductors.
- E. Conductor Insulation:
 - 1. Type THHN and Type THWN-2: Comply with UL 83 and NEMA WC 70.

2. Type XHHW and Type XHHW-2: Comply with UL 44 and NEMA WC 70.

2.2 CONTROL CONDUCTORS

- A. Conductors for discrete control devices shall be stranded copper Type THHN/THWN-2, complying with UL 83 in raceway.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. 3M Electrical Products.
 2. ABB (Electrification Products Division).
 3. Emerson Electric Co. (Automation Solutions - Appleton - O-Z/Gedney).
 4. ILSCO.
 5. NSi Industries LLC.
 6. Raychem.
- C. Mechanical Multi-Tap Connectors: Insulated mechanical tap connectors with removeable screw and port caps. ILSCO Nimbus PBTS series or approved equal.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
 1. Material: Copper.
 2. Type: Two hole with long barrels.
 3. Termination: Compression.
- E. Motor Terminal Splice Insulation
 1. Provide motor terminal splice insulation in the motor connection box that will withstand constant vibration and abrasion without degrading the insulation of the splice. A product shall be used that is specifically designed for the purpose of motor terminations.

2. For motor splices in general purpose areas use a bolted splice with a boot-type motor stub splice insulator with integral TY RAP cable ties. Thomas & Betts MSC series or equal. For splices using wire larger than 8 AWG, it is also acceptable to use a heat shrinkable motor stub splice connection kit, Raychem, MCK-V or equal.
3. For motors in outdoor, damp or corrosive environments, use a waterproof motor stub insulator, Thomas & Betts multi-splice insulator MSLT series or equal. For splices using wire larger than 8 AWG, it is also acceptable to use a heat shrinkable motor stub splice connection kit, Raychem, MCK-V series or equal.

PART 3 EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. Control Conductors: Copper Stranded.
- D. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- E. Feeders Installed below Raised Flooring: Type THHN/THWN-2, single conductors in raceway.
- F. Feeders in Cable Tray: Type THHN/THWN-2, single conductors in raceway.
- G. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- H. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

- I. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- J. Branch Circuits in Cable Tray: Type THHN/THWN-2, single conductors in raceway.
- K. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- L. Class 1 Control Circuits: Type THHN/THWN-2 in raceway.
- M. Class 2 Control Circuits: Type THHN/THWN-2 in raceway.
- N. VFC Output Circuits: Type XHHW-2 in metal conduit or Type TC-ER cable with braided shield as indicated on the Conduit and Wire Schedule.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 16133 "Raceways and Boxes" and Section 16143 "Underground Ducts and Raceways" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Support cables according to Section 16129 "Hangers and Supports."
- G. Conductor Spacing:
 - 1. Unless specifically shown otherwise on the drawings, in all areas maintain a minimum 2-inch separation between all conductors of different voltages. For parallel runs over 6 feet, maintain the following minimum separation between conductors:
 - a. Signal (12/24) VDC and 120 VAC – 6 inches
 - b. Signal (12/24) VDC and 480 VAC – 12 inches
 - c. 120 VAC control wire and 480 VAC – 2 inches

H. Wire Bending Radius:

1. The radius of bends in all wire (conductors and cables) shall not be less than five (5) times the outside diameter of the wire. Any wire installed with bends less than five times the diameter which the engineer deems has caused that insulation to be damaged shall be removed and new wire shall be installed.

3.4 CONNECTIONS

- 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-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
 1. Retain subparagraph below if aluminum conductors are specified.
 2. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors. Splices for aluminum conductors shall be compression type.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 16153 "Identification for Electrical Systems."

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections as specified in Section 16670 "Electrical Testing".

END OF SECTION

**SECTION 16126
GROUNDING AND BONDING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency and testing agency's field supervisor.
- C. Field quality-control reports.
- D. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.
- C. ANSI/IEEE Standard 142 Recommended for Practice for Grounding of Industrial and Commercial Power Systems.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. ABB (Electrification Products Division).
 2. Appleton - O-Z/Gedney; Emerson Electric Co., Automation Solutions.
 3. Burndy; Hubbell Incorporated, Construction and Energy.
 4. ILSCO.
 5. Siemens Industry, Inc., Energy Management Division.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
1. Solid Conductors: ASTM B3.
 2. Stranded Conductors: ASTM B8.
 3. Tinned Conductors: ASTM B33.
 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- K. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.
- L. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- M. Water Pipe Clamps:
 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Die-cast zinc alloy.
 - b. Listed for direct burial.
 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

PART 3 EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Grounding Conductors: Green-colored insulation with continuous yellow stripe.

- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
 - 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type

connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- C. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- D. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.4 LABELING

- A. Comply with requirements in Division 16 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections as specified in Section 16670 "Electrical Testing".

3.6 COORDINATION

- A. General: Coordinate installation of grounding connections for equipment with equipment installation work. Inspect grounding and bonding system conductors for tightness and proper installation.
- B. Connections: Use exothermic welds or irreversible compression products for connecting bonding and grounding conductors to ground rods, to counterpoise, structural steel, piping systems, and elsewhere where shown on Drawings. Provide all accessories required for a complete installation.

3.7 TESTING

- A. Perform tests and inspections as specified in Section 16670 "Electrical Testing".

END OF SECTION

**SECTION 16129
HANGERS AND SUPPORTS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel slotted support systems.
 - 2. Conduit and cable support devices.
 - 3. Support for conductors in vertical conduit.
 - 4. Structural steel for fabricated supports and restraints.
 - 5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
 - 6. Fabricated metal equipment support assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event."
 2. Component Importance Factor: 1.5.
 3. Component Amplification Factor: 2.5.
 4. Component Response Modification Factor: 6.0.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame Rating: Class 1.
 2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-diameter holes at a maximum of 8 inches on center in at least one surface.
1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. GS Metals Corp.
 - d. Thomas & Betts Corporation; A Member of the ABB Group.
 - e. Unistrut; Part of Atkore International.
 - f. Wesanco, Inc.
 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

3. Material for Channel, Fittings, and Accessories: Stainless steel, Type 316.
 4. Channel Width: Selected for applicable load criteria.
- B. Conduit and Cable Support Devices: Hot-dipped, malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
1. Clamps: Conduit clamps shall be hot-dipped, malleable-iron, one-hole straps with associated clamp backs.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded stainless-steel stud, for use in hardened Portland cement concrete, steel or wood with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.

- 3) Hilti, Inc.
 - 4) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325. Stainless steel.
 5. Toggle Bolts: All Stainless-steel springhead type.
 6. Hanger Rods: Threaded stainless-steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Sheet Metal for Instrumentation Racks: 6061-T6 aluminum alloy.
- C. Materials: Comply with requirements in Section 05500 "Metal Fabrications" for steel shapes and plates.

PART 3 EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA 1.
 2. NECA 102 for aluminum conduit installations.
 3. NECA 105 for metal cable tray systems.
 4. NECA 111 for nonmetallic cable tray systems.
- B. Support systems shall be applied as specified below for each respective area classification as defined in Section 16012 "Electrical General".
- C. Outdoor Areas:
 1. Stainless steel.

2. Threaded fastening hardware shall be stainless steel.
- D. Indoor Wet and/or Damp Areas:
1. Stainless.
 2. Threaded fastening hardware shall be stainless steel.
- E. Corrosive Areas:
1. Stainless steel or fiberglass unless otherwise indicated on the drawings. Where fiberglass is used it shall be installed with fasteners suitable for the purpose.
 2. Threaded fastening hardware shall be stainless steel.
- F. Hazardous Areas:
1. Threaded fastening hardware, rods, channels, clamps, brackets and other support systems shall be stainless steel.
- G. General Purpose Areas:
1. Hot-dipped galvanized steel or aluminum unless otherwise indicated on the drawings. Aluminum support systems shall not be installed in direct contact with concrete or masonry walls.
 2. Threaded fastening hardware, rods, channels, clamps, brackets and other support systems shall be stainless steel.
- H. Comply with requirements in Section 07841 "Through Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- I. Comply with requirements for raceways and boxes specified in Section 16133 "Raceways and Boxes."
- J. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- K. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
1. Secure raceways and cables to these supports with single-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, raceways may be supported by openings through structure members, according to NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lbs.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 05500 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Comply with requirements in Section 09912 "Exterior Painting", Section 09922 "Interior Painting" and Section 09960 "High-Performance Coatings" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A780.

END OF SECTION

**SECTION 16133
RACEWAYS AND BOXES**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Metal wireways and auxiliary gutters.
4. Nonmetal wireways and auxiliary gutters.
5. Surface raceways.
6. Boxes, enclosures, and cabinets.

B. Related Requirements:

1. Section 16012 "Electrical General" for area classifications.

1.3 DEFINITIONS

- A. ARC: Aluminum rigid conduit.
- B. GRC: Galvanized rigid steel conduit.
- C. IMC: Intermediate metal conduit.
- D. EMT: Electrical metaling tubing.
- E. FMC: Flexible metal conduit.
- F. LFMC: Liquid-tight flexible metal conduit.
- G. LFNC: Liquid-tight flexible nonmetallic conduit.
- H. RNC: Rigid nonmetallic conduit.

- I. RMC: Rigid metal conduit.
- J. RTRC: Reinforced thermosetting resin conduit (fiberglass).

1.4 SUBMITTALS

- A. Product Data: For raceways, surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:
 - 1. Structural members in paths of conduit groups with common supports.
 - 2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
- C. Seismic Qualification Data: Certificates, for enclosures, cabinets, and conduit racks and their mounting provisions, including those for internal components, from manufacturer.
 - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - 4. Detailed description of conduit support devices and interconnections on which the certification is based and their installation requirements.
- D. Source quality-control reports.

1.5 CONDUIT SCHEDULE

- A. Refer to conduit and wire schedule on plans for raceway sizing and routing descriptions.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
- B. Comply with NFPA 70.

PART 2 PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. Anamet Electrical, Inc.
 - d. Electri-Flex Company.
 - e. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - f. Southwire Company.
 - g. Thomas & Betts Corporation; A Member of the ABB Group.
 - h. Wheatland Tube Company.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. ARC: Comply with ANSI C80.5 and UL 6A.
5. IMC: Comply with ANSI C80.6 and UL 1242.
6. Coated Steel Conduit: PVC-coated GRC.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch, minimum.
7. EMT: Comply with ANSI C80.3 and UL 797.
8. FMC: Comply with UL 1; zinc-coated steel.
9. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. Anamet Electrical, Inc.
 - c. Electri-Flex Company.
 - d. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - e. Southwire Company.
 - f. Thomas & Betts Corporation; A Member of the ABB Group.
 - g. Wheatland Tube Company.
2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.
5. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
6. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
7. Expansion Fittings:
 - a. Hot dipped galvanized steel, complying with UL 514, rated for environmental conditions in areas where installed.
 - b. Exposed Runs: Expansion fittings shall be of the weatherproof type and shall be provided with an external bonding jumper. The expansion fittings shall allow for 4 inches of longitudinal movement and shall be designed so that when completely assembled the end of each conduit entering the fitting is bushed. O.Z. GEDNEY Type EX or approved equal.
 - c. Embedded runs: Expansion fittings shall be of the watertight and concrete-tight type and shall be provided with an internal bonding jumper. The expansion material shall be neoprene and shall allow for

0.75 inches of movement in any direction. Fittings shall be O.Z. GEDNEY Type DX.

8. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.
- C. Joint Compound for IMC, GRC or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Anamet Electrical, Inc.
 - c. Arnco Corporation.
 - d. CANTEX INC.
 - e. Condux International, Inc.
 - f. Electri-Flex Company.
 - g. Lamson & Sessions.
 - h. RACO; Hubbell.
 - i. Thomas & Betts Corporation; A Member of the ABB Group.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fiberglass (RTRC):
 - a. Comply with NEMA TC 14.
 - b. Comply with UL 2515 for aboveground raceways.
 - c. Comply with UL 2420 for belowground raceways.

4. ENT: Comply with NEMA TC 13 and UL 1653.
5. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
6. LFNC: Comply with UL 1660.
7. Rigid HDPE: Comply with UL 651A.
8. Continuous HDPE: Comply with UL 651A.
9. Coilable HDPE: Preassembled with conductors or cables, and complying with ASTM D3485.
10. RTRC: Comply with UL 2515A and NEMA TC 14.

B. Nonmetallic Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit; a part of Atkore International
 - b. Anamet Electrical, Inc.
 - c. CANTEX, INC.
 - d. Champion Fiberglass, Inc.
 - e. Electri-Flex Company.
 - f. Kraloy.
 - g. RACO; Hubbell.
 - h. Thomas & Betts Corporation; A Member of the ABB Group.
2. Fittings, General: Listed and labeled for type of conduit, location, and use.
3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
4. Fittings for LFNC: Comply with UL 514B.
5. Solvents and Adhesives: As recommended by conduit manufacturer.
6. Expansion Fittings:

- a. PVC, complying with UL 651, rated for environmental conditions where installed.
- b. Fittings shall be of two-piece rigid PVC construction with internal O-ring to prevent the entrance of water and provide watertight seal. Fittings shall provide a minimum of 4" of longitudinal expansion in straight runs.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. B-line, an Eaton business.
 2. Hoffman; a brand of nVent.
 3. Square D.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 12 unless otherwise indicated, and sized according to NFPA 70.
 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Crouse-Hinds, an Eaton business.
 2. EGS/Appleton Electric.
 3. Erickson Electrical Equipment Company.
 4. Hoffman; a brand of nVent.

5. Hubbell Incorporated.
 6. RACO; Hubbell.
 7. Spring City Electrical Manufacturing Company.
 8. Thomas & Betts Corporation; A Member of the ABB Group.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, aluminum, Type FS/FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb. (23 kg) shall be listed and marked for the maximum allowable weight.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- I. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- J. Gangable boxes are prohibited.
- K. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 12 with continuous-hinge cover with flush latch unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 2. Nonmetallic Enclosures: Plastic.
 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- L. Fittings and boxes in hazardous places shall be:
1. Rated for Class 1, Division 1 or 2 to match Area Classification and made from copper free aluminum.

2. Conduit fittings shall be rigid steel or PVC coated rigid steel. Seal fittings for hazardous areas shall be CROUSE HINDS EYE or EYSEF 40% fill.
 3. All metallic hardware (hinges, screws, bolts, etc.) shall be type 316 stainless steel.
- M. Fittings and Boxes in CORROSIVE AREAS:
1. Non-metallic or stainless steel for unclassified areas.
 2. PVC coated copper free aluminum for Class 1, Division 1 areas.
 3. Stainless steel or copper free aluminum for Class 1, Division 2 areas.
 4. All metallic hardware (hinges, screws, bolts, etc.) shall be type 316 stainless steel.

PART 3 EXECUTION

3.1 RACEWAY APPLICATION

- A. Raceways shall be applied as specified below for each respective area classification as defined in Section 16012 "Electrical General".
- B. Outdoor Areas:
1. Conduit entrances shall be threaded, and fittings shall have gasketed covers.
 2. Threaded fastening hardware and rods shall be stainless steel. Raceway supports such as channel, clamps and brackets shall be stainless steel.
 3. Exposed Conduit: GRC.
 4. Concealed Conduit, Aboveground: GRC.
 5. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 - a. Sweeps and risers for transition of PVC from below grade to above grade shall be GRC wrapped with corrosion resistant tape or RTRC.
 6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 7. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R stainless steel unless otherwise indicated.
- C. Indoor Wet and/or Damp Areas:

1. Conduit entrances shall be threaded, and fittings shall have gasketed covers.
 2. Threaded fastening hardware and rods shall be stainless steel. Raceway supports such as channel, clamps and brackets shall be stainless steel.
 3. Boxes and Enclosures: NEMA 250, Type 4X, stainless steel.
 4. Device boxes shall be cast, copper free aluminum.
 5. Exposed, Not Subject to Physical Damage: GRC
 6. Exposed, Not Subject to Severe Physical Damage: GRC
 7. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Areas below 6'0"
 - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 8. Concealed in Ceilings and Interior Walls and Partitions: EMT or RNC, Type EPC-40-PVC.
 9. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 10. Boxes and Enclosures: NEMA 250, Type 4X stainless steel.
- D. Corrosive Areas: Apply raceway products as specified below unless otherwise indicated.
1. Exposed Conduit: RNC, Type EPC-80-PVC.
 2. Concealed, Raceway: RNC, Type EPC-40-PVC.
 3. Raceway supports such as channel, clamps and brackets shall be stainless steel.
 4. Threaded fastening hardware and rods shall be stainless steel.
 5. Boxes and Enclosures: NEMA 250, Type 4X stainless steel or non-metallic unless otherwise indicated.
- E. Hazardous Areas:
1. Hazardous areas shall have electrical installations which conform to Class and Division as shown on the drawings or as defined by the NEC and NFPA 820.
 2. Provide seal fittings per NEC requirements.

3. Exposed Conduit: GRC
 4. Exposed Conduit in Corrosive and Hazardous Areas: PVC-coated rigid steel conduit.
 5. Boxes and Enclosures: Shall be determined by area requirements.
 6. Raceway Supports:
 - a. Threaded fastening hardware and rods shall be stainless steel. Raceway supports such as channel, clamps and brackets shall be stainless steel.
- F. General Purpose Areas:
1. Exposed Conduit: GRC or IMC.
 2. Conduit Concealed in Walls or Ceilings: For general purpose lighting and receptacle circuits, conduit may be EMT.
 3. Boxes and Enclosures: Exposed boxes shall be cast, copper free aluminum, type FS/FD. Concealed boxes may be NEMA 1. Boxes poured in concrete shall be cast.
- G. Minimum Raceway Size:
1. Aboveground: 3/4-inch trade size.
 2. Underground: 1-inch trade size.
- H. Raceway Fittings: Compatible with raceways and suitable for use in area classification and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
 3. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
 5. Conduits containing shielded drive cable: Where pulling points are required, provide junction boxes appropriate for the location and sized per the NEC to accommodate the bending radius of the installed cable.

- I. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- J. Motor feeders sourced from VFC's not utilizing shielded power cable shall be rigid metal conduit.
- K. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- L. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with requirements in Section 16129 "Hangers and Supports" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Conceal all general receptacle and lighting raceways within finished walls, ceilings and floors.
- G. Complete raceway installation before starting conductor installation.
- H. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- I. Install no more than the equivalent of three 90-degree bends in any conduit run. Support within 12 inches of changes in direction.
- J. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- K. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- L. Support conduit within 12 inches of enclosures to which attached.

- M. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- N. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- O. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- P. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch-trade size and insulated throat metal bushings on 1-1/2-inch-trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- Q. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- R. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- S. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- U. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- V. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.

5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- W. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- X. Expansion-Joint Fittings:
1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Y. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.

- 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
 - Z. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to bottom of box unless otherwise indicated.
 - AA. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
 - BB. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
 - CC. Locate boxes so that cover or plate will not span different building finishes.
 - DD. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
 - EE. Set metal floor boxes level and flush with finished floor surface.
 - FF. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- 3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL THROUGH PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 16144 "Sleeves and Sleeve Seals."
- 3.4 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07841 "Through Penetration Firestopping."
- 3.5 PROTECTION
- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.6 FIELD INSPECTION

- A. Prior to backfilling and encasing conduits installed underground or covering conduits concealed in walls and ceilings, all raceways shall be inspected by the Engineer. Engineer shall be contacted a minimum of one week in advance for field inspection of concealed raceway. No raceway shall be concealed or backfilled until inspected by the Engineer. Prior to the Engineer inspection, the conduits to be inspected shall bear some type of marking indicating what the conduit is, in relation to the conduit and wire schedule; the marking may be tape with writing or simply writing directly on the conduit. Marking the conduit is the Contractor's responsibility.

END OF SECTION

**SECTION 16153
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system

components used in identification signs and labels. Use same designations indicated on Drawings.

- D. Delegated-Design Submittal: For arc-flash hazard study.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Raceways Carrying Intrinsically Safe Circuits:
 - 1. Self-adhesive vinyl labels with the words "Intrinsic Safety Wiring" or approved equal. Labels shall be located as to be visible after installation and appear in every section of the raceway system that is separated by enclosures, walls, partitions or floors. Spacing of labels shall not exceed 25 feet.
- C. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - 1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.

2. Insulation on phase conductor sizes AWG No. 10 and smaller shall be colored, No. 8 AWG and larger may have black insulation with self-adhesive vinyl tape of the appropriate color from the table below.
 3. Insulation on the grounded conductor (neutral) sizes AWG No. 8 and smaller shall be colored, AWG No. 6 and larger may have black insulation with self-adhesive vinyl tape of white or gray in accordance with the table below.
- D. Color-Coding for Power and Control Conductors, 600V or Less: Wiring shall conform to the following color code. Colors specified in table below are those generally used for phase conductors at this voltage.

| Description | 208/120 | 120/240 | 480/277 | Control |
|------------------|---------|---------|---------|---------|
| Phase A (Left) | Black | Black | Brown | -- |
| Phase B (Center) | Red | Red | Orange | -- |
| Phase C (Right) | Blue | Blue | Yellow | -- |
| Neutral | White | White | Gray | White |
| Ground | Green | Green | Green | Green |
| 120V Control | -- | -- | -- | Red |
| DC Control (+) | -- | -- | -- | Blue |
| DC Control (-) | -- | -- | -- | Gray |
| External Source | -- | -- | -- | Orange |

- E. Raceways and Cables Carrying Circuits at More Than 600 V:
1. Black letters on an orange field.
 2. Legend: "DANGER - CONCEALED HIGH VOLTAGE WIRING."
- F. Warning Label Colors:
1. Identify system voltage with black letters on an orange background.
 2. Black letters on an orange background with black letters on a white background for the message panel.

- G. Warning labels and signs shall include, but are not limited to, the following legends:
1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES"
 3. Portable Generator Warning:
 - a. Separately Derived: "WARNING – FOR CONNECTION OF A SEPARATELY DERIVED (BONDED NEUTRAL) SYSTEM ONLY"
 - b. Non-separately Derived: "WARNING – FOR CONNECTION OF A NONSEPARATELY DERIVED (FLOATING NEUTRAL) SYSTEM ONLY"
 4. Grounding Warning for Standby Systems: "WARNING – SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THIS EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCE(S) IS ENERGIZED."
- H. Equipment Identification Labels:
1. White letters on a black field.

2.3 LABELS

- A. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather, chemical and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Graphic Products.
 2. Minimum Nominal Size:
 - a. 3-1/2 by 5 inches for equipment.
 - b. 4 by 6 inches for arc flash labels.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Panduit Corp.
 - c. Thomas & Betts.
 - d. HellermannTyton.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils thick by 1 to 2 inches wide; compounded for outdoor use.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Emedco.
 - d. Marking Services, Inc.
- C. Floor Marking Tape: 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Carlton Industries, LP.
 - b. Seton Identification Products.
 - c. Brady Corporation.
- D. Underground-Line Warning Tape:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Marking Services, Inc.
 - c. Seton Identification Products.
2. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
3. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.
 - b. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
 - c. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.
4. Tag:
 - a. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core; bright colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
 - b. Width: 3 inches.
 - c. Overall Thickness: 5 mils.
 - d. Foil Core Thickness: 0.35 mil.

- e. Weight: 28 lb./1000 sq. ft.
- f. Tensile according to ASTM D882: 70 lbf and 4600 psi.

2.5 TAGS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Brady Corporation.
 - 2. Carlton Industries, LP.
 - 3. Seton Identification Products.
- B. Metal Tags: Stainless steel or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- C. Plastic Tags: UV-stabilized phenolic or acrylic tags with black background and with white lettering. Tags may be rectangular 1-1/2-inch wide with length as required or 2-inch round/square tags with 3/8-inch minimum lettering and punched for use with self-locking cable tie fasteners.

2.6 SIGNS

- A. Baked-Enamel Signs:
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Carlton Industries, LP.
 - b. Champion America.
 - c. Emedco.
 - d. Marking Services, Inc.
 - 2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 3. 1/4-inch grommets in corners for mounting.
 - 4. Nominal Size: 7 by 10 inches.

B. Metal-Backed Butyrate Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Champion America.
 - c. Marking Services, Inc.
2. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396-inch galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
3. 1/4-inch grommets in corners for mounting.
4. Nominal Size: 10 by 14 inches.

C. Laminated Acrylic or Melamine Plastic Signs:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Marking Services, Inc.
2. Engraved legend.
3. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height

shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

- f. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. HellermannTyton.
 - 2. Panduit Corp.
- B. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black, except where used for color-coding.
- C. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D638: 12,000 psi.
 - 3. Temperature Range: Minus 40 to plus 185 deg F.
 - 4. Color: Black.
- D. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength at 73 Deg F according to ASTM D638: 7000 psi.
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F.

- 5. Color: Black.

2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 EXECUTION

3.1 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- B. Heat Shrink Identification Products: Before applying products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, operation and maintenance manual, 29 CFR 1910.145, and with those required by applicable codes and standards. Use consistent designations throughout Project.
- B. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Coordinate installation of identifying devices with location of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Verify identity of each item before installing identification products.
- E. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- F. Apply identification devices to surfaces that require finish after completing finish work.
- G. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.

- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- I. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- J. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- K. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- L. Painting Identification: Comply with requirements in Painting Sections for surface preparation and paint application.
- M. Aluminum ID tags shall not be used in rooms where chlorine, or like substance, is present.
- N. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.
- O. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
- P. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in enclosures where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- Q. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
- R. Underground Line Warning Tape:
 - 1. During backfilling of trenches, install continuous underground line warning tape for power, lighting, communication, control wiring and optical fiber cable as specified in Section 16143 "Underground Ducts and Raceways".
- S. Metal Tags:
 - 1. Place in a location with high visibility and accessibility.
 - 2. Secure using cable ties appropriate for the location.

- T. Baked-Enamel Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.
- U. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
 - 2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high sign; where two lines of text are required, use labels 2 inches high.
- V. Cable Ties: General purpose for attaching tags, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- B. All wiring in industrial machines and equipment shall be in accordance with NFPA 79. Notify Owner of any deficiencies noted during installation.
- C. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil. Stencil legend "DANGER - CONCEALED HIGH-VOLTAGE WIRING" with 3-inch-high, black letters on 20-inch centers.
- D. Locate identification at changes in direction, at penetrations of walls and floors, and at 30-foot maximum intervals.
- E. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Identify with metal tags.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
 - 2. Provide tags for all raceways identified in conduit and wire schedules.

3. Locate identification at each end of raceway and at penetrations of walls, floors, enclosures, vaults and handholes.
- F. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits: Identify with metal tags.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
 2. Provide tags for all raceways identified in conduit and wire schedules.
 3. Locate identification at each end of raceway and at penetrations of walls, floors, enclosures, vaults and handholes.
- G. Power-Circuit and Control Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use self-adhesive vinyl tape to identify the phase in conformance with the color-coding legend requirements of Part 2.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
 2. All control wiring in control panels or other enclosures that is powered from an external source and is not disconnected by the control panel disconnect shall be terminated at a disconnecting terminal block upon entering the enclosure. The color of the wire shall then be changed to yellow to identify it as being powered from an external source. Provide identification nameplate on the exterior of the enclosure to indicate sources of external power.
- H. Power-Circuit Conductor Identification, More Than 600 V: For conductors in vaults, pull and junction boxes, manholes, and handholes, use nonmetallic preprinted tags colored and marked to indicate phase, and a separate tag with the circuit designation.
- I. Wire Marking:
1. All power and control conductors (including conductors in instrument and relay compartments of motor control centers, control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment), shall be tagged at each end with legible, pre-printed heat-shrink tubes showing the complete wire designation.
 2. Wire marking lettering shall be bold and type written.
 3. Wiring within a single enclosure shall be marked with the basic wire and terminal number at each end.

4. All field wiring for controls shall have wire labels at each end. The labels shall be marked with the output terminal number at the source ~~original~~-equipment (control panel, MCP or MCC), the remote device terminal number (if applicable) and tag name separated by a slash.
5. Examples:
 - a. A control cable from the Main Control Panel (MCP) terminal #X102 to the pump 101 check valve limit switch (ZS-101) the wire tag number at both ends shall be X102 / ZS-101.
 - b. A control cable from the MCP to a local control panel terminal #Y102, to terminal #24 in LCP-200, the wire tag number at both ends shall be Y102 / 24-LCP200
 - c. A control cable from the MCP terminal #H32 to the NMCC1 terminal #6, the tag number at both ends shall be H32 / 6-NMCC1.
 - d. A control cable from the NMCC1 terminal #C4 to device ZS-101, the wire tag number at both ends shall be C4-NMCC1 / ZS-101.
6. Spare wiring shall be identified at each end with "SP#" and remote equipment number.
 - a. Example: For two spare control cables from the Main Control Panel (MCP) terminal to the local control panel (LCP-202), the wire tag number at the LCP shall be SP1 / MCP and SP2 / MCP. The tag number at the MCP shall be SP1 / LCP202 and SP2 / LCP202.
- J. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- K. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, control wiring and optical-fiber cable. Install as directed in section 16143 "Underground Ducts and Raceways"
- L. Concealed Raceways and Duct Banks, More Than 600 V, within Buildings: Apply floor marking tape to the following finished surfaces:
 1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
 2. Wall surfaces directly external to raceways concealed within wall.
 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.

- M. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- N. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- O. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
 - 1. Apply to exterior of door, cover, or other access.
 - 2. Identify system voltage with black letters on an orange background.
 - 3. For equipment with multiple power or control sources, apply to door or cover of equipment, including, but not limited to, the following:
 - a. Power-transfer switches.
 - b. Controls with external control power connections.
- P. Arc Flash Warning Labeling: Self-adhesive labels.
- Q. Operating Instruction Signs: Baked-enamel warning signs
- R. Emergency Operating Instruction Signs: Baked-enamel warning signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- S. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets and racks of each systems. Systems include power, lighting, control communications, signal, monitoring and alarm systems unless equipment is provided with its own identification.
 - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
 - 2. Outdoor Equipment: Laminated acrylic or melamine plastic sign.
 - 3. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 4. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of an engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- e. Emergency system boxes and enclosures.
- f. Motor-control centers.
- g. Enclosed switches.
- h. Enclosed circuit breakers.
- i. Enclosed controllers.
- j. Manual motor controllers.
- k. Magnetic motor controllers.
- l. Soft-start motor controllers.
- m. Variable-speed controllers.
- n. Push-button stations.
- o. Power-transfer equipment.
- p. Contactors.
- q. Remote-controlled switches, dimmer modules, and control devices.
- r. Battery-inverter units.
- s. Battery racks.
- t. Power-generating units.
- u. Monitoring and control equipment.
- v. UPS equipment.

END OF SECTION

SECTION 16430
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

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 SUMMARY

- A. Section Includes:
 - 1. Nonfusible switches.
 - 2. Molded-case circuit breakers (MCCBs).

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
 - 5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF format.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 1. Include plans, elevations, sections, details and attachments to other work.
 2. Include wiring diagrams for power, signal and control wiring.
 - C. Qualification Data: For qualified testing agency.
 - D. Seismic Qualification Data: Certificates, for enclosed switches and circuit breakers, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
 - E. Field quality-control reports.
 - F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.
 1. In addition to items specified in Section 01782 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in digital format.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

2. Fuse Pullers: Two for each size and type.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Accredited by NETA.
 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
 2. Altitude: Not exceeding 3300 feet.

1.8 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers and components with equipment served and adjacent surfaces. Maintain required workspace clearances for equipment access doors and panels.

1.9 WARRANTY

- A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Enclosed switches and circuit breakers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.3 NONFUSIBLE SWITCHES

- A. Compact, Heavy Duty, Hazardous Area:
 - 1. Aluminum Feed-Thru Compact Non-Fused Disconnect Switch Enclosure with ABB Switch - 25A/3P/600VAC/50HP Max, Killark, B7NFD25A - B7NFD Series or equal.

2.4 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. ABB.
 - 2. Allen Bradley.
 - 3. Eaton
- B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.
- C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

- D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 100 percent rated for the available fault current unless otherwise indicated on the Drawings.
- E. MCCBs shall be equipped with a device for locking in the isolated position.
- F. Lugs shall be suitable for 194 deg F (90 deg C) rated wire, sized according to the 167 deg F (75 deg C) temperature rating in NFPA 70.
- G. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.
- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- I. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- J. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 16148 "Seismic Controls for Electrical Systems."
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 16153 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections as specified in Section 16670 "Electrical Testing".

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in Section 16675 "Coordination Studies."

END OF SECTION

**SECTION 16670
ELECTRICAL TESTING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Electrical test and inspection requirements for all electrical equipment, motors, instruments and components.

1.3 GENERAL DESCRIPTION OF WORK

- A. General: Provide testing of electrical work installed under division 16, as specified herein and in other Division 16 sections. Feeders and equipment shall not be placed in service until they have been checked out and tested, as applicable.
- B. The following will be tested as indicated in this section:
 - 1. Electric Actuators.
 - 2. Conductors.
 - 3. System Function.

1.4 QUALITY ASSURANCE

- A. Qualifications of the testing organization and personnel:
 - 1. Testing Organization:
 - a. The testing organization shall be regularly engaged in the testing of electrical equipment devices, installations, and systems.
 - b. The testing organization shall use technicians who are regularly employed for testing services.
 - c. The testing organization shall submit appropriate documentation to demonstrate that it satisfactorily complies with these requirements.
 - 2. Testing Personnel:

- a. Technicians performing these electrical tests and inspections shall be trained and experienced concerning the apparatus and systems being evaluated. These individuals shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved. They must evaluate the test data and make a judgment on the serviceability of the specific equipment.
- B. The Engineer reserves the right to require that the originally approved personnel be replaced with other qualified personnel if, in his opinion, the original personnel are not qualified or are not properly conducting the system testing.

1.5 DIVISION OF RESPONSIBILITY

A. The Owner's Representative:

- 1. The Owner's representative shall provide the testing organization with the following:
 - a. A complete set of electrical plans and specifications, including all change orders.
 - b. Site-specific hazard notification and safety training.
- 2. The testing organization shall provide the following:
 - a. All field technical services, tooling, equipment, instrumentation, and technical supervision to perform such tests and inspections.
 - b. Specific power requirements for test equipment.
 - c. Notification to the user prior to commencement of any testing.
 - d. A timely notification of any system, material, or workmanship that is found deficient based on the results of the acceptance tests.
 - e. A written record of all tests and a final report.

1.6 SAFETY AND PRECAUTIONS

- A. All parties involved must be cognizant of applicable safety procedures. This document does not include any procedures, including specific safety procedures. It is recognized that an overwhelming majority of the tests and inspections recommended in these specifications are potentially hazardous. Individuals performing these tests shall be capable of conducting the tests in a safe manner and with complete knowledge of the hazards involved.
- B. Safety practices shall include, but are not limited to, the following requirements:

1. All applicable provisions of the Occupational Safety and Health Act, particularly OSHA 29CFR 1910.
 2. Accident Prevention Manual for Industrial Operations, National Safety Council.
 3. Applicable state and local safety operating procedures.
 4. Owner's safety practices.
 5. ANSI/NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces.
- C. A safety lead person shall be identified prior to commencement of work.
- D. A safety briefing shall be conducted prior to the commencement of work.
- E. All tests shall be performed with the apparatus de-energized and grounded except where otherwise specifically required to be ungrounded or energized for certain tests.
- F. The testing organization shall have a designated safety representative on the project to supervise operations with respect to safety. This individual may be the same person described in 1.5.A.2.

1.7 SUITABILITY OF TEST EQUIPMENT

- A. All test equipment shall meet the requirements in Section 1.8 and be in good mechanical and electrical condition.
- B. Field test metering used to check power system meter calibration must be more accurate than the instrument being tested.
- C. Accuracy of metering in test equipment shall be appropriate for the test being performed. Wave shape and frequency of test equipment output waveforms shall be appropriate for the test and the tested equipment.

1.8 TEST INSTRUMENT CALIBRATION

- A. Testing organization shall have a calibration program which assures that all applicable test instruments are maintained within rated accuracy for each test instrument calibrated.
- B. The firm providing calibration service shall maintain up to date instrument calibration instructions and procedures for each test instrument calibrated.
- C. The accuracy shall be directly traceable to the National Institute of Standards and Technology (NIST).
- D. Instruments shall be calibrated in accordance with the following frequency schedule:

1. Field instruments: Analog, 6 months maximum. Digital, 12 months maximum.
 2. Laboratory instruments: 12 months maximum.
 3. Leased specialty equipment: 12 months maximum.
- E. Dated calibration labels shall be visible on all test equipment.
- F. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
- G. Calibrating standard shall be of better accuracy than that of the instrument tested.

1.9 SUBMITTALS

- A. General: Notify the Engineer in writing two weeks prior to all scheduled testing to allow time for Engineer to schedule witnessing of testing, where elected by Engineer.
- B. Testing Procedures: Submit four physical copies or an electronic PDF of all proposed testing procedures to the Engineer for review at least 30 days prior to conducting any testing on the project.
- C. Calibration List: Submit four physical copies or an electronic PDF listing all testing devices to be used for the project to the Engineer for approval. Listing shall include documentation that the devices are properly calibrated.
- D. Reporting Forms: Submit four physical copies or an electronic PDF of all proposed forms to be used in recording testing data and results to the Engineer for review at least 30 days prior to conducting any testing on the project.
- E. Test Data and Results: Submit four physical copies or an electronic PDF of complete data and certified test results for each test performed, including, but not limited to:
1. Test performed.
 2. Test procedure.
 3. System and area tested.
 4. Date(s) and time(s) of test.
 5. Weather conditions.
 6. Test criteria.
 7. Test results.
 8. Additional pertinent information.

- F. Operational Certification: Submit four certified copies of an operational certification which documents that all equipment and systems have been fully tested to verify proper operation in accordance with the design shown in the Contract documents and manufacturer's recommendations.
- G. Certification: Certifications stating that submitted test data and results are true and correct shall be provided for all submittals under this section. Certification shall be executed by an authorized officer if the Contractor is a corporation, by a partner if the Contractor is a partnership, by the owner if the Contractor is a sole proprietorship or by the authorized representative if the Contractor is a joint venture.
- H. Test Log: The Contractor shall maintain a test log at the site to document the results of all successful and unsuccessful testing and balancing as it is performed. This log shall be available for review by the Engineer and a copy of the log shall be submitted to the Engineer prior to the Substantial Completion inspection. A space shall be provided on the test log signoff by the Engineer or Owners representative.
- I. Submit a comprehensive final test report after all testing has been completed and before final acceptance of the project.
- J. The test report shall include the following:
 - 1. Summary of project.
 - 2. Description of equipment tested.
 - 3. Description of tests.
 - 4. Test data.
 - 5. Analysis and recommendations.
- K. Test data records shall include the following minimum requirements:
 - 1. Identification of the testing organization.
 - 2. Equipment identification.
 - 3. Humidity, temperature, and other conditions that may affect the results of the tests and/or calibrations.
 - 4. Date of inspections, tests, maintenance, and/or calibrations.
 - 5. Identification of the testing technician.
 - 6. Indication of inspections, tests, maintenance, and/or calibrations to be performed and recorded.

7. Indication of expected results when calibrations are to be performed.
 8. Indication of “as-found” and “as-left” results, as applicable.
 9. Sufficient spaces to allow all results and comments to be indicated.
- L. The testing organization shall furnish a copy or copies of the complete report to the owner as specified in the acceptance testing contract.

1.10 TESTING FORMS

- A. The Contractor is responsible for providing all required testing forms. For convenience, the following test forms have been included at the end of this Section:
1. Electrical System Test Report
 2. Electrical Ground Rod Test Report
 3. Motor Data and Test Report.
 4. Instrument Test Report.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide all materials and test equipment required for testing of specified electrical systems, including re-testing until acceptable results are obtained.

2.2 PRODUCTS

- A. Tested products which fail to provide acceptable test results shall be repaired or replaced with suitable materials as required to obtain acceptable results.

PART 3 EXECUTION

3.1 TESTING

- A. General: Tests shall be conducted during construction as specified by these Specifications and as required by authorities having jurisdiction.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Scope:
1. The Contractor shall provide all material, equipment, labor and technical supervision to perform tests and inspections as specified herein.

2. It is the intent of these tests to ensure that all electrical equipment is operational within the industry and manufacturer's tolerances and is installed in accordance with the Contract Documents.
3. The tests and inspections shall determine the suitability of the system for energization.
4. If the test results indicate corrective measures are required, the Contractor shall undertake all such corrective measures. No additional compensation will be paid for corrective measures.

3.2 CONDUCTORS AND CABLES

- A. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors feeding the following critical equipment and services for compliance with requirements:
 1. All 480V power feeders scheduled in the Conduit & Wire Schedule.
 2. Service feeder and pump feeder power cabling.
 3. Motor feeders.
- B. Perform each of the following visual and electrical tests:
 1. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 2. Test bolted connections for high resistance using one of the following.
 - a. A low-resistance ohmmeter.
 - b. Calibrated torque wrench.
 - c. Thermographic survey.
 3. Inspect compression-applied connectors for correct cable match and indentation.
 4. Inspect for correct identification.
 5. Inspect cable jacket and condition.
 6. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 7. Continuity test on each conductor and cable.

8. Uniform resistance of parallel conductors.
- C. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 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 splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 - D. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - E. Perform voltage, current and resistance tests as required to complete the Electrical System Test Report form included in this specification section. Test reports must be submitted to the Engineer prior to start up. The Contractor shall inform the Engineer when testing is taking place a minimum of 5 days in advance. Testing shall not take place unless the Engineer or other Owner representative is present to witness the testing.
 - F. Cables will be considered defective if they do not pass tests and inspections.
 - G. Prepare test and inspection reports to record the following:
 1. Procedures used.
 2. Results that comply with requirements.
 3. Results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
 - H. Remove and replace malfunctioning wires and cables and retest and specified above.
 - I. Test Values:
 1. Compare bolted connection resistances to values of similar connections.
 2. Bolt-torque levels should be in accordance with Table 100.12 unless otherwise specified by the manufacturer.
 3. Microhm or millivolt drop values shall not exceed the high levels of the normal range as indicated in the manufacturer's published data. If manufacturer's data is not available, investigate any values which deviate from similar connections by more than 50 percent of the lowest value.

4. Insulation-resistance values should not be less than 50 megohms.
5. Investigate deviations in resistance between parallel conductors.

3.3 CONTROL-VOLTAGE ELECTRICAL POWER CABLES

A. Tests and Inspections:

1. Visually inspect cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test cabling for direct-current loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination, but not after cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in its "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in its "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

B. End-to-end cabling will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 ELECTRIC ACTUATORS

A. Tests and Inspections:

1. The Contractor shall perform voltage, current and resistance tests as required to complete the Motor Test Report. The Contractor shall inform the Engineer a minimum of 3 days in advance of testing and shall only perform tests with the Engineer or Owner's representative present.

B. Test reports must be submitted to the Engineer prior to final acceptance by the Owner.

C. If the test results indicate corrective measures are required, the Contractor shall undertake all such corrective measures until the electrical system is accepted by the Engineer. No additional compensation will be paid for corrective measures.

3.5 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

A. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:

- a. Inspect physical and mechanical condition.
- b. Inspect anchorage, alignment, grounding and clearances.
- c. Verify that the unit is clean.
- d. Verify blade alignment, blade penetration, travel stops and mechanical operation.
- e. Verify that fuse sizes and types match the Specifications and Drawings.
- f. Verify that each fuse has adequate mechanical support and contact integrity.
- g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
- h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
- i. Verify correct phase barrier installation.
- j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compared bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
- e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

B. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:

- a. Verify that equipment nameplate data is as described in the Specifications and shown on the Drawings.
- b. Inspect physical and mechanical condition.
- c. Inspect anchorage, alignment, grounding, and clearances.
- d. Verify that the unit is clean.
- e. Operate the circuit breaker to ensure smooth operation.
- f. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate

from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

g. Inspect operating mechanism, contacts, and chutes in unsealed units.

h. Perform adjustments for final protective device settings in accordance with the coordination study.

2. Electrical Tests:

a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

c. Perform a contact/pole resistance test. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.

e. Determine the following by primary current injection:

- 1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
 - 4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.
- f. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.
 - g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.
 - h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.
 - i. Verify operation of charging mechanism. Investigate units that do not function as designed.
3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 4. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.

- c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- 5. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.6 SYSTEM FUNCTION TESTS

- A. It is the purpose of system function tests to prove the correct interaction of all sensing, processing, and action devices. Perform system function tests upon the completion of acceptance testing required on specified equipment.
- B. Develop test parameters and perform tests for the purpose of evaluating performance of all manufacturer's published data.
- C. Verify the correct operation of all interlock safety devices for fail-safe functions in addition to design function.
- D. Verify the correct operation of all sensing devices, alarms, and indicating devices.

END OF SECTION

MOTOR DATA AND TEST REPORT

EQUIPMENT NAME AND NUMBER: _____

EQUIPMENT SPECIFICATION SECTION: _____

MOTOR STARTER LOCATION _____

CONTRACTORS REPRESENTATIVE _____ Date _____

MOTOR NAMEPLATE DATA

MFR Name/Model No. _____

Voltage/Phase/HP _____

FLA/LRA _____

Service Factor _____

Efficiency Index (or percent) _____

NEMA Design _____

Code Letter _____

Insulation Type _____

Temperature Rise _____

Ambient Temperature _____

RPM _____

Enclosure _____

Thermal Trip Setting _____

Space HTR: Watts/Volts _____

Other Data _____

MOTOR STARTER INFORMATION

Manufacturer/Type _____

Overload Heater No _____

| | | | | | | | |
|-----------------------------|---------|-----|-------|-----|-------|-----|-------|
| * RECORDED FULL LOAD DATA | VOLTS | A-G | _____ | B-G | _____ | C-G | _____ |
| FULL LOAD OPERATING VOLTAGE | VOLTS | A-B | _____ | B-C | _____ | C-A | _____ |
| FULL LOAD OPERATING CURRENT | AMPS | A | _____ | B | _____ | C | _____ |
| INSULATION RESISTANCE | MEGOHMS | A-G | _____ | B-G | _____ | C-G | _____ |
| MOTOR CIRCUIT RESISTANCE | OHMS | A-B | _____ | B-C | _____ | C-A | _____ |

*VOLTAGE & CURRENT READINGS SHALL BE TAKEN AT THE CLOSEST ACCESSIBLE POINT TO THE LOAD

TRANSMITTER CALIBRATION / TEST DATA FORM

Tag. No. and/or Description: _____ Serial No. _____

Make and Model No.: _____

Associated Panel: _____

Type of testing equipment used: _____

Input: _____

Output: _____

Range: _____ Scale: _____

Calibrated Value (flow/pressure/turbidity etc.) at 4mA _____

Calibrated Value (flow/pressure/turbidity etc.) at 20mA _____

Simulate process variable (flow, pressure, turbidity, etc.) and measure output with appropriate meter.

Related value is (example: the level associated with the pressure).

| <u>% Range</u> | <u>Input (engr. units)</u> | <u>Related value</u> | <u>Expected Output</u> | <u>Actual Output</u> |
|----------------|----------------------------|----------------------|------------------------|----------------------|
| 0 | _____ | _____ | _____ | _____ |
| 25 | _____ | _____ | _____ | _____ |
| 50 | _____ | _____ | _____ | _____ |
| 75 | _____ | _____ | _____ | _____ |
| 100 | _____ | _____ | _____ | _____ |

COMMENTS:

TESTED BY _____ DATE: _____

OWNERS REPRESENTATIVE _____ DATE: _____

ELECTRICAL SYSTEM TEST REPORT – 600V CABLE

ELECTRICAL SYSTEM
DESCRIPTION DATA

SERVICE DESCRIPTION:

Nominal Voltage, Phase To Phase _____

Phase To Neutral – Single Or Three Phases- _____

Number Of Conductors _____

SERVICE CONDUCTORS:

Phase Size And Insulation Type _____

Neutral Size And Insulation Type _____

Ground Size And Insulation Type _____

SERVICE DISCONNECT DESCRIPTION:

Circuit Breaker Or Disconnect Switch _____

Size (amps) _____

Fuse (amps) _____

MEASURED CONDITIONS

DATA

| | | | | |
|---|--------|-----------|-----------|-----------|
| Operating Load Voltage | Volts | Vab _____ | Vbc _____ | Vca _____ |
| | | Van _____ | Vbn _____ | Vcn _____ |
| Operating Load Feeder Current | Amps | Ia _____ | Ib _____ | Ic _____ |
| | | a-b _____ | b-c _____ | c-a _____ |
| | | a-g _____ | b-g _____ | c-g _____ |
| Conductor Insulation Mega ohms Resistance - record the indicated measurement for each of the following circuits: | Mega Ω | a-g _____ | b-g _____ | c-g _____ |

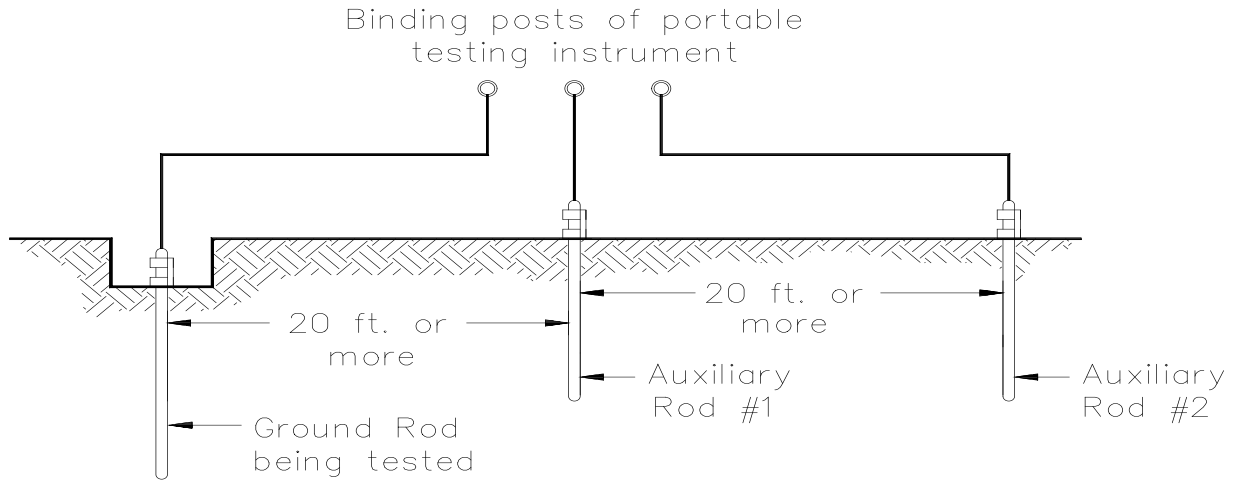
Service Feeder _____

Pump Feeders _____

Motor Feeders _____

480V Feeders _____

ELECTRICAL GROUND ROD TEST REPORT



GROUND ROD RESISTANCE TESTING

PROCEDURE:

To measure ground resistance, two additional temporary grounds, consisting of short rods 2 or 3 feet long, shall be driven in the ground at least 20 feet away from the rod being tested. A direct-reading ground resistance tester shall then be connected to the three ground rods by means of insulated leads. The battery operated ground resistance tester reads the resistance of the ground rod being tested directly in ohms. The ground rod location / designation and its measured ohm value shall be recorded in chart below.

| GROUND ROD LOCATION / DESIGNATION | OHM VALUE |
|-----------------------------------|-----------|
| 1. | * |
| 2. | * |
| 3. | * |
| COMPOSITE GROUND | * |

*Ohm value of a single ground rod shall not exceed 25 Ohms. If additional ground rod(s) are added, the "composite" ground electrode shall have a maximum acceptable reading of 15 Ohms which shall be recorded in chart above.

**SECTION 16858
HEAT TRACE**

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This section covers furnishing and installing complete electrical heat trace system as per drawings, and as specified herein. Contractor to coordinate all work with Division 15.
- B. Provide heat trace freeze protection for the exposed portion of the relocated sludge loading conveyor.

1.2 STANDARDS AND CODES

- A. All materials and equipment specified herein shall within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.
- B. All materials and equipment specified herein shall conform with all applicable NEMA, ANSI and IEEE standards.
- C. 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.
- D. Quality Assurance:
 - 1. The Heat Trace Cable Manufacturer shall have a complete quality assurance program that includes product qualification testing and routine testing of heater cable against minimum standards of acceptance.
 - 2. Manufacturer's qualification testing on representative samples shall include power output, T-rating, jacket insulation resistance, low temperature flexibility, and startup inrush characteristics for a temperature range of Minus 40 to plus 150 deg F.
 - 3. Quality Control tests on every foot of heating cable shipped shall include both a visual inspection and a high-frequency sine wave spark test as checks on jacket uniformity. In addition, all braided products shall pass a dry dielectric test. Quality Control tests on representative samples shall include a check of cable dimensions and power output.
 - 4. Heat tracing systems shall be furnished from a single source from a single manufacturer.

1.3 ACTION SUBMITTALS

- A. Submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.
- B. Heat Trace System Calculations
 - 1. Contractor shall coordinate with manufacture to provide thermal calculations showing the heat trace system is properly sized for freeze protection. Calculation submittals shall include the following at a minimum:
 - a. Heating cable calculations.
 - b. Calculations showing number of heat cable wraps per foot.
 - c. Method of attachment to conveyor.
 - d. Pipe insulation calculations.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operations and Maintenance Data: For heat trace and heat trace control units to include in operations and maintenance manuals.

1.6 WARRANTY

- 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.

PART 2 PRODUCTS

2.1 HAZARDOUS AREA (CL 1, DIV 2) CONVEYOR HEAT TRACE SYSTEMS

- A. Heat Trace Controller and Temperature Sensors
 - 1. Controller kit shall consist of a digital thermostat with microprocessor-based temperature control and power connection kit. Controller shall be used for freeze protection protected by self-regulating heat trace. Unit shall be rated for Class 1, Division 2 hazardous area locations. Unit shall be capable of switching 30 amperes of current. 100-Ohm platinum RTD temperature sensors shall be included with the heat trace controllers. Heat trace controllers shall be Chromalox #DTS-HAZ, or approved equal.

2. Wall Mount Kit: MP-2, or approved equal.
- B. Heating Cable (Heat Trace)
1. Heating cables shall be self-regulating, parallel circuit, semi-conductive resistance type, with heating element extruded in a continuous strip between parallel copper conductors. Heating cables shall be capable of being overlapped without overheating at overlap places. Cable shall be furnished with tinned copper shield and an outer polyolefin jacket and be capable of being cut to desired length in the field. Constant watt type heating cable will not be acceptable. Cable shall be purposely made for the application of providing freeze protection for metal process piping. Raychem self-regulating XL-TRACE heat cable or Engineer reviewed equal.
 2. Heating cable shall be suitable for operation from heat trace controller. Line voltage fluctuations shall not appreciably affect cable heat output.
 3. The heater shall not require the use of heat transfer cement or compounds in any form.
 4. The heater shall vary its output in response to temperature variations along a pipe, due to heat sinks such as fittings or pipe supports.
 5. 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.

PART 3 EXECUTION

3.1 GENERAL

- A. Contractor shall coordinate all heat trace installation work with Division 15.

3.2 HEATING CABLE

- A. Install heating cable under pipe insulation in accordance with Cable Supplier's installation instructions and electrical drawings. Any discrepancy and/or conflict shall be brought to the attention of the Engineer for final resolution.

3.3 MAXIMUM LENGTH OF CABLE RUNS

- A. In order to limit the start-up current of branch circuits feeding heater cables, the maximum length of run of individual heater cables shall not exceed 95 percent of the maximum length recommended by the Heater Cable Manufacturer for cable ambient temperature of minus 40 deg F.

3.4 MAXIMUM RATING OF BRANCH OVERCURRENT DEVICE

- A. The rating of branch circuit breakers for any heat trace circuit shall not exceed 40A.

3.5 TESTING

- A. Heat Trace: Prior to installation, contractor shall conduct insulation resistance and ohm testing per manufacture's instructions. Testing results shall be submitted, reviewed, and approved prior to heat trace installation.
- B. Functionally test each section of heat trace system under load, and according to Manufacturer's recommended test procedures.

END OF SECTION

**SECTION 16928
CONTROL SYSTEM**

PART 1 GENERAL

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 SUMMARY

- A. Work and materials specified in this section include the system for control and monitoring of motor driven pumps and equipment and all component instruments and sensing devices.
- B. Included in this work is the furnishing and testing of the local control panels (LCP) revisions, motor control centers (MCC) revisions, and all interconnecting control wiring between the control system equipment, LCP's, MCC and other devices.
- C. Appendix A is a copy of existing LCP Drawings.
- D. CSI will be provided with an electronic copy of the existing LCP drawings.

1.3 DEFINITIONS

- A. Contractor: The Contractor, sometimes referred to as the "Prime Contractor" or "General Contractor", is the party who furnishes and installs all tools, materials and equipment, and has a formal contract with the Owner. The Contractor is responsible for the work of the Electrical Contractor, Control System Integrator (C. S. I.), and all other Contractors and Sub-Contractors.
- B. Electrical Contractor: The Electrical Contractor is the party who furnishes and installs all non-control electrical equipment and power distribution equipment and infrastructure.
- C. C. S. I.: Control System Integrator is the party that furnishes all control components, configures the control system and provides all documentation, designs the detailed control wiring diagrams plus the layout and assembly of the custom control panels.
- D. Control System: The Control System includes all equipment, instruments and wiring for control and monitoring of all operating pumps and equipment. This includes custom control panels, motor control center, packaged control panels, and control equipment furnished with other systems and mechanical equipment. All sensing, transmitting, indicating, control and recording of all functions as specified and shown are also included in the control system.

1.4 SYSTEM DESCRIPTION

- A. The control system shall include the instruments, control devices, programmable controllers, input and output devices, sensors, interfacing devices, cabinets, enclosures and other components indicated and implied by the Plans and these Specifications.
- B. The control system shall be designed and assembled by the C. S. I. to provide:
 - 1. Control of motor driven pumps and equipment.
 - 2. Monitoring of operation of motor driven pumps and equipment.
 - 3. Monitoring of operation of emergency generator.
 - 4. Monitoring of operation of automatic transfer switch.
 - 5. The capabilities indicated and implied by the plans and specifications.
- C. The control system shall be designed and assembled by the C. S. I. to be an integrated system composed completely of components which are specifically designed and used for and in conjunction with control and operation of motor-driven pumps and equipment. All components shall be standard, catalog-listed products, new and free of defects.
- D. The control system shall be supplied by the C. S. I. as an integral, complete system with all required components including all interfacing equipment, appurtenances and accessories and all such devices which may be required for proper interfacing as part of the control system.
- E. The control system shall include the following major components:
 - 1. Local Control Panel (LCP) revisions.
 - 2. Motor Control Centers revisions and associated equipment.

1.5 RESPONSIBILITY OF ELECTRICAL CONTRACTOR AND C. S. I.

- A. The C. S. I. shall be fully and completely responsible for the design and assembly of the control system as specified herein and shall be enjoined by the Electrical Contractor as a supplier of custom control equipment. The assignment of specific responsibilities herein to the C. S. I. shall not, in any way and under any conditions, diminish or usurp the General or Electrical Contractor's full and complete responsibility for all work performed and all materials installed under the contract. The contract between the Electrical Contractor and the C. S. I. shall specifically require that the C. S. I. conform to and meet all requirements specified herein.
- B. The Electrical Contractor's responsibilities include the following:

1. Reviewing the C. S. I.'s submittals and wiring diagrams for coordination with space requirements, raceway requirements of field wiring, etc.
 2. Supplying the C. S. I. with submittals of equipment related to the power and control systems which the C. S. I. must include in their submittals and integrate. Such as motors, packaged control panels which the C. S. I. does not build, etc.
 3. Installation of the control panels.
 4. Installation of power distribution equipment, automatic transfer switches and motor control centers, etc.
 5. Installation of the interconnecting wiring per the C. S. I.'s wiring diagrams.
 6. Installation of sensors and actuators per detailed contract drawings or drawings or instruction supplied by the C.S.I.
- C. The C. S. I.'s responsibilities include the following:
1. Supply motor control center parts and control panel parts.
 2. Detailed design of control panels. The contract drawings show the general layout of the control panels. The CSI shall provide detailed and scaled design of all components on and in the control panels and determine specific requirements.
 3. All interconnecting wiring of control equipment including remote control panel(s), pump panel(s), packaged equipment panels, mechanical equipment with control components, etc.
 4. Testing and inspection of pump panel(s), motor control centers, automatic transfer switches and control panels in CSI's shop.
 5. Coordinate with the Electrical Contractor for specific requirements and locations of raceway penetrations and field wiring in control panels.
 6. The CSI shall supply the Electrical Contractor with all necessary detailed installation drawings and/or written instructions for installation of all control components and sensing devices for proper system operation.

1.6 STANDARDS AND CODES

- A. All equipment and materials shall conform to the latest revised editions of applicable standards published by the following organizations:
1. American National Standards Institute (ANSI).
 2. Institute of Electrical and Electronic Engineers (IEEE).

3. National Electrical Manufacturers Association (NEMA).
 4. Underwriters' Laboratories (U/L).
 5. Instrument Society of America (ISA).
 6. National Fire Protection Association (NFPA)
- B. All electrical equipment and materials, and the design, construction, installation, and application thereof shall comply with all applicable provisions of the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and any applicable Federal, State, and local ordinances, rules and regulations.
- C. All materials and equipment specified herein shall within the scope of UL examination services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.
- D. All control panels shall bear a label by UL or by an approved testing authority for the completed assembled panel.

1.7 ACTION SUBMITTALS

- A. Per the submittal requirements of Sections 01330 and 16012 and the following, The C. S. I. shall develop and shall submit to the Engineer, through the Electrical Contractor, the following project data:
1. All shop drawings: (provide an electronic copy, in AutoCAD, of all shop drawings on disk to the Engineer with the submittals and with final as-built drawings).
 2. Cut sheets for all products with a Bill of Materials showing quantity, manufacturer, catalog number, the supplier name and phone number, and relevant spec. paragraph number. Number each item in the Bill of Materials and relate the Bill of Materials to the submitted product index.
- B. Provide reference numbering on all cut sheets to relate them to the bill of materials. Provide same reference numbering by the equipment shown on the shop drawings.
- C. Cutsheets may be submitted via one of the two following methods:
1. Submit cutsheets bound in a 3-hole binder with tabs and bill of materials in the front – provide at least 1 tab for every 4 products.
 2. Submit cutsheets in electronic PDF format with a bill of materials in the front. PDFs shall have bookmarks for each product and be neatly legible. PDFs that are not bookmarked and product cutsheets that are illegible will be rejected by the Engineer.

1.8 INFORMATIONAL SUBMITTALS

A. Field Test Reports:

1. At the completion of the field testing required by paragraph 3.2 of this Section. The C.S.I. shall develop and submit to the Engineer a Field Test Report that includes the following:
 - a. I/O Checklist.
2. Field Test Reports must be submitted prior to requesting validation testing from the Engineer.

B. Operation and Maintenance Training

1. Develop and submit operation and maintenance training materials for the instruction of Owner and/or Owner's personnel and submit to the Engineer at least (2) weeks prior to conducting the training.
2. After the completion of the training, the C.S.I shall submit copies of the instruction materials to the Engineer signed by all personnel that received instruction.

1.9 CLOSEOUT SUBMITTALS

A. OPERATION AND MAINTENANCE DATA

1. The C. S. I. shall prepare and assemble detailed operation and maintenance manuals in accordance with the project general requirements. The manuals shall include, but not be limited to, the following:
 - a. Preventative maintenance procedures.
 - b. Trouble-shooting.
 - c. Calibration.
 - d. Testing.
 - e. Replacement of components.
 - f. Automatic mode operation.
 - g. Manual mode operation.
 - h. Interface navigation.
 - i. Setpoints and Variables.

- j. Control System Security.
 - k. Alarms.
 - l. System schematics / shop drawings.
 - m. Electronic copy on disk of all shop drawings in version of AUTOCAD acceptable to Owner.
 - n. As-built wiring diagrams of cabinet and enclosure contained assemblies.
 - o. As-built wiring diagrams of overall system.
2. Updated system schematics and wiring diagrams shall be included as described in the Shop drawing and Submittal sections of this specification.
- a. Catalog data and complete parts list for all equipment and control devices.
 - b. Listing of recommended spare parts.
 - c. Listing of recommended maintenance tools and equipment.
3. Programmer Will Provide:
- a. Program documentation printout with tag numbers and descriptive comments.
 - b. Backup program on electronic media.

1.10 SHOP DRAWINGS

- A. The C. S. I. shall develop all shop drawings required for revised design, fabrication, assembly and installation of the control system. Shop drawings shall include all drawings required in manufacture of specialized components and for assembly and installation of them. Shop drawings shall be CAD drawn and include the following:
- 1. System schematic diagrams for the entire control system including but not limited to: all sensors, control panels, motor control center and motor control equipment; with all components and their locations indicated. Wire and terminal numbers shall be included on the schematic diagrams.
 - 2. Technical data sheets for all components with the complete part number of the component clearly designated with all required options.
 - 3. Arrangement drawings of all panel front- and internal-mounted instruments, switches, devices, and equipment indicated. Show all panel mounting details

required. Include outer dimensions of all panels on the drawing. Deviations from approved arrangements require re-submittal and approval prior to installation.

4. Arrangement drawings shall be drawn to scale using standard Architectural or Engineering scales. See example drawings.
5. Detailed dimensional drawings of the installation of all sensors (level, pressure, flow, valve position, motion, etc.), actuators and of mounting brackets and other devices required for installation of sensors and actuators.
6. Shop drawings shall be provided on NON-FOLDED sheets no larger than 11 by 17 inches. Shop drawings shall include specific product detail such as rating, size, and number of contacts, etc. Wiring diagrams shall be included for all components in the system including control equipment supplied with mechanical devices.
 - a. The shop drawings shall be identified by the submittal number, revision number, and submittal date.
 - b. The MCC shop drawings shall be submitted concurrently with the Control System Integrator Drawings. Refer to specification 16443.
7. Wiring diagrams shall:
 - a. Be in format per example drawings at the end of this section.
 - b. Have a minimum of one sheet per each motor controller, or subsystem.
 - c. Have numbering by equipment to relate equipment shown on shop drawings to the bill of materials.
 - d. Include wiring diagrams for packaged control panels and other related control equipment supplied with mechanical systems.
 - e. Include instrument loop diagrams per LOOP example dwg.
 - f. Include for all motor control wiring diagrams, both the motor power and control wiring in the MCC bucket and other related control wiring for the motor on the same sheet. Per typical MOTOR CONTROL example dwg. At the end of this section.
 - g. Include details of individual PLC input and output cards with card wiring, base, slot, input, output, terminal, and device identification.
 - h. Provide individual PLC card information on an EXCEL spread sheet (on a "per card" basis, per example at the end of this section and provide one electronic copy on disk to the Engineer.

- i. Provide wire and terminal numbering per the requirements in Section 16153.
8. For shop drawing packages which include more than 10 sheets provide the drawings in a separate 11 by 17 inch binder with an index for the drawings at the front.
9. Installation details shall include the size, number, type and location of interconnecting wiring and conduit, installation of cabinets and enclosures, installation of sensors, instruments, limit switches, and other installation requirements. Shop drawings shall be submitted to the Electrical Contractor for review and approval. After approval by the Electrical Contractor, copies of all shop drawings shall be submitted to the Engineer.
10. Shop Drawing submittal shall contain submittal date and revision number on all shop drawing sheets.

1.11 CONTRACTOR REVIEW OF SUBMITTALS

- A. The Contractor and Electrical Contractor shall review all shop drawings prior to submittal to the Engineer. This review shall include:
 1. Coordination of wire routing on the wiring diagrams and the raceway system.
 2. Equipment shall be checked for layout and size for coordination and verification that equipment will fit within the space designated.
 3. Coordination for getting equipment into the structures.
 4. Coordinate with panel wire entrances and interior wireways and space (size and location) for field connections.
 5. Coordination of equipment mounting and installation.
 6. All submitted Shop Drawings shall be reviewed, signed and dated prior to Engineers review by:
 - a. General Contractor.
 - b. Electrical Contractor.
 - c. Control System Integrator.

1.12 WARRANTY

- A. As part of the guarantee required by these Specifications, the Electrical Contractor shall cause the C. S. I. to make any and all repairs, replacements, modifications and adjustments required to eliminate any and all defects in design, materials and

workmanship for his work, which are disclosed within the one year guarantee period beginning at the date of substantial completion. The C. S. I. shall begin all repairs, replacements, modifications and adjustments within twenty-four (24) hours of notification by telephone by the Owner and shall complete such repairs, replacements, modifications and adjustments within forty-eight (48) hours of notification. Should the C. S. I. fail to begin the work within 24 hours or complete the work within 48 hours, the Owner may proceed to undertake or complete the work. In such event, the Electrical Contractor and his surety shall be liable for all costs incurred by the Owner.

1.13 COORDINATION WITH MOTOR CONTROL AND OTHER EQUIPMENT

- A. The C. S. I. shall be solely and completely responsible for coordination and integration of control system with the motor control and other related equipment. The C. S. I. shall communicate directly with the manufacturer(s) and supplier(s) of all related control equipment to determine all intended details of the equipment which may influence or affect the control system.
- B. The C. S. I. shall determine all requirements for and shall cause integration of the control system and all other control equipment into a unified operating system. The C. S. I. shall define all requirements for all interfacing equipment and shall supply all appurtenances, accessories and all such devices which may be required for proper interfacing as part of the control system.
- C. The C. S. I. shall be responsible to obtain submittal information on equipment supplied by other disciplines and to integrate them into the control system to form a complete working package as outlined by the contract documents. This includes, but is not limited to, the following list of major pieces of equipment.
 - 1. Motor Operated Valves.

1.14 QUALITY ASSURANCE

- A. Control Systems Integrator Qualifications:
 - 1. Description of ownership and organization of company.
 - 2. Resumes of principals and/or key employees.
 - 3. Description of expertise in design, assembly, testing and installation of control systems for municipal waterworks and sewerage facilities.
 - 4. Description of similar size municipal control systems designed, assembled and installed in the last five (5) years. Description shall include:
 - a. Names of employees involved in each system.
 - b. Detailed description and drawings of each system.

- c. Cost of each system.
 - d. Names and telephone numbers of persons involved in operation and maintenance of each system.
- B. Description of the service capabilities normally provided by the company including resumes of employees assigned to field service and listing of service equipment.
- C. Description of spare parts normally stocked and of restocking procedures.
- D. Testing Agency Qualifications: Member Company of NETA or an NRTL.
 - 1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.
- E. Additional information that may assist the Owner in ascertaining the C. S. I.'s general ability to perform the work.
- F. Acceptability of the C. S. I. will be determined solely by the Owner.
- G. The Electrical Contractor, C. S. I., and the selected manufacturer shall anticipate that the Owner may withhold approval of the selected manufacturer if, in the opinion of the Owner, the manufacturer does not have the experience, capability or for performance and execution of similar projects in the past.
- H. The Electrical Contractor, C. S. I., and any manufacturer not approved by the Owner shall not be entitled to an extension of time or to any claim for damages because of extra and unanticipated costs, hindrances, delays or complications caused by or resulting from failure by the Owner to approve any manufacturer for whatever reason.

1.15 APPROVED CONTROL SYSTEM INTEGRATORS

- A. The Control System Integrator shall be selected by the Contractor from the following acceptable companies:
 - 1. Woodhawk Controls; Coeur d' Alene, ID; 208
 - 2. Taurus Power and Controls; Kent, WA; 425-656-4170.
 - 3. Technical Systems Inc.; Lynnwood, WA; 425-775-5696.
 - 4. Quality Controls, Inc.; Lynnwood, WA; 425-778-8280.
 - 5. Control Freek; Spokane, WA; 509-499-9849.
 - 6. QualiTEC; Liberty Lake, WA; 509-227-5686.
 - 7. Townsend Controls, Inc.; Pasco, WA; 509-524-9949.

- B. Other alternate System Integrators not listed above shall be considered for acceptability by the Owner based on the qualifications noted in 1.14 above and will be listed by addendum as necessary. Qualification shall be submitted to Engineer 10 days prior to the date to receive bids to be considered.

1.16 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment to the job site at the appropriate time for installation. Equipment items shall be crated or affixed to pallets with protective wrappings. Exercise care to prevent damage from handling. Store mechanical and electrical components off the ground in weathertight enclosures. Keep equipment dry at all times.

PART 2 PRODUCTS

2.1 GENERAL

- A. Design and Assembly:
 - 1. All equipment and materials utilized in the system shall be the products of reputable, experienced manufacturers with at least five (5) years experience in the manufacture of similar equipment. Similar items in the system shall be the products of the same manufacturer. All equipment shall be of industrial grade and of standard construction, shall be capable of long, reliable, trouble-free service, and shall be specifically intended for control and monitoring of operation of motor-driven pumps and equipment. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. All equipment, where practical, shall be of solid state, integrated circuit design.
 - 2. The system shall be completely assembled in the shop by the C. S. I. All components and equipment shall be prewired to the maximum extent possible.
 - 3. All components, including both internally and face-mounted instruments and devices, shall be clearly identified with phenolic nameplates of white background with black letters.
- B. Interconnecting Wiring and Terminals
 - 1. The C. S. I. shall determine all requirements for field-installed interconnecting wiring between control system components, sensors, pumps and equipment. The C. S. I. shall determine the number, size, and type of wires and the number, size, type, and location of conduits and wireways.
 - 2. The wire and conduit shown on the plans shall be considered only as general guidelines for signal and control circuits. The C. S. I. shall determine all specific requirements and shall confirm or modify the wiring and conduit shown on the plans to conform to such requirements.

3. All interconnecting wires installed by the manufacturer and installer shall be numbered at each end using custom pre-printed heat shrink sleeve markers. Markers shall be T&B, SHRINK-KON HVM or approved equal. Terminations shall be made using solderless pressure connectors at all terminations. All conductors shall be stranded wire with thermoplastic insulation and shall be cabled to groups and supported so as to prevent breaking and to present an orderly arrangement and neat appearance. All outgoing wiring shall be terminated on a marked terminal strip capable of connection of at least 2 No. 14 wires and all terminal connections shall be numbered consecutively throughout the system.
4. Provide 5 spare terminals in each enclosure that has terminals or 10 percent whichever is the greater amount. In addition, provide extra din rail with enough space for 20 percent more terminals.
5. For all energized circuits (power and control) powered from the panel and extend outside of the panel provide an individual fused terminal with appropriate fast blow fuse. Provide one fused terminal for each group of digital inputs associated with the control of a motor load.
6. (1/2 amp for PLC inputs) and “blown fuse” indicator light for each circuit.
7. For all signal circuits that extend outside of the panel provide an individual fused terminal with appropriate fusing and integral blown fuse indication. All 4 to 20 mA circuits shall be individually fused with a 1/16 amp fast blow fuse.
8. For all energized circuits powered outside of the panel which extend into the panel, provide a disconnecting terminal to isolate each individual circuit.
9. In general all control wiring shall be #14 AWG except PLC I/O wiring between the PLC cards and the terminal strips within the same cabinet shall be #18 AWG.
10. Provide wire ways as necessary in the enclosure to contain all internal wiring and all field wiring. Size wireways such that there is ample room for the wiring required by this contract. Wireways shall be filled to a maximum of 70 percent to allow 30 percent more future wire.
11. Low voltage DC control and signal conductors shall be bundled separately from alternating current circuits. Separate raceways and wire gutters shall be dedicated for AC and DC wiring, and labeled as such on the shop drawings. Wiring may cross at right angles if necessary. Special caution shall be used for PLC I/O card wiring and field terminations to accommodate the separation of AC and DC circuits. Intrinsically safe wiring shall be physically separated from non-intrinsically safe wiring.
12. All wiring shall be neatly tied in position with nylon cable ties. Instruments with portable cord connections shall be fed through the instrument panel plug strip which shall be located near the top of the panel directly above the instruments.

Instrument supply cords shall be the only panel wiring which is not continuously supported and tied.

13. All wiring and tubing crossing hinges shall be installed in a manner to prevent chafing. Bundles of similar conductors shall be clamped securely to the door and to the panel, and the bundles shall run parallel to the hinge for at least 12 inches. Spiral nylon cable wrap shall be provided in the hinge section of the bundle to fully protect the conductors or tubing against chafing.

2.2 PROGRAMMABLE CONTROL EQUIPMENT

- A. Programmable Logic Controller (PLC): In order to provide an integrated facility control system and common maintenance, the following PLCs with expansion modules were used as the basis of design.
 1. Allen Bradley CompactLogix, no equal.
 2. 16 Channel discrete input: 1769-IQ16
 3. 16 channel discrete output: 1769-OB16
- B. Programming of Programmable Controllers:
 1. Programming of the programmable controller (PLC) shall be by the Owner and shall not be included in the Electrical Contractors bid price.
- C. Terminals:
 1. Provide terminals for all wire connections to field wiring and internal power distribution. Analog loops that are 24 VDC powered shall have a knife switch to disable the loop if necessary. Connections shall have box type lugs capable of terminating 2 #14 AWG stranded wires. Terminals shall be strip mounted as manufactured by Phoenix Contact or equal.
 2. Provide terminals on a 1-1/2 inch raised track in control cabinets. Track shall be aluminum and bonded to the cabinet.
 3. Fuse terminal blocks shall be hinged disconnect level type with "blown fuse" indicators. PHOENIX CONTACT UK 5 series or equal.
 4. Disconnecting terminal blocks shall be knife type with light indicator PHOENIX CONTACT type MTK or equal.
 5. Provide 1 spare, or 3 percent whichever is the greater amount, spare (non installed) replacement terminals for each type used.
- D. Control Panel Circuit Breakers:

1. Control panel circuit breakers shall be thermal-magnetic type, supplementary overcurrent devices. Circuit breakers shall be snap mountable on five different types of mounting rails. Circuit breakers shall be sized for actual circuit load. Or as shown on the drawings. Provide 1 spare circuit breaker of each size used, or the number of spares shown on the drawings, whichever is greater
 2. Control panel circuit breakers shall be Allen-Bradley 1492-CB or 1492-GH, or approved equal.
- E. Fuses:
1. Fuses shall be of the type and amperage indicated on the drawings. The voltage rating shall be appropriate for the application indicated. The fuse types indicated on the drawings imply a certain set of fuse characteristics. No substitutions of fuse types will be allowed without written approval from the Engineer.
 2. Provide blown fuse indicators on all fuses.

2.3 RELAYS

- A. Relays for General Purpose:
1. Relays for general purpose use shall have 10 Amp contacts with the appropriate coil voltage for the application. All relays shall have an integral indicating light to show if there is coil voltage present. They shall have an 8-pin/blade base and matching socket. Appropriate relay shall be selected based on application from the control wiring diagrams.
 2. Units shall be Allen-Bradley 700 type HA, HB, IDEC RH Series, or approved equal.

PART 3 EXECUTION

3.1 FIELD TESTING

- A. The C. S. I. and Electrical Contractor shall perform operational testing of the control system in the field. Testing shall be conducted in two phases. The initial testing shall include, but not be limited to, operation of all input and output (I/O) points, control devices and motor controls.
- B. The initial testing of the control system shall include configuration of the PLC and its communications equipment, energizing each digital input and output and simulating each analog input and output using a loop simulator and calibrator. The I/O shall be tested in conjunction with the Electrical Contractor who is installing the instrumentation and control wiring. Circuits not energized shall be tested for continuity. Energized circuits shall be tested through all components from the field instrument to the hardware I/O memory locations in the PLC. If a point cannot be verified within 5

minutes of starting the check that point shall be noted as a punch list item to be corrected and re-tested at a later time.

- C. The C. S. I. shall provide an I/O checklist for all points in the control panel. The list shall include for each point, the tag name of the points, a description of the point, comments, date and time of the test, and a signature line for the person performing the test. Show that each Digital point was set and reset. Show verification of all Analog points at 0 percent, 25 percent, 50 percent, and 100 percent of range. The Checklist shall be submitted to the Engineer 1 week prior to the startup of the control system. The C. S. I. and the Electrical Contractor shall both be present for the verification of the I/O system by the Engineer.
- D. The C. S. I. shall ensure that control panels have been installed correctly and tested 1 week prior to the commencement of the system startup. Startup testing shall not begin until the panel installation has been completed and verified by the Engineer.

3.2 INSTALLATION

- A. The control system shall be installed in accordance with the installation drawings and instructions prepared by the C. S. I. Installation shall be performed by workers who are skilled and experienced in the installation of electrical instrumentation and control systems.
- B. Installation shall include all elements and components of control system and all conduit and interconnecting wiring between all elements, components, sensors and valve operators. All wiring between cabinets, sensors, pumps and equipment shall be multiple color coded for ease of servicing. All terminations shall be made with solderless pressure connectors. All wiring shall be in accordance with the requirements of Sections 16119 and 16123. Intrinsically safe wiring shall be separated with barriers per NEC requirements.
- C. Install a copy of the O&M wiring diagram for each controlled load in the associated drawing pocket of each MCC bucket.

3.3 CALIBRATION AND START-UP

- A. All components of the control system shall be calibrated by the C. S. I. after completion of installation. Each component shall be adjusted to be within the manufacturer's required range and for the specific application.
- B. Components that cannot be properly calibrated or that are found to exceed the manufacturer's specified range or accuracy shall be removed and replaced at no additional cost to the Owner.
- C. The control system shall be placed into operation by the C. S. I.
- D. All components shall be recorded on loop check-off forms and shall be witnessed tested by the Owner or representative.

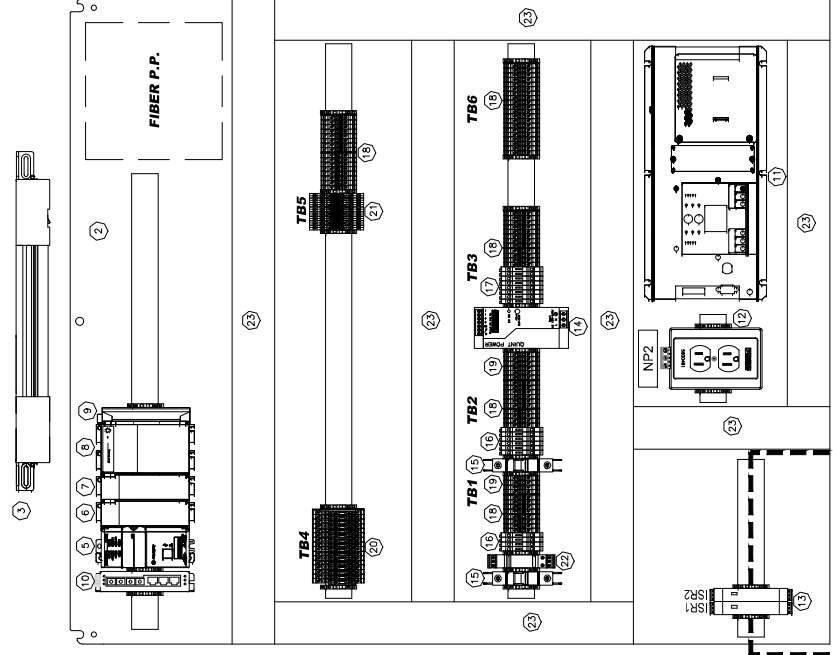
3.4 SYSTEM VALIDATION

- A. When the installation is ready for validation testing (as determined by Engineer), the Contractor shall commence integration testing of the control system. This shall determine that all system components connect up correctly to each other so that the system works as designed.
- B. The C. S. I. shall calibrate all instruments, indicators, recorders, loops, etc. and fill out appropriate test forms provided at the end of this section. Test forms shall be received by the Engineer prior to validation testing.
- C. After the integration testing is complete, validation testing shall be by the C. S. I. and Contractor, with the Owner and Engineer present. Validation testing shall include operation and verification of all control components and features of the entire control system. The Contractor shall inform the Engineer of the testing schedule at least one week prior to the commencement of testing. Validation testing shall be considered complete when the Owner and Engineer have determined that all of the original system requirements have been met.
- D. The Contractor shall revise, modify, adjust and reprogram the system as required during and following start-up to provide the operation required by the Engineer.
- E. Note: The Engineer shall not be called out by the Contractor for validation testing on equipment until all components are installed, all wiring points have been checked, and operation has been tested and verified by the Contractor.

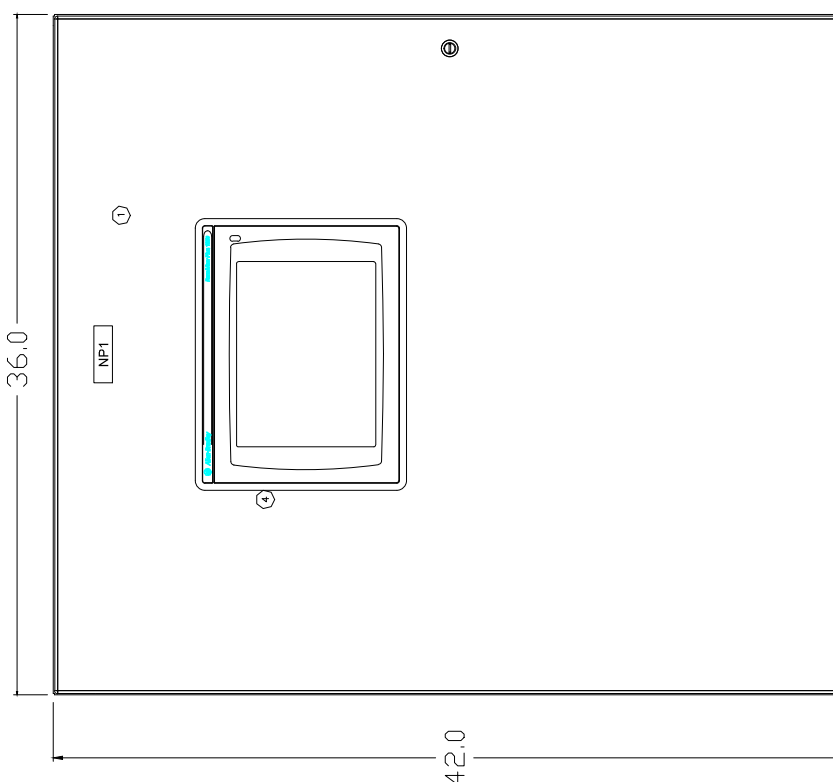
END OF SECTION

| BILL OF MATERIALS | | |
|-------------------|---------------|---|
| ITEM QTY | MANUF | PART NUMBER DESCRIPTION |
| 1 | HOFFMAN | CSD425R12 42" X 36" X 12" ENCLOSURE, NEMA 12 |
| 2 | HOFFMAN | CP4236 42" X 36" BACK PANEL |
| 3 | HOFFMAN | LEDX3M5 LED LIGHT |
| 4 | ALLEN-BRADLEY | 271NXTGCA48 1CT TOUCHSCREEN HMI |
| 5 | ALLEN-BRADLEY | 1786-LSE COMPACT LOGIC CPU |
| 6 | ALLEN-BRADLEY | 1786-H16 16 POINT 24VDC DISCRETE INPUT MODULE |
| 7 | ALLEN-BRADLEY | 1786-HF8 8 POINT ANALOG INPUT MODULE |
| 8 | ALLEN-BRADLEY | 1786-FM4 PLC POWER SUPPLY |
| 9 | ALLEN-BRADLEY | 1786-ECR PLC END CAP RIGHT |
| 10 | SIEMENS | 6ES7 307-1EA00-0AB0 3 PORT COPPER & FIBER ETHERNET SWITCH |
| 11 | PHOENIX | SLX-2MS4-ST 120VAC 15A DUPLEX RECEPTACLE |
| 12 | PHOENIX | 5600481 120VAC 15A DUPLEX UPS |
| 13 | PHOENIX | 2855884 2 CHANNEL INTRINSICALLY SAFE RELAY |
| 14 | PHOENIX | 2865750 24VDC 5A POWER SUPPLY |
| 15 | SQUARE D | 60110 SINGLE POLE 10A CIRCUIT BREAKER |
| 16 | PHOENIX | 3548100 120VAC FUSE BLOCK W/ INDICATION |
| 17 | PHOENIX | 3548000 24VDC FUSE BLOCK W/ INDICATION |
| 18 | PHOENIX | GMA-2 250V 2A 5X20MM FAST-BLOW GLASS FUSE |
| 19 | PHOENIX | 3541102 600V 30A 8MM TERMINAL BLOCK |
| 20 | PHOENIX | 3030271 8MM TERMINAL BLOCK JUMPER BAR |
| 21 | PHOENIX | 3547028 TERMINAL BLOCK END COVER |
| 22 | PHOENIX | 3022276 TERMINAL BLOCK END ANCHOR |
| 23 | PHOENIX | 1201720 150MM X 150MM PERFORATED STEEL DIN RAIL |
| 24 | PHOENIX | 3544108 600V 6MM GROUNDING BLOCK |
| 25 | PHOENIX | 3544220 2 LEVEL FUSE BLOCK |
| 26 | PHOENIX | 3238719 2 LEVEL 24VDC FUSE PLUG |
| 27 | PHOENIX | GMA-1A 500MM 1A FAST ACTING GLASS FUSE |
| 28 | PHOENIX | 2714537 3 LEVEL FUSE BLOCK |
| 29 | PHOENIX | 0921037 3 LEVEL 24VDC FUSE PLUG |
| 30 | PHOENIX | GMA-3A 500MM 3A FAST ACTING GLASS FUSE |
| 31 | PHOENIX | 2856912 120VAC SPD |
| 32 | PHOENIX | F233VHR W/ C2WH6 2" X 3" WHITE WIRE DUCT AND COVER |

| DEVICE NAMEPLATE DATA | |
|-----------------------|-----------------------|
| ITEM | LINE 1 / LINE 2 |
| NP1 | CONTROL PANEL LCP-SL |
| NP2 | PLC USE ONLY 1786-MAX |



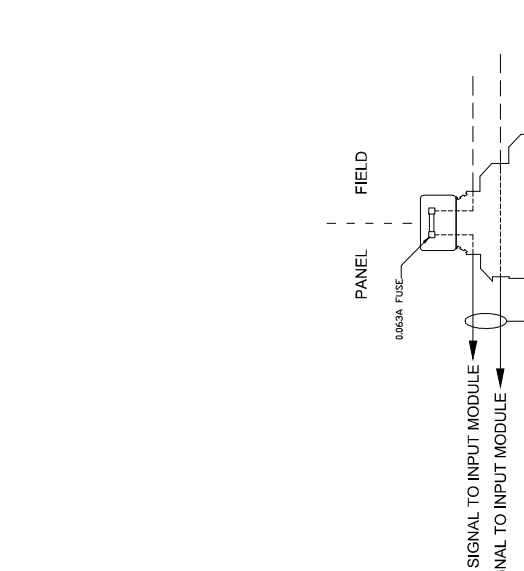
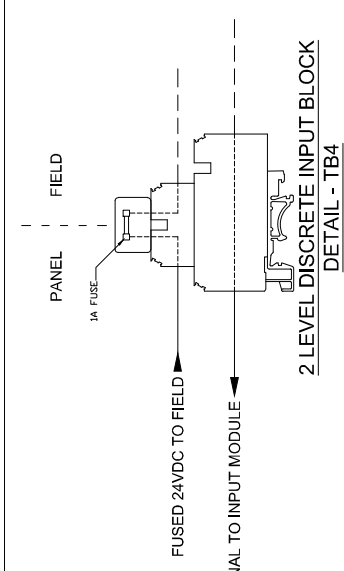
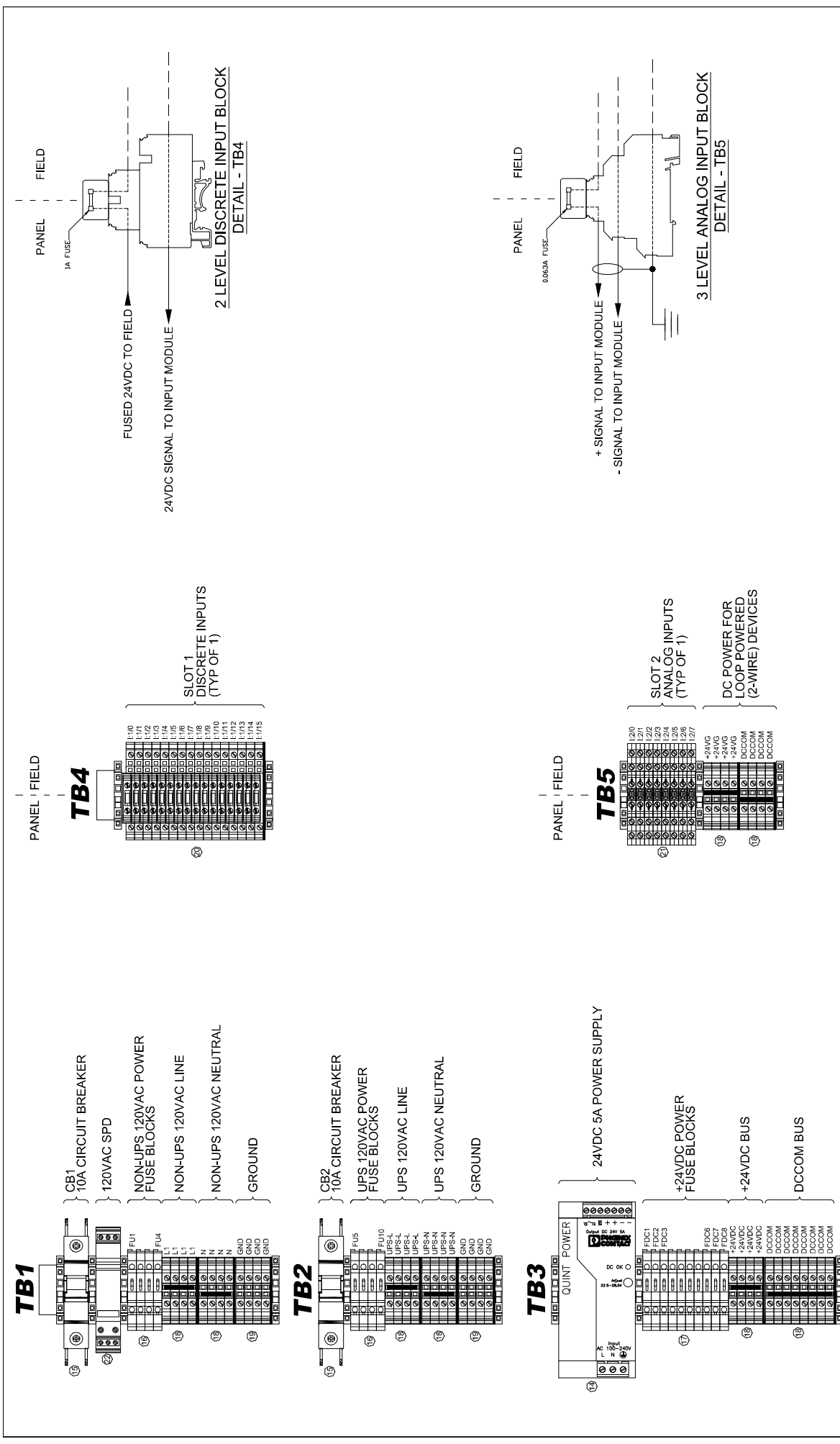
BACKPANEL VIEW



EXTERIOR PANEL VIEW

| | | | | | | | | |
|----|---|--|--------|---|---|---|--|-----------------|
| BY | - | REVISION DESCRIPTION | DATE | - | - | - | PROJECT DESCRIPTION: | PROJECT NUMBER: |
| | | CITY OF POST FALLS WASTEWATER, POST FALLS, IDAHO HW, EQ AND SLUDGE IMPROVEMENTS PROJECT | 150701 | | | | | |
| | | | | | | | DRAWING DESCRIPTION: | DRAWING NUMBER: |
| | | | | | | | LCP-SL PLC CONTROL PANEL CONTROL PANEL LAYOUT AND BOM | E-1 |

CONTROLFREEK, INC.
11616 E. Montgomery Dr., Suite 9
Spokane Valley, WA 99206

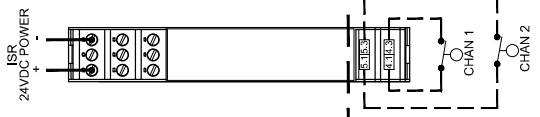
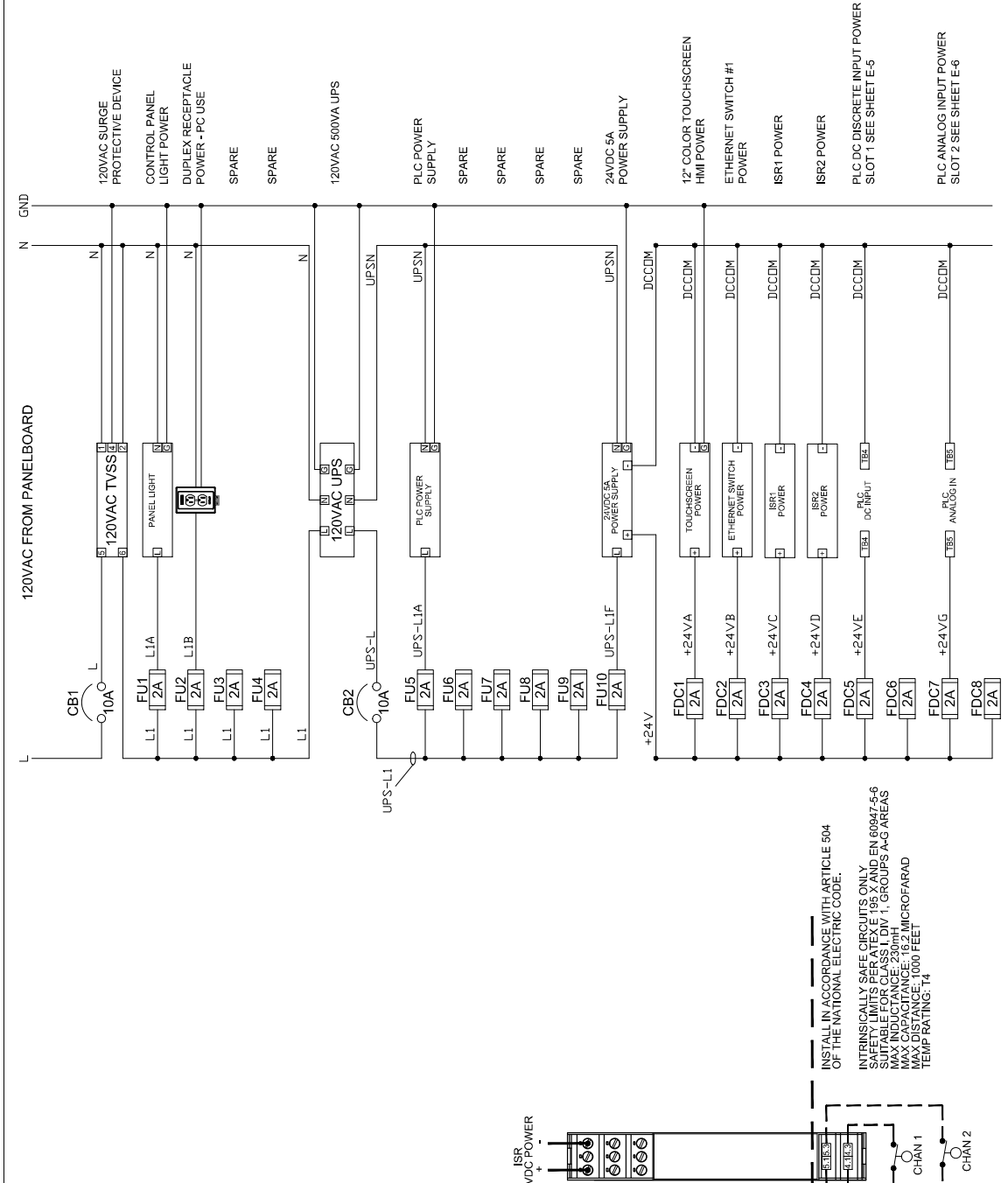


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| PROJECT DESCRIPTION: | | PROJECT NUMBER: |
| CITY OF POST FALLS WASTEWATER, POST FALLS, IDAHO HW, EQ AND SLUDGE IMPROVEMENTS PROJECT | | 150701 |
| DRAWING DESCRIPTION: | | DRAWING NUMBER: |
| LCP-SL PLC CONTROL PANEL TERMINAL BLOCK DETAILS | | E-2 |
| REVISION DESCRIPTION | | |
| BY | DATE | |
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 11616 E. Montgomery Dr., Suite 9
 Spokane Valley, WA 99206

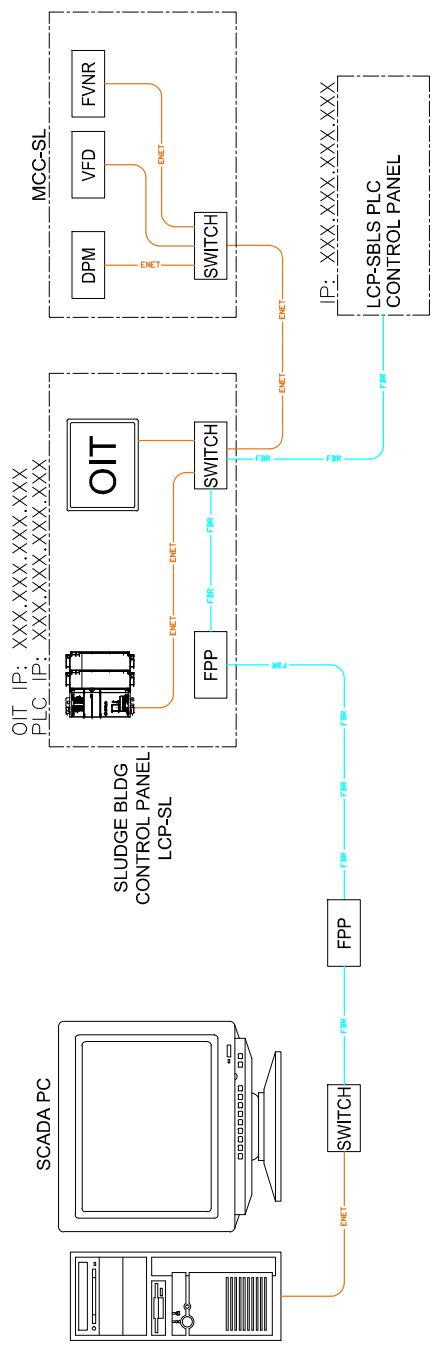
UL 508A WIRE COLOR CODE:
BLACK - all ungrounded control circuit conductors operating at the supply voltage.
RED: ungrounded ac control circuit conductors.
WHITE: grounded ac current-carrying control circuit conductor regardless of voltage.
GREEN W/ YELLOW STRIPE: used for grounding conductors.
YELLOW: ungrounded control circuits or other wiring that remain energized when the main disconnect is in the OFF position.
WHITE W/ YELLOW STRIPE: grounded ac control circuit current carrying conductor that remains energized when main disconnect switch is in the OFF position.
BLUE: ungrounded dc control circuits.
WHITE W/ BLUE STRIPE: grounded dc current-carrying control circuit conductor.
GREY: ungrounded dc current carrying control circuit conductor

NOTE:
 Control circuit conductors for programmable input/output and static control wiring are able to be sized 18 - 30 AWG.
WIRE TEMPERATURE RATING VALUES:
 TERMINALS RATED LESS THAN 100A: 60° C
 COPPER CONDUCTORS ONLY
TIGHTENING TORQUE VALUES:
 CIRCUIT BREAKER: 21 lb/inches
 FUSE BLOCKS: 5.3 - 7.1 lb/inches
 TERMINAL BLOCKS: 5.3 - 7.1 lb/inches
 RELAYS: 4.4 lb/inches

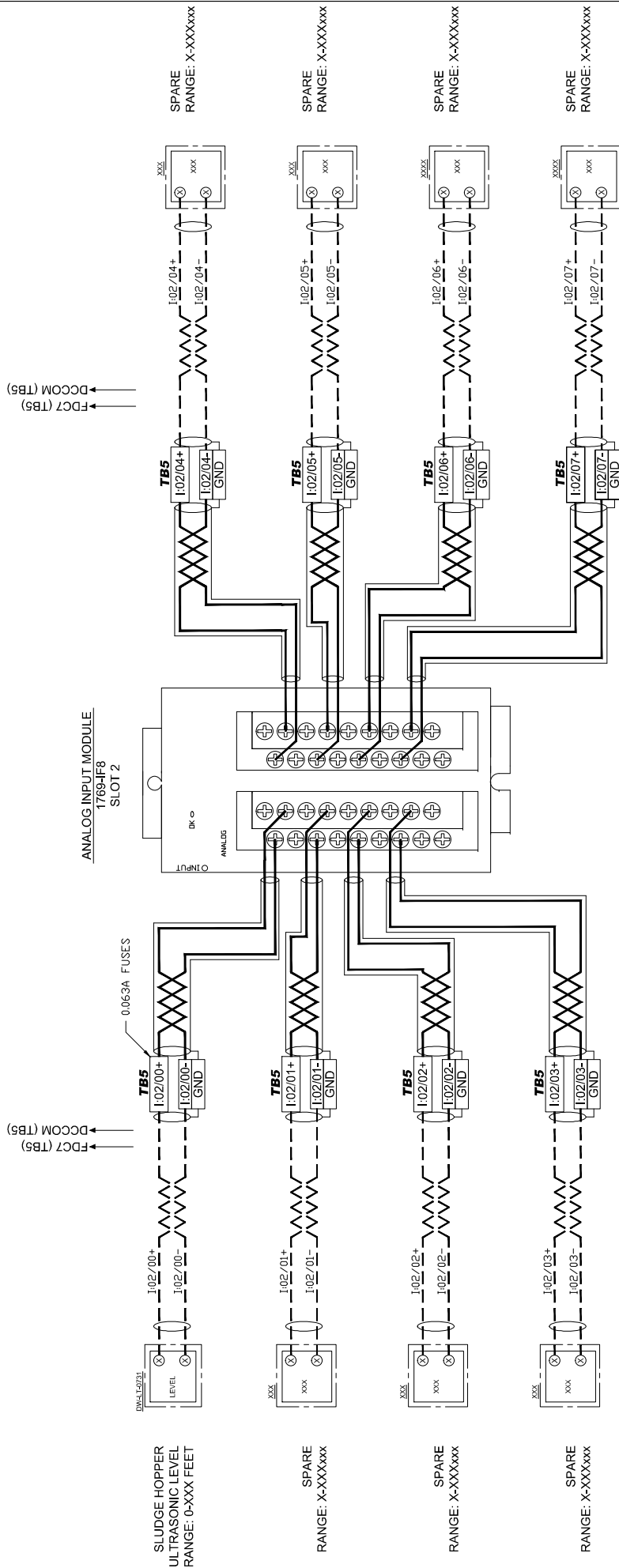


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| | | PROJECT DESCRIPTION: | | PROJECT NUMBER: | |
| | | CITY OF POST FALLS WASTEWATER, POST FALLS, IDAHO HW, EQ AND SLUDGE IMPROVEMENTS PROJECT | | 150701 | |
| | | DRAWING DESCRIPTION: | | DRAWING NUMBER: | |
| | | LCP-SL PLC CONTROL PANEL POWER DISTRIBUTION DIAGRAM | | E-3 | |
| BY: - | | REVISION DESCRIPTION: | | DATE: | |
| | | | | | |

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 11616 E. Montgomery Dr., Suite 9
 Spokane Valley, WA 99206



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|----|---|----------------------|---|---|----------------|
| BY | - | REVISION DESCRIPTION | CONTROLFREEK, INC. 11616 E. Montgomery Dr., Suite 9 Spokane Valley, WA 99206 | PROJECT DESCRIPTION: CITY OF POST FALLS WASTEWATER, POST FALLS, IDAHO HW, EQ AND SLUDGE IMPROVEMENTS PROJECT DRAWING DESCRIPTION: LCP-SL PLC CONTROL PANEL NETWORK DIAGRAM | PROJECT NUMBER |
| | | - / - / - | | | DATE |
| | | | | | DRAWING NUMBER |
| | | | | | E-4 |

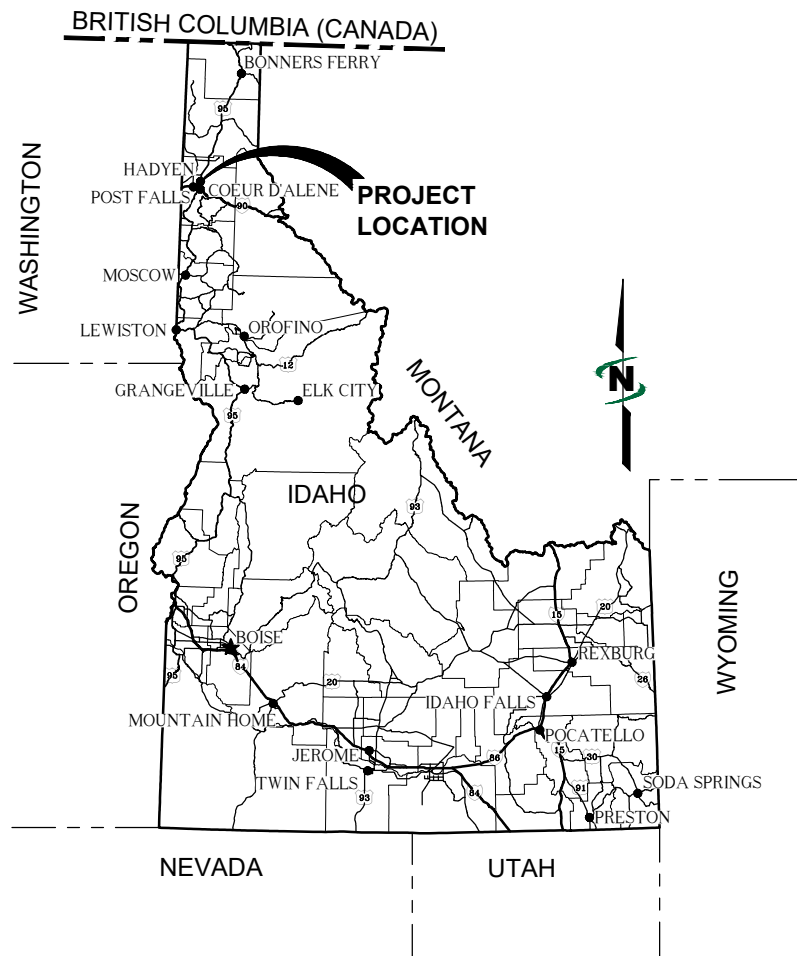


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| BY | REVISION DESCRIPTION | DATE | CONTROLFREEK, INC. 11616 E. Montgomery Dr., Suite 9 Spokane Valley, WA 99206 | PROJECT DESCRIPTION: CITY OF POST FALLS WASTEWATER, POST FALLS, IDAHO HW, EQ AND SLUDGE IMPROVEMENTS PROJECT | PROJECT NUMBER: 150701 |
| - | | -/- | | LCP-SL PLC CONTROL PANEL PLC SLOT 2 ANALOG INPUT MODULE | DRAWING NUMBER: E-6 |

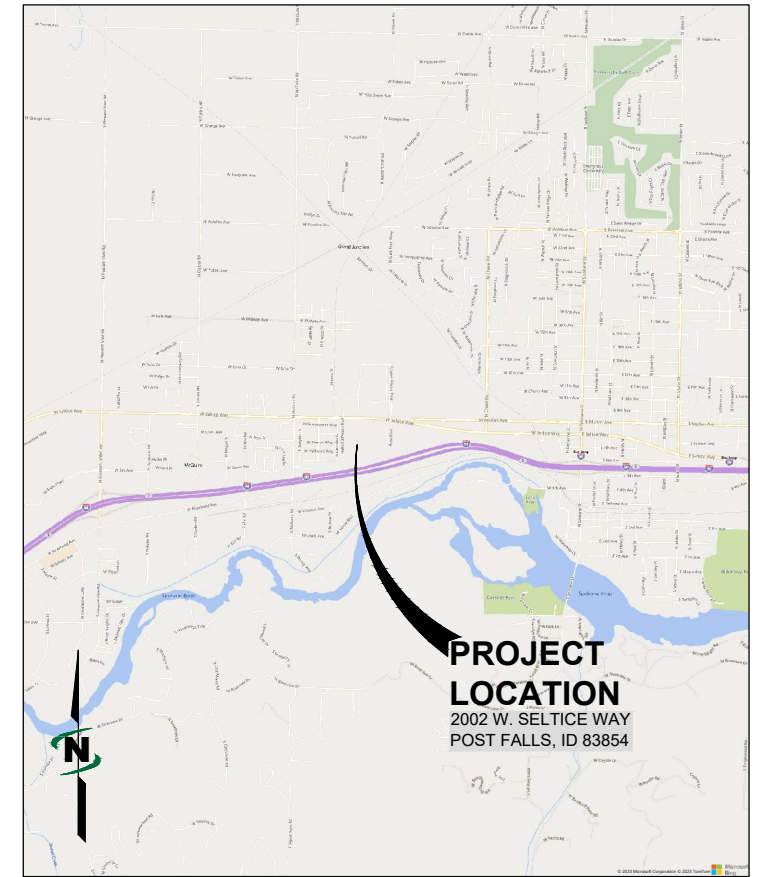
BIOSOLIDS HOPPER MODIFICATIONS CITY OF POST FALLS

KOOTENAI COUNTY, IDAHO
January 2024

OWNER
THE CITY OF POST FALLS



LOCATION MAP
NOT TO SCALE



VICINITY MAP
NTS



PROJECT NO. 20-23-033



J-U-B ENGINEERS, INC.
7825 Meadowlark Way, Coeur d'Alene, ID 83815
p | 208 762 8787 f | 208 762 9797 w | www.jub.com

- CITY OF POST FALLS
 RON JACOBSON, MAYOR
 SAMANTHA STEIGLEDER, CITY COUNCIL SEAT 1
 JOSH WALKER, CITY COUNCIL SEAT 2
 JOE MALLOY, CITY COUNCIL PRESIDENT SEAT 3
 NATHAN ZIELGER, CITY COUNCIL SEAT 4
 RANDY WESTLUND, CITY COUNCIL SEAT 5
 KENNY SHOVE, CITY COUNCIL SEAT 6
 SHELLY ENDERUD, CITY ADMINISTRATOR.....(208) 773-3511
 JOHN BEACHAM, PUBLIC WORKS DIRECTOR.....(208) 457-3374
 CRAIG BORRENPOHL, P.E., UTILITIES MANAGER.....(208) 777-9857
 ANDREW ARBINI, UTILITIES PROJECT MANAGER.....(208) 777-9857
 BILL MELVIN, CITY ENGINEER.....(208) 773-4235
 ADAM TATE, CHIEF OPERATOR.....(208) 773-1438
 SHERIFF.....911 or (208) 446-1300
 AMBULANCE.....911
 FIRE DEPARTMENT KC FIRE AND RESCUE.....911 or (208) 772-5711
 DIGLINE.....811
 AVISTA.....(800) 936-6629
 IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY
 KATY BAKER-CASILE, P.E. - ENGINEERING MANAGER.....(208) 666-4622
 EAST GREENACRES IRRIGATION DISTRICT
 RON WILSON.....(208) 773-7579



Know what's below.
Call before you dig.

CALL 2 BUSINESS DAYS IN ADVANCE BEFORE
YOU DIG, GRADE, OR EXCAVATE FOR THE
MARKING OF UNDERGROUND MEMBER
UTILITIES

LAST UPDATED: 1/9/2024
SHEET:
1
DRAWING:
G-001

File Date: 1/9/2024 1:05 PM, Plotted By: William Baker, File Path: \\C:\Users\wjbaker\OneDrive\Documents\20-23-033\G-001X.DWG

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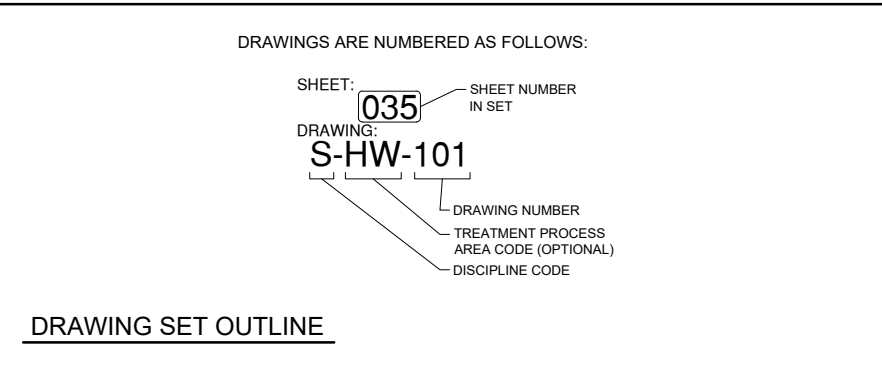
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| SHEET INDEX | | DESCRIPTION |
|---|---------------------------------------|----------------------|
| DRAWING TITLE | | |
| GENERAL (G) | | |
| G-001 | COVER SHEET | |
| G-002 | SHEET INDEX AND LEGENDS | |
| G-003 | PROJECT OVERVIEW | |
| STRUCTURAL (S) | | |
| S-001 | STRUCTURAL GENERAL NOTES | |
| S-DW-101 | BIOSOLIDS HOPPER | PLAN VIEW |
| S-DW-501 | BIOSOLIDS HOPPER | SECTIONS AND DETAILS |
| PROCESS MECHANICAL (D) | | |
| D-DW-001 | DEWATERING AREA OVERVIEW | |
| DX-DW-101 | DEMOLITION PLAN | |
| D-DW-101 | BIOSOLIDS HOPPER | PLAN VIEW |
| D-DW-301 | BIOSOLIDS HOPPER | SECTION VIEWS |
| D-DW-302 | BIOSOLIDS HOPPER | SECTION VIEWS |
| D-DW-501 | BIOSOLIDS HOPPER | SECTIONS AND DETAILS |
| D-DW-502 | BIOSOLIDS HOPPER | SUPPORT DETAILS |
| D-DW-503 | BIOSOLIDS HOPPER | SECTIONS AND DETAILS |
| ELECTRICAL (E) | | |
| E-001 | ELECTRICAL LEGEND | |
| E-DW-001 | ONE-LINE DIAGRAM AND LOAD CALCULATION | |
| E-DW-002 | WIRING DIAGRAMS | |
| E-DW-003 | CONDUIT AND WIRE SCHEDULE | |
| E-DW-101 | POWER AND CONTROL PLAN | |
| E-DW-102 | POWER AND CONTROL PLAN | |
| PROCESS AND INSTRUMENTATION DIAGRAMS (I) | | |
| I-001 | LEGEND | |
| I-701 | DEWATERING AREA | |
| I-702 | DEWATERING AREA | |

| SUBPROCESS NUMERICAL IDENTIFIERS | SUBPROCESS DESCRIPTION | EXAMPLE EQUIPMENT TAG |
|----------------------------------|---|-------------------------------------|
| 0100 to 0149 | NA | HW-P-0110 |
| 0150 to 0199 | NA | EQ-P-0151 |
| 0200 to 0249 | NA | AN-MX-0201 |
| 0250 to 0299 | NA | AO-MX-0252 |
| 0300 to 0399 | NA | OD-AER-0301 |
| 0400 to 0499 | NA | SC5-CL-0401 RAS5-P-0401 WAS5-P-0401 |
| 0500 to 0599 | NA | OD5-AER-0501 |
| 0600 to 0699 | NA | SC8-CL-0601 RAS8-P-0601 WAS8-P-0601 |
| 0700 to 0799 | NA | DW-BFP-0701 |
| 0800 to 0899 | this process group is going to be replaced this project | |
| 0900 to 0999 | this process group is going to be replaced this project | DI-P-0901 |
| 1000 SERIES | | |
| 1000 to 1099 | PUMP STATION | |
| 2000 SERIES | | |
| 2000 to 2099 | 1ST STAGE PLATE SETTLER CHEM INJECTION/RAPID MIXING | TC1-MX-2001 |
| 2100 to 2199 | 1ST STAGE FLOCCULATION BASINS/MIXERS | TC1-MX-2101 |
| 2200 to 2299 | PLATE SETTLERS AND SLUDGE DRAW-OFF SYSTEMS | TC1-TK-2201 |
| 2300 to 2399 | PLATE SETTLER SLUDGE PUMPS | TC1-P-2301 |
| 2400 to 2499 | PLATE SETTLER DRAIN PUMPS | TC1-P-2401 |
| 3000 SERIES | | |
| 3000 to 3099 | MF WETWELL/RAPID MIX/EQUALIZATION BASIN AND MF SYSTEM | |
| 3100 to 3199 | MF UNIT DETAIL I - MF FEED PUMP AND AUTOSTRAINER | |
| 3200 to 3299 | MF UNIT DETAIL II - MF MODULE RACK | |
| 3300 to 3399 | MF FILTRATE TANK AND BACKWASH SUPPLY SYSTEM | |
| 3400 to 3449 | SCOUR AIR SYSTEM | |
| 3450 to 3499 | COMPRESSED AIR | |
| 3500 to 3529 | MF CLEANING SYSTEM - TANKS | |
| 3530 to 3599 | MF CLEANING SYSTEM - PUMPS | |
| 3600 to 3649 | SODIUM HYPOCHLORITE SYSTEMS | |
| 3650 to 3699 | CITRIC ACID SYSTEMS | |
| 3700 to 3749 | SODIUM HYDROXIDE (CAUSTIC) SYSTEMS | |
| 3750 to 3799 | SODIUM BISULFITE SYSTEMS | |
| 3800 to 3849 | HIGH pH NEUTRALIZATION | |
| 3850 to 3899 | LOW pH NEUTRALIZATION | |
| 3900 to 3949 | ALUM SYSTEMS | |
| 3950 to 3999 | RESERVED | |
| 4000 SERIES | | |
| 4000 to 4099 | UV DISINFECTION | UV-HV-4001 |
| 4100 to 4149 | UTILITY (PLANT WATER) PUMPING SYSTEMS | NPW1-P-4101 |
| 4150 to 4199 | RECYCLED WATER (CLASS A REUSE) PUMPING | |
| 4200 to 4249 | POTABLE WATER | |
| 4250 to 4299 | POTABLE WATER FOLLOWING AIR-GAP AND REPUMPING | |
| 4300 to 4349 | RESERVED | |
| 4350 to 4399 | RESERVED | |
| 4400 to 4449 | RESERVED | |
| 4450 to 4499 | RESERVED | |
| 4500 to 4549 | PLANT DRAIN PUMP STATION NO. 2 | |



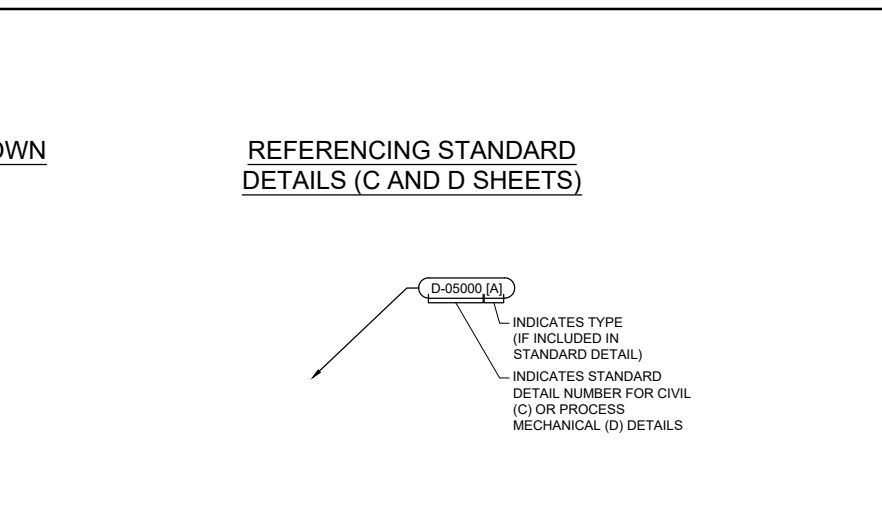
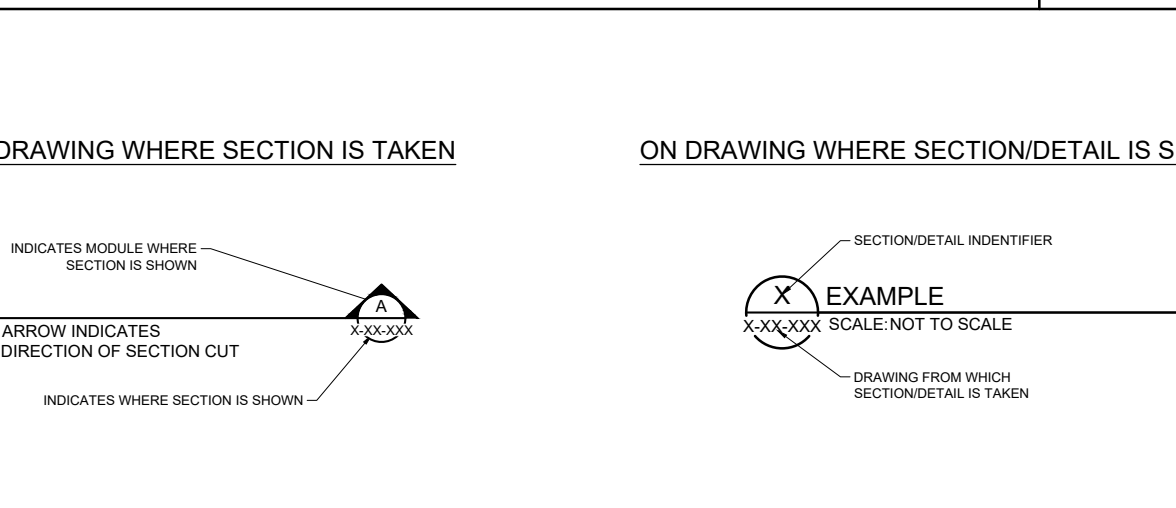
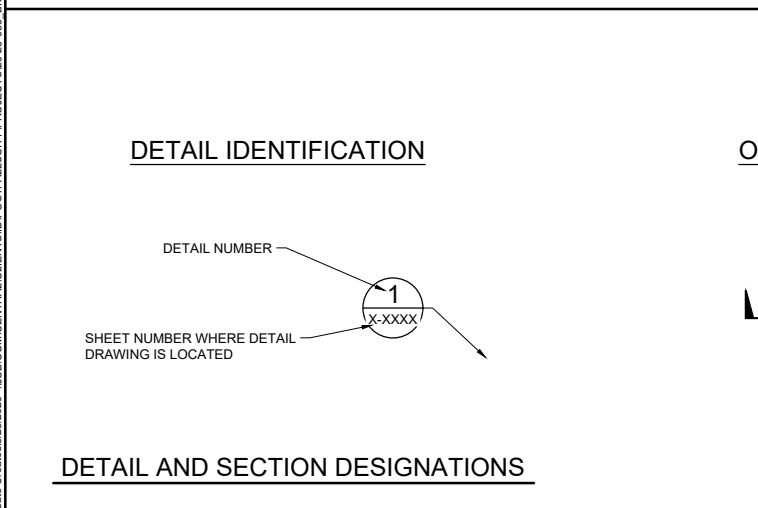
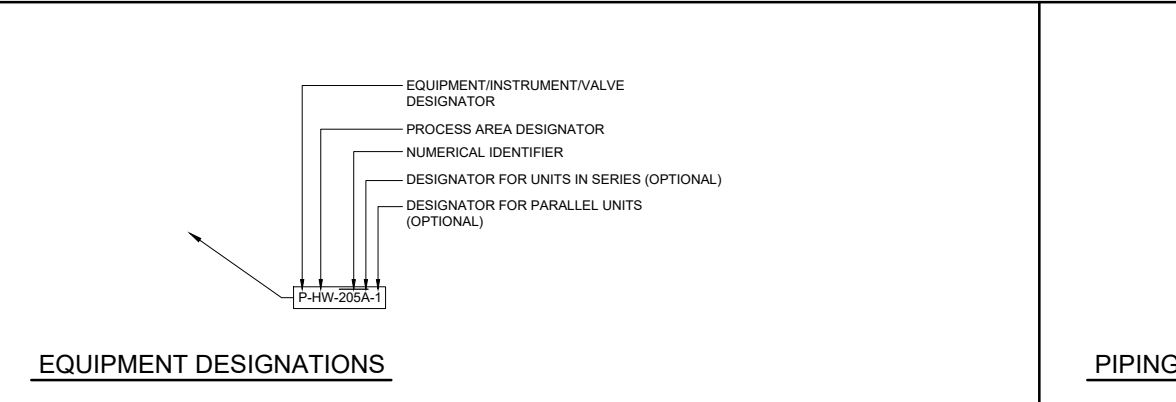
DRAWING SET OUTLINE

| | |
|----|---|
| G | GENERAL |
| V | SURVEY |
| C | CIVIL (GENERAL) |
| CG | CIVIL GRADING |
| CU | CIVIL UTILITIES |
| S | STRUCTURAL |
| A | ARCHITECTURAL |
| D | PROCESS MECHANICAL |
| M | MECHANICAL - HVAC AND PLUMBING |
| E | ELECTRICAL |
| I | INSTRUMENTATION & CONTROLS |
| #Z | STANDARD/TYPICAL DETAILS FOR DISCIPLINE "#" |

DISCIPLINE CODES

| | |
|-----|-------------------------------------|
| 000 | GENERAL / ISOMETRICS |
| 100 | PLAN VIEWS |
| 200 | ELEVATIONS |
| 300 | SECTIONS |
| 400 | ENLARGED PLANS/SECTIONS/ELEVATIONS |
| 500 | DETAILS |
| 600 | SCHEMATICS |
| 700 | DIAGRAMS |
| 800 | CONTROL DESCRIPTIONS / USER DEFINED |
| 900 | TYPICAL DETAILS |

DRAWING NUMBERS



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STATE OF IDAHO

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BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS

GENERAL (G)
SHEET INDEX AND LEGENDS

FILE: 20-23-033-G-001X
JUB PROJ. #: 20-23-033
DRAWN BY: WRH
DESIGN BY: STK
CHECKED BY: RMC

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LAST UPDATED: 1/9/2024

SHEET: 2
DRAWING: G-002

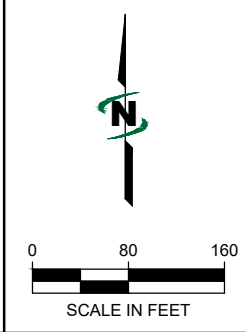
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Plot Date: 1/9/2024 12:19 PM. Printed By: William Holder
 Date Created: 2/22/2023 JUB.COM\CENTRAL\CLIENTS\ID\POSTFALL\CITY\PROJECTS\23-033_BIOSOLIDS\HOPPER\DESIGN\CAD\SH-ET-23-033_G-001X.DWG

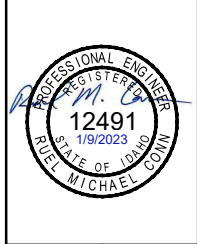


| EXISTING FACILITIES # | |
|-----------------------|--|
| 1 | HEADWORKS |
| 2 | EQUALIZATION TANK 1 |
| 3 | EQUALIZATION TANK 2 |
| 4 | EQUALIZATION PUMP STATION |
| 5 | BIOFILTER SYSTEMS |
| 6 | LABORATORY/CONTROL BUILDING |
| 7 | ADMIN BUILDING 1 |
| 8 | ADMIN BUILDING 2 |
| 9 | SPLITTER BOX S-1 |
| 10 | SLUDGE STORAGE BUILDING |
| 11 | DEWATERING BUILDING |
| 12 | UTILITY BUILDING 1 |
| 13 | SLUDGE HOLDING TANKS |
| 14 | SECONDARY CLARIFIERS 1 AND 2 |
| 15 | SECONDARY CLARIFIER 3 |
| 16 | SECONDARY CLARIFIER 4 |
| 17 | SECONDARY CLARIFIER 5 |
| 18 | SECONDARY CLARIFIER 6 |
| 19 | SECONDARY CLARIFIER 7 |
| 20 | SECONDARY CLARIFIER 8 |
| 21 | OXIDATION DITCH 1 |
| 22 | OXIDATION DITCH 2 |
| 23 | OXIDATION DITCH 3 |
| 24 | OXIDATION DITCH 4 |
| 25 | OXIDATION DITCH 5 |
| 26 | OXIDATION DITCH 6 |
| 27 | UTILITY BUILDING 2 |
| 28 | OD 1 TO 4 AN SELECTOR BASINS |
| 29 | OD 5 AND 6 AN & AO SELECTOR BASINS |
| 30 | UV DISINFECTION (OLD BUILDING) |
| 31 | EFFLUENT PARSHALL FLUME |
| 32 | UTILITY WATER PUMP STATION (INTERMEDIATE PARSHALL FLUME) |
| 33 | INTERMEDIATE PUMP STATION (SECONDARY EFFLUENT) |
| 34 | TERTIARY PLATE SETTLERS |
| 35 | CHEMICAL STORAGE SYSTEMS |
| 36 | MEMBRANE FILTRATION |
| 37 | UV DISINFECTION AND UTILITY WATER PUMPING |
| 38 | SLUDGE LOADING FACILITY |
| 39 | PLANT DRAIN PUMP STATION 1 |
| 40 | PLANT DRAIN PUMP STATION 2 |

| NEW OR MODIFIED FACILITIES X | |
|------------------------------|---------------------------|
| A | BIOSOLIDS HOPPER UPGRADES |




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BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS
 GENERAL (G)
 PROJECT OVERVIEW

| | |
|---|------------------|
| FILE: | 20-23-033_G-001X |
| JUB PROJ. #: | 20-23-033 |
| DRAWN BY: | WRH |
| DESIGN BY: | STK |
| CHECKED BY: | RMC |
| AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY | ONE INCH |
| LAST UPDATED: | 9/23/2023 |
| SHEET: | 3 |
| DRAWING: | G-003 |

GENERAL REQUIREMENTS

- 1. THESE GENERAL STRUCTURAL NOTES AND SPECIFICATIONS SUPPLEMENT THE PROJECT WRITTEN TECHNICAL SPECIFICATIONS AND THE PROJECT STRUCTURAL DRAWINGS.
2. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION BRACING, TEMPORARY SHORING, AND OTHER SITE SAFETY CONTROLS REQUIRED DURING CONSTRUCTION IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS, TO INSURE THE STABILITY AND SAFETY OF ALL CONSTRUCTION UNTIL IT IS COMPLETED AND SELF-SUPPORTING.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL WATER, BOTH ABOVE AND BELOW GROUND, RUNOFF AND OTHER ENVIRONMENTAL CONTROLS REQUIRED DURING CONSTRUCTION TO INSURE THE SITE IS MAINTAINED IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
4. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION DETAILS AND METHODS FOR THIS STRUCTURE. CONNECTION DETAILS AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR IN NATURE TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE ENGINEER FOR CLARIFICATION OR INSTRUCTION.
5. PRIOR TO IMPLEMENTING ANY CHANGES TO THESE PLANS, THE ENGINEER SHALL BE NOTIFIED IN WRITING FOR THEIR WRITTEN APPROVAL. CHANGES IMPLEMENTED WITHOUT THE ENGINEERS WRITTEN APPROVAL SHALL RELIEVE THE ENGINEER OF ANY CLAIM OR LIABILITY RESULTING FROM THAT PORTION OF THE STRUCTURE CHANGED OR AFFECTED BY THE CHANGE.

CONTRACTOR RESPONSIBILITY FOR COORDINATION

- 1. IT IS THE CONTRACTORS PRIME RESPONSIBILITY TO COORDINATE THE WORK SHOWN ON ALL OF THE PROJECT DRAWINGS, GENERAL, SPECIAL AND TECHNICAL SPECIFICATIONS.
2. THE CONTRACTOR IS RESPONSIBLE TO VERIFY ALL EXISTING CONSTRUCTION MATERIAL TYPES DIMENSIONS, ELEVATIONS AND CONDITIONS. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS AMONG ALL DRAWINGS AND IN THE FIELD PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION, ANY DISCREPANCY SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER.
4. IT IS THE CONTRACTORS RESPONSIBILITY TO CAREFULLY STUDY AND COORDINATE THE CONSTRUCTION REQUIREMENTS SHOWN ON THE STRUCTURAL DRAWINGS. WHEN CONFLICTS OR DISCREPANCIES ARE FOUND BETWEEN THESE PLAN SETS AND/OR WITHIN THESE DRAWINGS, THE CONTRACTOR SHALL REPORT THEM IMMEDIATELY TO THE PROJECT ENGINEER FOR DIRECTION AND/OR CLARIFICATION.
5. ANY CONSTRUCTION WORK DONE BY THE CONTRACTOR BEFORE OBTAINING SUCH CLARIFICATION FROM THE PROJECT ENGINEER SHALL BE AT THE CONTRACTORS OWN RISK AND COST. FURTHERMORE; ANY WORK REQUIRED TO CORRECT, REPLACE AND/OR RESTORE THE WORK AS DIRECTED BY THE ENGINEER SHALL BE AT THE CONTRACTORS OWN RISK AND COST.

CODES

- 1. INTERNATIONAL BUILDING CODE, IBC 2018 EDITION.
2. MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES, ASCE 7-16.
3. AMERICAN CONCRETE INSTITUTE, ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE; REFERENCED EDITION.
4. AMERICAN CONCRETE INSTITUTE, ACI 530, BUILDING CODE REQUIREMENTS AND SPECIFICATIONS FOR MASONRY STRUCTURES; CURRENT EDITION.
5. AMERICAN CONCRETE INSTITUTE, ACI 301, SPECIFICATIONS FOR STRUCTURAL CONCRETE.
6. AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AISC 14TH EDITION, STEEL CONSTRUCTION MANUAL.
7. AMERICAN INSTITUTE OF STEEL CONSTRUCTION, AISC 360, SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS; CURRENT EDITION.
8. AMERICAN WELDING SOCIETY, AWS D1.1 CURRENT EDITION, STRUCTURAL WELDING CODE.

SUBMITTALS

SUBMIT PRODUCT OR MATERIAL INFORMATION TO THE ARCHITECT/ENGINEER FOR REVIEW FOR THE FOLLOWING ITEMS:

- 1. CONCRETE MIX DESIGNS AND ADMIXTURES.
2. NON-SHRINK GROUT.
3. EXPANSION BOLTS.
4. ADHESIVE ANCHORS.
5. STRUCTURAL MASONRY GROUT AND MORTAR MIX DESIGNS.
6. STRUCTURAL CONCRETE BLOCK OR BRICK.
7. STRUCTURAL STEEL MILL CERTIFICATES.
8. LIGHT-GAGE STRUCTURAL STEEL MEMBERS.
9. WELDING PROCEDURE SPECIFICATION, WPS, FOR EACH TYPE 1 MOMENT CONNECTION WELD ON THE PROJECT.
10. WELDING ELECTRODES.

SHOP DRAWINGS

SUBMIT SHOP DRAWINGS TO THE ARCHITECT/ENGINEER FOR REVIEW PRIOR TO FABRICATION OF THE FOLLOWING ITEMS:

- 1. REINFORCING STEEL FOR MASONRY WALLS.
2. STRUCTURAL STEEL.
3. MISCELLANEOUS STEEL FABRICATIONS INCLUDING STAIRS, LADDERS, BAR-GRATING, FLOOR PLATE AND ACCESS DOORS AND HATCHES.

SPECIAL INSPECTIONS

SPECIAL INSPECTIONS PER IBC CHAPTER 17 ARE REQUIRED FOR THE FOLLOWING ITEMS:
C INDICATES CONTINUOUS, P INDICATES PERIODIC.

Table with 2 columns: Inspection Item and Frequency. Items include Post Installed Concrete Anchors, Structural Masonry, Structural Steel, and various welding and installation tasks.

DESIGN CRITERIA

- 1. RISK CATEGORY; ASCE TABLE 1.5-2-III
2. DEAD LOADS:
3. EXISTING EQUIPMENT WEIGHTS AS PROVIDED BY MFR DRAWINGS
4. WIND:
A. ULTIMATE DESIGN WIND SPEED, Vult; 115 MPH
B. NOMINAL DESIGN WIND SPEED, Vdesf; 90 MPH
C. SITE WIND EXPOSURE: C
D. WIND IMPORTANCE FACTOR: 1.15
E. ENCLOSURE CLASSIFICATION: ENCLOSED BUILDING
F. INTERNAL PRESSURE COEFFICIENTS: +0.18 TO -0.18
G. COMPONENT & CLADDING (FOR DEFERRED SUBMITTALS)
a. DESIGN WIND PRESSURES: +35PSF - 25 PSF
5. EARTHQUAKE:
A. SEISMIC IMPORTANCE FACTOR, Ie; 1.25
B. MAPPED SPECTRAL RESPONSE ACCELERATION:
a. SHORT PERIOD, Ss; 0.327g
b. 1-SECOND, S1; 0.113g
C. SOIL SITE CLASS: D
D. DESIGN SPECTRAL RESPONSE ACCELERATION PARAMETERS:
a. SHORT PERIOD, Sds; 0.335g
b. 1-SECOND, S1d; 0.178g
E. SEISMIC DESIGN CATEGORY: C
F. BASIC SEISMIC FORCE RESISTING SYSTEM(S):
a. ANALYSIS PROCEDURE: SEISMIC DESIGN OF NON-STRUCTURAL COMPONENTS
b. COMPONENT AMPLIFICATION FACTOR, a; 1.0
c. COMPONENT RESPONSE MODIFICATION FACTOR, Rp; 1.5
d. ANCHORAGE OVERSTRENGHT FACTOR, Q; 2.0

STAINLESS STEEL

- 1. ALL STEEL NOTED AS STAINLESS INCLUDING SHAPES, PLATES, BARS, PIPE, TUBING, FASTENERS, ANCHOR RODS AND ASSOCIATED MISCELLANEOUS STEEL ITEMS SHALL BE STAINLESS STEEL, GRADE 304 OR 316, UNLESS SPECIFICALLY NOTED OTHERWISE.
2. STRUCTURAL SHAPES, PLATES & BARS: ASTM A276 WITH Fy; 30 KSI.
3. STRUCTURAL STEEL TUBING: ROUND, SQUARE OR RECTANGULAR STRUCTURAL STEEL TUBING SHALL BE ASTM A847 WITH Fy; 35 KSI.
4. STRUCTURAL BOLTS: ASTM A593 GRADE G OR H, MINIMUM Fy; 65 KSI.
5. NUTS: ASTM A594 GRADE C OR D, HEAVY HEX NUTS. 35 KSI.
6. WASHERS: STAINLESS STEEL GRADE 304 OR 316, MINIMUM Fy; 30 KSI.
7. ANCHOR RODS (SET IN CONCRETE): ASTM A593 GRADE 304, MIN. Fy; 30 KSI.
8. THREADED BRACING RODS: ASTM A193 GRADE B8, MINIMUM Fy; 65 KSI.
9. PIPE: ASTM A790, MINIMUM Fy; 30 KSI.
10. ROUND OR SQUARE TUBING: TUBING SHALL CONFORM TO ASTM A269, MINIMUM Fy; 35 KSI.

STRUCTURAL STEEL

- 1. STRUCTURAL MATERIALS
A. W & WT SHAPES: ASTM A992 GRADE 50, Fy; 50 KSI.
B. M, S, C, MC & L SHAPES: ASTM A36, Fy; 36 KSI.
C. PLATES, BARS, CHANNELS & ANGLES: ASTM A36, Fy; 36 KSI.
D. STEEL PIPE: ASTM A53 GRADE B, Fy; 35 KSI.
E. SQUARE, RECTANGULAR HSS, STEEL TUBING: ASTM A500 GRADE C, Fy; 50 KSI.
F. RAISED PATTERN FLOOR PLATE: ASTM A786, Fy; 36 KSI.
2. WELDING OF STRUCTURAL STEEL
A. ALL WELDING SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT AWS STRUCTURAL WELDING CODE D1.1-02
B. WELD METAL: FEXX: 70 KSI, TYPICAL UNLESS OTHERWISE NOTED OR REQUIRED BY AWS.
C. ALL WELDERS SHALL BE TESTED AND CERTIFIED BY AN INDEPENDENT TESTING AGENCY.
D. ALL WELDERS SHALL BE CURRENTLY LISTED WITH WABO. (FOR WASHINGTON STATE PROJECTS)
E. QUALIFICATION OF WELDERS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR STANDARD QUALIFICATION PROCEDURE OF THE AWS.
F. CONTRACTOR SHALL SUBMIT A WPS FOR EACH TYPE 1 MOMENT CONNECTION WELD TO BE PERFORMED ON THE JOB. THE WPS SHALL FOLLOW THE REQUIREMENTS OF AWS D1.1 AND SPECIFY AT A MINIMUM THE FOLLOWING: PROCEDURE IDENTIFICATION, BASE METAL IDENTIFICATION, WELDING PROCESS, TYPE OF WELDING, POSITION OF WELDING, FILLER METAL SPECIFICATIONS, FILLER METAL CLASSIFICATION, NUMBER OF PASSES, WELDING CURRENT, WELDING POLARITY, PRE-HEAT AND INTER-PASS TEMPERATURES, CONTROLLED COOLING REQUIREMENTS, WELDING PARAMETERS SUCH AS ELECTRODE DIAMETER, AMPERAGE RANGE, VOLTAGE RANGE, TRAVEL SPEED RANGE, WIRE FEED SPEED RANGE, AND ELECTRICAL STICK-OUT.

COATING OF METALS

- 1. ALUMINUM AND DISSIMILAR METAL INSULATION COATING
A. ALL ALUMINUM SURFACES IN CONTACT WITH CEMENTITIOUS MATERIALS AND DISSIMILAR METAL SURFACES IN CONTACT WITH EACH OTHER SHALL BE INSULATION AGAINST CORROSION.
B. PREPARE SURFACES BY SOLVENT CLEANING (SP 1).
C. APPLY (1) COAT OF SINGLE-COMPONENT, COAL-TAR PITCH BASED BITUMINOUS PAINT.
D. MINIMUM COVER SHALL BE 10 MDFT.
2. PAINTING OF EXTERIOR STRUCTURAL STEEL
A. ALL EXTERIOR STRUCTURAL AND MISCELLANEOUS STEEL SHALL BE PAINTED IN CONFORMANCE WITH THIS SECTION.
B. PAINTING SHALL BE IN CONFORMANCE WITH THE IDAHO TRANSPORTATION DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, 2004 EDITION.
C. PAINTING SHALL BE IN CONFORMANCE WITH SECTION 627 - PAINTING.
D. PAINT MATERIALS SHALL CONFORM WITH SECTION 707 - PAINT.
E. COLORS SHALL BE AS APPROVED BY THE PROJECT ARCHITECT/ENGINEER OR OWNER.
F. SUBMIT COLOR CHIPS TO THE PROJECT ARCHITECT/ENGINEER OR OWNER FOR THEIR APPROVAL PRIOR TO ORDERING MATERIALS.
3. ALL STRUCTURAL AND MISCELLANEOUS METALS SHALL BE PROTECTED FROM CORROSION WITH ONE OF THE FOLLOWING SYSTEMS:
A. STAINLESS STEEL:
a. UN-COATED.
B. STEEL:
a. HOT-DIP GALVANIZED STEEL.
b. PAINTED.
C. ALUMINUM:
a. ANODIZED.
b. PAINTED.
D. REFER TO SPECIFICATION 09900 OF THE TECHNICAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
E. STRUCTURAL STEEL INCLUDES HOT-ROLLED STEEL FRAMING, BRACING, STEEL BAR JOISTS AND GIRDERS.
F. MISCELLANEOUS STEEL INCLUDES METAL STAIRS, WALKWAYS, GRATED FLOORS AND SUPPORTS, AND METAL RAILINGS AND GUARD RAILS.
G. REFER TO OTHER SECTIONS FOR COATING REQUIREMENTS FOR ALL EQUIPMENT, PIPING, MECHANICAL, ELECTRICAL, ARCHITECTURAL AND SUBMERGED METAL ITEMS.
4. ALUMINUM TO BE ANODIZED SHALL BE COATED AS FOLLOWS:
A. ALL EXPOSED SURFACES SHALL RECEIVE AN ANODIZED FINISH IN CONFORMANCE WITH ALUMINUM ASSOCIATIONS STANDARD SSA-46 OR AAMA 611 STANDARD.
B. PROCESS SHALL BE SULFURIC OR EQUIVALENT ANODIZING WITH ELECTROLYTIC OR IMMERSION DEPOSITED INORGANIC PIGMENTATION IN THE COATING.
C. THE RESULTING ANODIZED FINISH SHOULD BE CONTINUOUS, FULLY SEALED AND FREE OF POWDERY SURFACES, SMUT AND BLEMISHES.
D. ANODIC FILM THICKNESS SHALL BE .0002 INCH MINIMUM.
5. ALUMINUM TO BE PAINTED SHALL BE COATED AS FOLLOWS:
A. SURFACES PREPARED IN ACCORDANCE WITH SSPC-SP-1.
B. SURFACES PRIMED WITH KEM BOND HS PRIMER.
C. FINISH COAT TO BE PRO INDUSTRIAL URETHANE ALKYD ENAMEL.
D. REFERENCE SHERMAN WILLIAMS OR APPROVED EQUAL.
6. HOT DIP GALVANIZING SHALL BE IN CONFORMANCE WITH:
A. ASTM A123 STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS COVERS THE REQUIREMENTS FOR GALVANIZING BY THE HOT-DIP PROCESS ON IRON AND STEEL PRODUCTS MADE FROM ROLLED, PRESSED, AND FORGED SHAPES, CASTINGS, PLATES, BARS, AND STRIPS.
B. ASTM A153 STANDARD SPECIFICATION FOR ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE COVERS ZINC COATINGS APPLIED BY THE HOT-DIP PROCESS ON IRON AND STEEL HARDWARE. IT IS INTENDED TO BE APPLICABLE TO HARDWARE ITEMS THAT ARE CENTRIFUGED OR OTHERWISE HANDLED TO REMOVE EXCESS ZINC. ASTM A153 ALSO CONTAINS INFORMATION ON MINIMUM COATING THICKNESS AS WELL AS FINISH AND ADHERENCE REQUIREMENTS.
7. PAINTING OF STEEL SHALL BE IN CONFORMANCE WITH THE SOCIETY FOR PROTECTIVE COATINGS, SSPC, LATEST RECOMMENDATIONS.
8. FOR METAL IN A NON-CORROSIVE ENVIRONMENT:
A. SURFACES PREPARATION:
a. SSPC-SP1 SOLVENT CLEANING.
b. SSPC-SP6 COMMERCIAL BLAST CLEANING.
B. COATINGS:
a. PRIMER: POLYIMIDE EPOXY, 3.0 TO 4.0 MDFT
b. FINISH COAT: ACRYLIC POLYURETHANE, 2.0 TO 3.0 MDFT.
9. FOR METAL IN A CORROSIVE ENVIRONMENT:
A. SURFACES PREPARATION:
a. SSPC-SP1 SOLVENT CLEANING.
b. SSPC-SP10 NEAR WHITE BLAST CLEANING WITH A SURFACE PROFILE OF 1.5 TO 3.0 MILS.
B. COATINGS:
a. PRIMER: POLYIMIDE EPOXY, 3.0 TO 4.0 MDFT
b. STRIPE COAT: POLYAMIDOAMINE EPOXY; 3.0 TO 4.0 MDFT.
c. INTERMEDIATE COAT: POLYAMIDOAMINE EPOXY; 3.0 TO 4.0 MDFT.
d. FINISH COAT: ACRYLIC POLYURETHANE, 2.0 TO 3.0 MDFT.
10. THE PROJECT ENGINEER SHALL HAVE FINAL SAY AS TO THE DETERMINATION OF WHAT IS A "NON-CORROSIVE" VERSUS A "CORROSIVE" ENVIRONMENT.
11. PAINTING OF ALUMINUM SHALL BE IN
12. COLORS SHALL BE AS APPROVED BY THE PROJECT ENGINEER OR OWNER.
13. SUBMIT COLOR CHIPS TO THE PROJECT ENGINEER OR OWNER FOR THEIR APPROVAL PRIOR TO ORDERING MATERIALS.

MASONRY AND BRICK

- 1. MASONRY 28 DAY COMPRESSIVE STRENGTHS FOR GROUT, MORTAR, AND BLOCK
A. THE MASONRY ASSEMBLAGE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,000 PSI. ASSEMBLY SHALL BE VERIFIED PER IBC STANDARDS USING THE UNIT STRENGTH METHOD.
a. GROUT: 2,000 PSI
b. MORTAR: 1,800 PSI TYPE S
c. BLOCK: 2,000 PSI AT 28 DAYS ON THE NET AREA
B. THE MASONRY ASSEMBLAGE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,500 PSI. ASSEMBLY SHALL BE VERIFIED PER IBC STANDARDS USING THE UNIT STRENGTH METHOD.
a. GROUT: 2,500 PSI
b. MORTAR: 2,500 PSI TYPE M
c. BLOCK: 3,250 PSI AT 28 DAYS ON THE NET AREA
2. STRUCTURAL MASONRY AND BRICK REQUIREMENTS
A. GENERAL. ALL STRUCTURAL MASONRY CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 530.1, SPECIFICATIONS FOR MASONRY STRUCTURES; CURRENT EDITION.
B. STRUCTURAL MASONRY UNITS:
a. CONCRETE MASONRY UNITS: ALL CONCRETE MASONRY UNITS (CMU) SHALL CONFORM TO ASTM C-90, WITH A MINIMUM NET AREA COMPRESSIVE STRENGTH OF 2,000 PSI.
b. HOLLOW CLAY LOAD BEARING BRICK: ALL HOLLOW CLAY LOAD BEARING BRICK UNITS (BRICK) SHALL BE ATLAS BRICK CONFORMING TO ASTM C-652 WITH A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.
c. ALL BLOCK/BRICK SHALL BE LAID UP WITH A STANDARD RUNNING BOND UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS.
d. PLACE MASONRY UNITS IN ACCORDANCE WITH ACI 530.1 SECTION 3.3, MASONRY ERECTION.
C. MORTAR:
a. ALL MORTAR FOR USE WITH STRUCTURAL MASONRY UNITS SHALL CONFORM TO ASTM C270, CLASS S AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 1,900 PSI.
b. MORTAR SHALL BE IN ACCORDANCE WITH ACI 530.1, SECTION 2.1, MORTAR MATERIALS.
D. GROUT:
a. ALL GROUT FOR USE WITH STRUCTURAL MASONRY UNITS SHALL CONFORM TO ASTM C476 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2,000 PSI.
b. GROUT SHALL BE IN ACCORDANCE WITH ACI 530.1, SECTION 2.2, GROUT MATERIALS.
c. PLACE GROUT IN ACCORDANCE WITH ACI 530.1, SECTION 3.5, GROUT PLACEMENT.
d. GROUT POUR HEIGHT. DO NOT EXCEED THE MAXIMUM GROUT POUR HEIGHT LISTED IN ACI 530.1, TABLE 7.
e. GROUT LIFT HEIGHT. DO NOT EXCEED THE MAXIMUM GROUT LIFT HEIGHTS AS DEFINED BY ACI 530.1, SECTION 3.5 D.
E. CELLS: FILL ALL CELLS CONTAINING REINFORCING STEEL AND AS DIRECTED ON THE DRAWINGS SOLID FULL HEIGHT WITH GROUT.
F. BOND BEAMS: ALL BOND BEAMS SHALL BE GROUTED SOLID TO A MINIMUM HEIGHT OF 8-INCHES.
G. LINTELS: ALL MASONRY LINTELS (UNITS OVER WALL OPENINGS GREATER THAN 8-INCHES IN LENGTH) SHALL BE GROUTED SOLID FROM THE BOTTOM OF THE LINTEL TO A TOTAL STRUCTURAL DEPTH AS INDICATED ON THE PLANS, OR 16-IN. MINIMUM. EXTEND THE LENGTH OF SOLID GROUTING PAST THE EDGE OF EACH OPENING AS INDICATED ON THE PLANS OR 8" MINIMUM.
H. REINFORCING:
a. FABRICATE BARS USED IN MASONRY REINFORCEMENT IN ACCORDANCE WITH THE FABRICATING TOLERANCES OF ACI 315, AND IN ACCORDANCE WITH ACI 530.1, SECTION 2.7.
b. PLACE REINFORCEMENT IN ACCORDANCE WITH ACI 530.1, SECTION 3.4 B.
c. ALL REINFORCING STEEL SHALL BE IN PLACE AND SECURED AGAINST DISPLACEMENT PRIOR TO GROUTING WITH WIRE TIES, SPACERS OR OTHER SUITABLE DEVICES AT TOPS AND BOTTOMS AND INTERVALS NOT EXCEEDING 192 BAR DIAMETERS NOR 10-FEET.
d. BAR PLACEMENT: WHERE ONE VERTICAL BAR IS CALLED FOR IN EACH VERTICAL CORE THE BAR IS TO BE PLACED IN THE CENTER OF THE MASONRY CORE. WHERE TWO VERTICAL BARS ARE CALLED FOR THEY SHALL BE PLACED NEAR EACH WALL FACE WITH 1/8-INCH OF CLEARANCE FOR FINE GROUT AND 1/4-IN. OF CLEARANCE FOR COURSE GROUT.
e. LAPS: WHERE BARS ARE NOT CONTINUOUS LAP ALL BARS AS INDICATED ON THE DRAWINGS. WHERE NOT OTHERWISE INDICATED PROVIDE A MINIMUM VERTICAL LAP SPLICE OF 48 BAR DIAMETERS AND A MINIMUM HORIZONTAL LAP SPLICE OF 32 BAR DIAMETERS.
I. ANCHOR BOLTS: ANCHOR BOLTS SHALL BE ACCURATELY SET WITH TEMPLATES OR BY APPROVED EQUIVALENT MEANS AND HELD IN PLACE TO PREVENT MOVEMENT. CONFORM TO ACI 530.1, SECTION 3.4 D.
J. WALL TIES: INSTALL WALL TIES IN ACCORDANCE WITH ACI 530.1, SECTION 3.4 C.
K. VENEER ANCHORS: INSTALL VENEER ANCHORS IN ACCORDANCE WITH ACI 530.1, SECTION 3.4 E.
L. FOUNDATION DOWELS: IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE PLACEMENT OF DOWELS PROJECTING FROM CONCRETE FOUNDATIONS INTO REINFORCED MASONRY OR BRICK WALLS.
M. MINIMUM REINFORCING: WHERE REINFORCING IS NOT NOTED ON THE DRAWINGS PROVIDE THE FOLLOWING MINIMUM REINFORCING STEEL:
a. 4" WALL: #4 VERTICAL BARS @ 48-INCHES O.C. CENTERED, ONE (1) #4 BARS IN HORIZONTAL BOND BEAMS @ 48-INCHES O.C.
b. 6" WALL: #4 VERTICAL BARS @ 48-INCHES O.C. CENTERED, ONE (1) #5 BARS IN HORIZONTAL BOND BEAMS @ 48-INCHES O.C.
c. 8" WALL: #5 VERTICAL BARS @ 48-INCHES O.C. CENTERED, TWO (2) #4 BARS IN HORIZONTAL BOND BEAMS @ 48-INCHES O.C.
d. 10" WALL: #6 VERTICAL BARS @ 48-INCHES O.C. CENTERED, TWO (2) #5 BARS IN HORIZONTAL BOND BEAMS @ 48-INCHES O.C.
e. 12" WALL: #5 VERTICAL BARS @ 48-INCHES O.C. EACH FACE, TWO (2) #5 BARS IN HORIZONTAL BOND BEAMS @ 48-INCHES O.C.
N. BOND BEAMS WITH TWO (2) #5 BARS HORIZONTALLY SHALL BE PROVIDED AT ALL FLOOR AND ROOF LINES AND AT THE TOP OF WALLS. PROVIDE A BOND BEAM WITH TWO (2) #5 BARS HORIZONTALLY ABOVE AND BELOW ALL OPENINGS, AND EXTEND THESE BARS 2'-0" PAST THE OPENING EDGE. PROVIDE FULL HEIGHT VERTICAL REINFORCEMENT, MATCHING TYPICAL VERTICAL REINFORCING, EACH SIDE OF OPENINGS, AT WALL ENDS AND INTERSECTIONS.
O. COLD-WEATHER CONSTRUCTION: WHEN AMBIENT AIR TEMPERATURE IS BELOW 40-DEGREES F, IMPLEMENT COLD WEATHER PROCEDURES IN ACCORDANCE WITH ACI 530.1, SECTION 1.8 C.
P. FIELD QUALITY CONTROL: PROVIDE SPECIAL INSPECTION AND VERIFICATION IN ACCORDANCE WITH ACI 530.1, SECTION 3.7.
Q. CLEANING: CLEAN ALL EXPOSED MASONRY SURFACES IN ACCORDANCE WITH ACI 530.1, SECTION 3.8.

BOLTS AND ANCHOR RODS

- 1. STRUCTURAL BOLTS: HIGH STRENGTH BOLTS SHALL BE ASTM A325, TYPE 1. NUTS FOR HIGH STRENGTH BOLTS SHALL CONFORM TO ASTM A563, GRADE DH, HEAVY HEX.
2. ANCHOR RODS: ANCHOR RODS (BOLTS SET INTO CONCRETE) SHALL BE ASTM F1554, Fy; 55 KSI. NUTS FOR ANCHOR RODS SHALL CONFORM TO ASTM A563, GRADE A, HEAVY HEX.
3. THREADED STEEL RODS: THREADED STEEL RODS SHALL CONFORM TO ASTM A36, Fy; 36 KSI. NUTS FOR THREADED RODS SHALL CONFORM TO ASTM A563, GRADE A, HEAVY HEX.
4. WASHERS: ALL WASHERS SHALL CONFORM TO ASTM F436.
5. BOLT PLACEMENT: ALL BOLTS SHALL BE ON MEMBER STANDARD GAGE LINES EXCEPT AS NOTED OTHERWISE.
6. BLIND SIDE FASTENERS: WHERE BOLTED CONNECTIONS ARE INDICATED TO BE MADE TO HSS SHAPES OR WHERE ACCESS IS UNAVAILABLE TO THE BACK SIDE OF THE FASTENER PROVIDE TYPE HB - HOLLO-BOLT BY LINDAPTER OR APPROVED EQUAL. BOLT SIZE SHALL BE AS INDICATED ON THE PLANS FOR THE THICKNESS OF MATERIALS INDICATED TO BE JOINED. INSTALL BOLTS PER THE MANUFACTURER'S SPECIFICATIONS. PROVIDE STAINLESS STEEL FASTENERS FOR ALL EXTERIOR APPLICATIONS

OTHER ANCHORAGE

- 1. EXPANSION BOLTS
A. BOLTS NOTED ON THE PLANS AS EXPANSION BOLTS SHALL BE HILTI KWIK BOLT T22, STUD ANCHORS; SIZE AND EMBEDMENT AS NOTED ON THE DRAWINGS, INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS; OR AN APPROVED EQUAL.
2. SHOT PINS
A. ANCHORS CALLED OUT AS SHOT-PINS SHALL BE HILTI, LOW-VELOCITY POWDER ACTUATED FASTENERS, SIZE PER THE DRAWINGS, INSTALLED PER THE MANUFACTURERS RECOMMENDATIONS; OR AN APPROVED EQUAL.
3. SHEAR CONNECTOR/STUDS
A. SHEAR CONNECTOR/STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS OR APPROVED CONFORMING TO AWS D1.1, TYPE B HEADED STUDS MADE FORM ASTM A108, 1010-1020, LOW-CARBON STEEL. SHEAR CONNECTOR/STUDS SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURERS STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS.
4. HEADED ANCHORS/STUDS
A. HEADED ANCHOR/STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS OR APPROVED CONFORMING TO AWS D1.1, TYPE A HEADED STUDS MADE FORM ASTM A108, 1010-1020, LOW-CARBON STEEL. SHEAR CONNECTOR/STUDS SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURERS STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS.
5. DEFORMED BAR ANCHORS (DBA)
A. DEFORMED BAR ANCHORS SHALL MEET THE REQUIREMENTS OF AWS D1.1, DEFORMED BAR ANCHORS, MADE FORM ASTM A496 MATERIAL WITH A MINIMUM YIELD STRENGTH OF Fy=70 KSI. DEFORMED BAR ANCHORS SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT IN ACCORDANCE WITH THEIR RECOMMENDATIONS.



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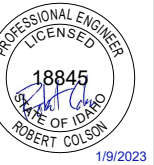
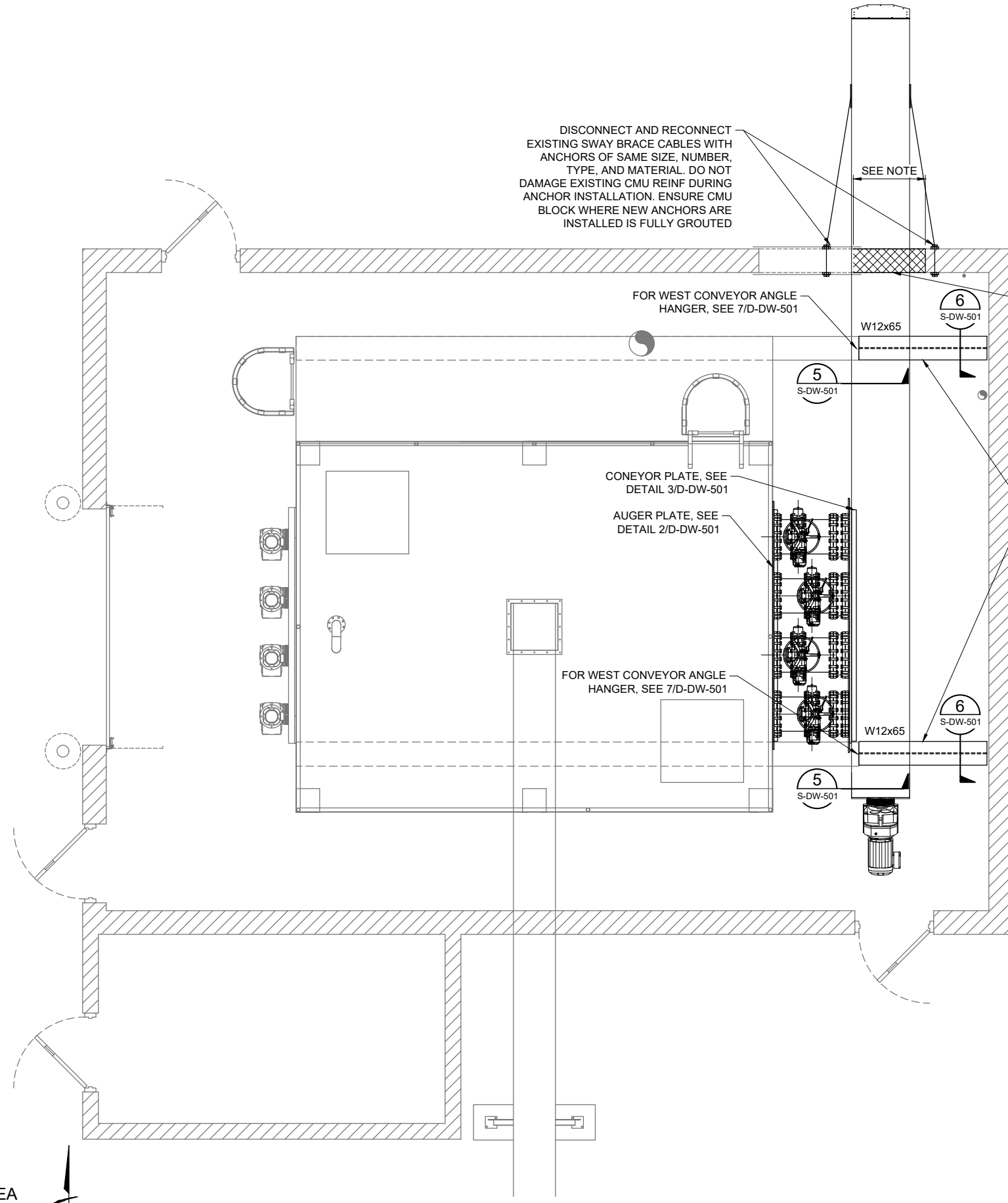


Table with columns: REVISION, NO, DESCRIPTION, BY, DATE

BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS
STRUCTURAL(S)
STRUCTURAL GENERAL NOTES

Plot Date: 10/20/24 12:26 PM. Plotted By: William Holder
 Date Created: 10/22/23 JUB: COM/CENTRAL/CLIENTS/ID/POSTFALLS/CITY/PROJECTS/23-033_BIOSOLIDS/HOPPER/DESIGN/CAD/SHEET/23-033_S-DW-101X.DWG

SLUDGE STORAGE AND LOADOUT AREA
 SCALE: 3/8" = 1'-0"



DISCONNECT AND RECONNECT EXISTING SWAY BRACE CABLES WITH ANCHORS OF SAME SIZE, NUMBER, TYPE, AND MATERIAL. DO NOT DAMAGE EXISTING CMU REINF DURING ANCHOR INSTALLATION. ENSURE CMU BLOCK WHERE NEW ANCHORS ARE INSTALLED IS FULLY GROUTED

SEE NOTE

FOR WEST CONVEYOR ANGLE HANGER, SEE 7/D-DW-501

W12x65

5 S-DW-501

6 S-DW-501

CONVEYOR PLATE, SEE DETAIL 3/D-DW-501

AUGER PLATE, SEE DETAIL 2/D-DW-501

FOR WEST CONVEYOR ANGLE HANGER, SEE 7/D-DW-501

5 S-DW-501

6 S-DW-501

W12x65

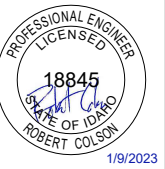
SAWCUT CMU AND REINFORCEMENT. WIDEN EXISTING OPENING, SEE DETAIL 1/S-DW-501. DEMO TO A BLOCK MODULE DIMENSION. INFILL WITH RIGID POLY-150 INSULATION. TAPE SEAMS, SEAL ALL PERIMETER JOINTS TO CREATE A NEW WEATHER PROOF ENCLOSURE.

RE-USE AND RELOCATE EXISTING EAST CONVEYOR ANGLE HANGER. FIELD DRILL HOLES IN NEW W12x65 BEAM AS REQUIRED TO ACCOMMODATE EXISTING BOLTS. CONTRACTOR OPTION TO REPLACE HANGER WITH MINIMUM L4x4x3/8 ANGLE. IF NEW HANGER IS USED, MATCH EXISTING ATTACHMENT TO CONVEYOR AND ENSURE CONVEYOR IS TIGHT TO TRANSFER BOX.



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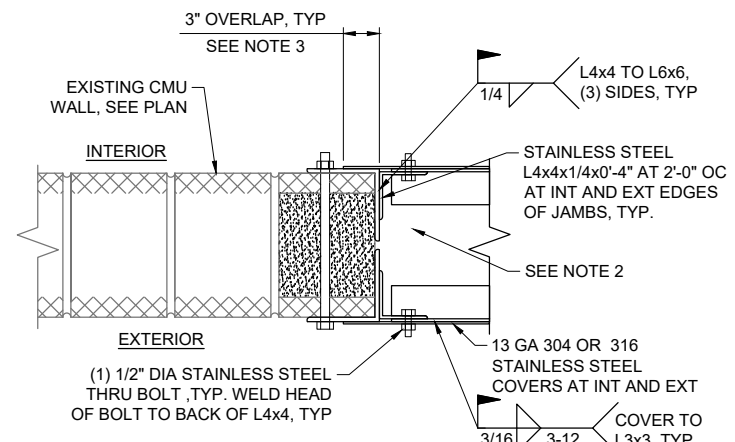
BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS
 STRUCTURAL (S)
 BIOSOLIDS HOPPER
 PLAN VIEW

| | |
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| FILE: | 20-23-033_S-DW-101X |
| JUB PROJ. #: | 20-23-033 |
| DRAWN BY: | RSM |
| DESIGN BY: | RSM |
| CHECKED BY: | RSM |
| SCALE: | ONE INCH = AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY |
| LAST UPDATED: | 10/22/2023 |
| SHEET: | 5 |
| DRAWING: | S-DW-101 |

| NO. | REVISION | DESCRIPTION | BY | APPR. | DATE |
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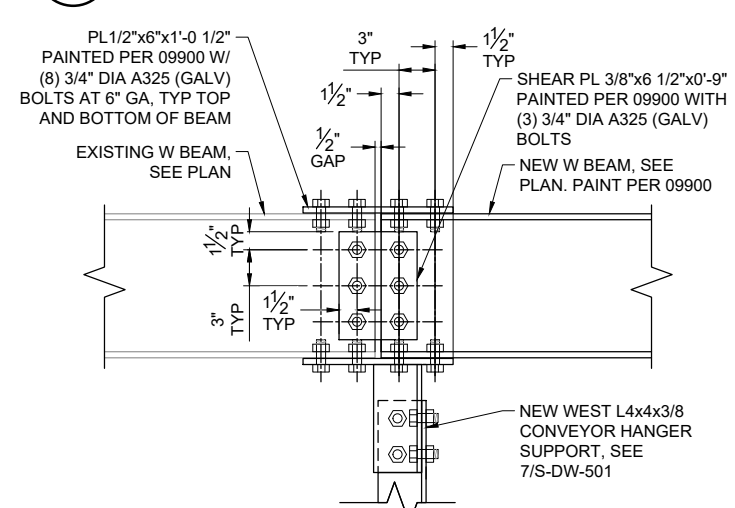
BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS
STRUCTURAL (S)
BIOSOLIDS HOPPER
SECTIONS AND DETAILS

FILE: 20-23-033 S-DW-101X
JUB PROJ. #: 20-23-033
DRAWN BY: WRH
DESIGN BY: STK
CHECKED BY: RMC
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
LAST UPDATED: 10/2/2023
SHEET:



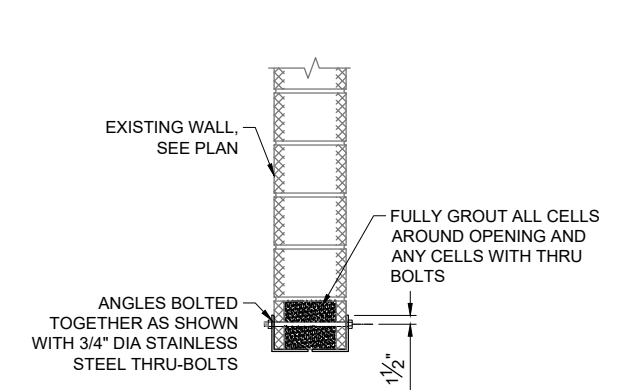
- NOTES:
- FOR ADDITIONAL INFORMATION NOT SHOWN, SEE 1/S-DW-501, 2/S-DW-501, AND 4/S-DW-501.
 - INFILL OPENING WITH RIGID INSULATION, TAPE SEAMS, AND SEAL ALL PERIMETER JOINTS TO CREATE A WEATHER PROOF ENCLOSURE.
 - PROVIDE POLYURETHANE WEATHER SEALANT AT ALL 3" OVERLAPS ON EXTERIOR SIDE OF WALL.

3 JAMB DETAIL
S-DW-101 SCALE:NTS



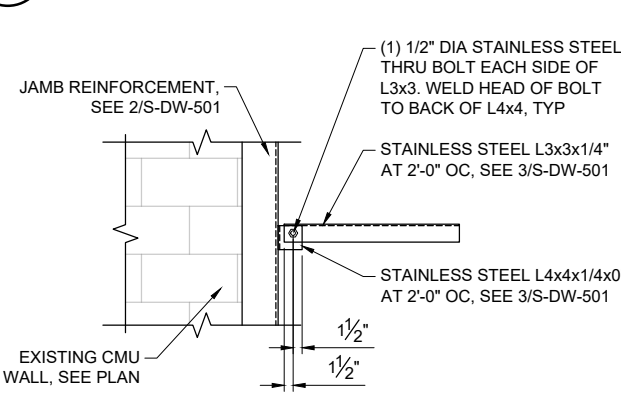
- NOTES:
- FIELD DRILL ALL HOLES IN EXISTING BEAM. CONTRACTOR OPTION TO WELD PLATES TO EXISTING BEAM IN LIEU OF FIELD DRILLING AND BOLTING. IF WELDING IS SELECTED, PROVIDE 1/4" FILLET WELD (3) SIDES FOR EACH PLATE.

5 BEAM SPLICE DETAIL
S-DW-101 SCALE:NTS



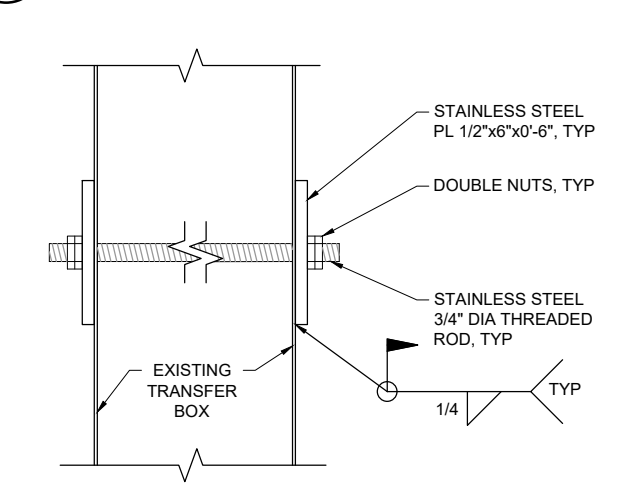
- NOTES:
- FOR INFORMATION NOW SHOWN, SEE 1/S-DW-501.

2 HEAD DETAIL
S-DW-101 SCALE:NTS



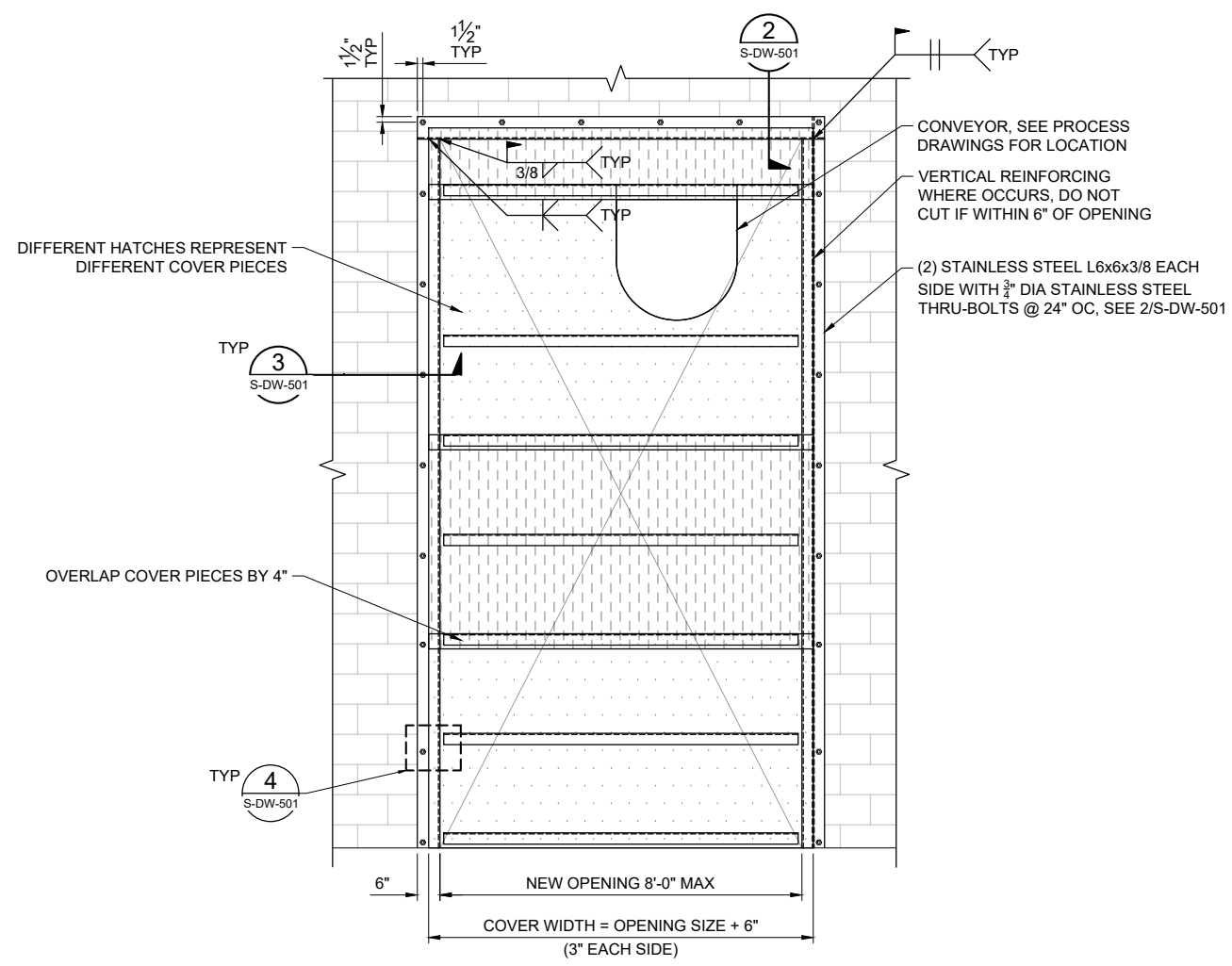
- NOTES:
- FOR ADDITIONAL INFORMATION NOT SHOWN, SEE 1/S-DW-501, 2/S-DW-501, AND 3/S-DW-501.
 - DETAIL TYPICAL AT INTERIOR AND EXTERIOR FACES OF EXISTING CMU WALL.

4 OPENING COVER SUPPORT ANGLES
S-DW-101 SCALE:NTS



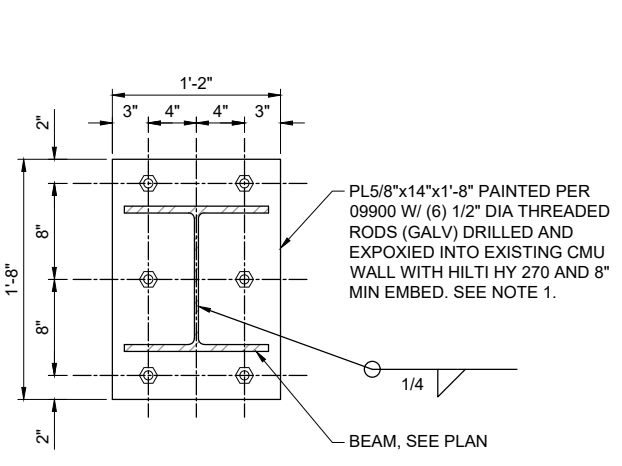
- NOTES:
- COORDINATE NUMBER AND LOCATION OF (3) TOTAL TRANSFER BOX STIFFENERS IN FIELD.

8 TRANSFER BOX STIFFENERS
S-DW-101 SCALE:NTS



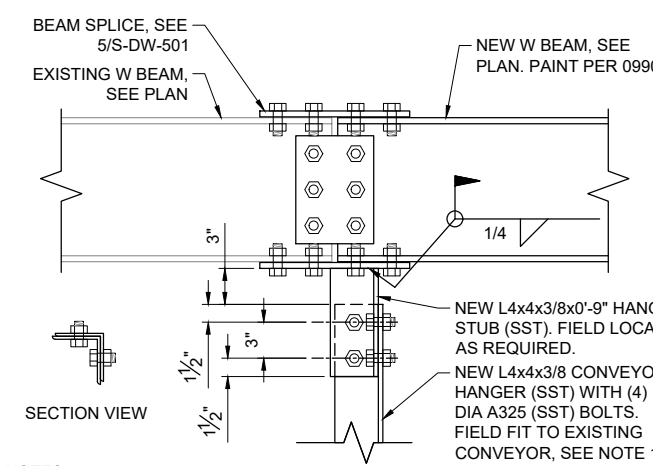
- NOTES:
- SAWCUT MASONRY AND INSERT HEAD REINFORCING ANGLES; INSTALL BOLTS THEN REMOVE 2'-0" STRIP OF MASONRY AT JAMS TO INSTALL JAMB REINFORCING, THEN COMPLETE REMOVAL OF MASONRY.
 - FULLY GROUT ALL CELLS AROUND OPENING AND ANY CELLS WITH THRU BOLTS.
 - COVERS AT INTERIOR AND EXTERIOR TO BE 13 GA 304 STAINLESS STEEL. WELD COVERS TO L3x3 ANGLES PER 3/S-DW-501. WHERE COVERS OVERLAP, ATTACH ONLY ONE OF THE OVERLAPPING COVERS TO THE L3x3 ANGLE.

1 NEW OPENING IN EXISTING WALL - DBL ANGLES
S-DW-101 SCALE:NTS



- NOTES:
- FULLY GROUT ALL CMU CELLS WHERE ANCHOR IS INSTALLED. INSTALL (1) ANCHOR PER CMU CELL.

6 BEAM TO EXISTING CMU WALL
S-DW-101 SCALE:NTS

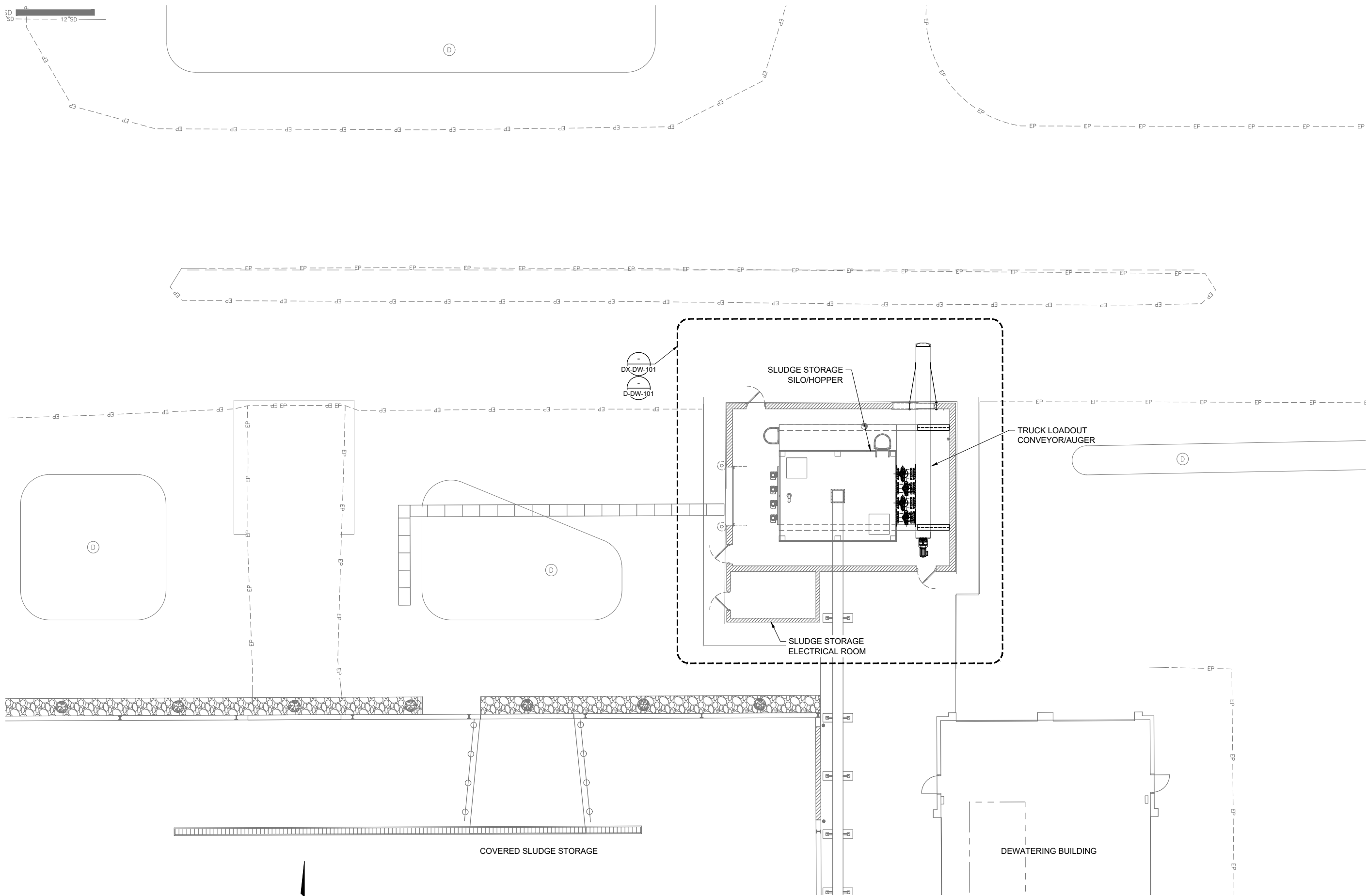


- NOTES:
- PROVIDE NEW L4x4x3/8 WEST CONVEYOR HANGER SUPPORT. ATTACHMENT TO CONVEYOR TO MATCH EXISTING CONDITIONS. ENSURE CONVEYOR IS TIGHT TO TRANSFER BOX
 - FOR REQUIREMENTS ON EAST CONVEYOR HANGER SUPPORT, SEE S-DW-101.
 - SUBMIT SHOP DRAWINGS SHOWING MODIFICATIONS TO DROP LEG SUPPORTS COORDINATED WITH BEAM SPLICE COMPONENTS.

7 WEST CONVEYOR HANGER AT BEAM SPLICE
S-DW-101 SCALE:NTS

Plot Date: 10/2/2023 12:24 PM. Printed By: William Holder
 Date Created: 10/2/2023 JUB-COM-CENTRAL-CUSTOMER-POST-FALLS-CITY-PROJECTS-20-23-033_BIOSOLIDS-HOPPER-DESIGN-CAD-SHEET-20-23-033_S-DW-101X.DWG

Plot Date: 1/9/2024 12:25 PM. Plotted By: William Holder
 Date Created: 2/22/2023 JUB:COM/CENTRAL/Clients/ID/POSTFALL/CITY/PROJECTS/23-033_BIOSOLIDS/HOPPER/DESIGN/CAD/SHEET/23-033_D-DW-101X.DWG



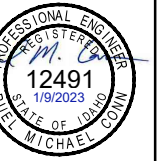
SLUDGE STORAGE AND LOADOUT AREA

SCALE: 0 4' 8' 16'
 1/8"=1'-0" at Full Scale



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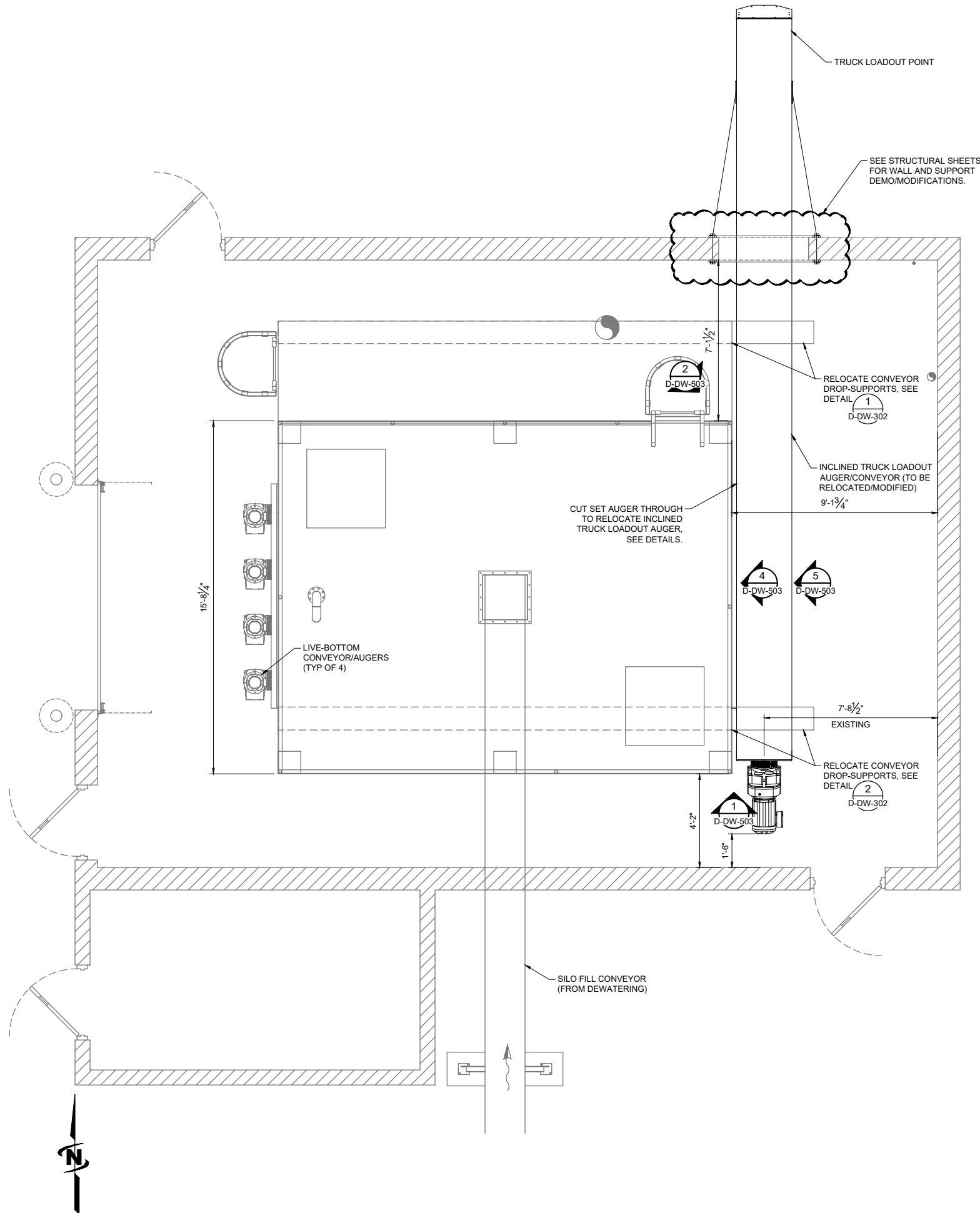
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**BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 DEWATERING AREA OVERVIEW**

FILE: 20-23-033_D-DW-101X
 JUB PROJ. #: 20-23-033
 DRAWN BY: WRH
 DESIGN BY: STK
 CHECKED BY: RMC
 AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
 LAST UPDATED: 1/9/2024
 SHEET: 7
 DRAWING: D-DW-001

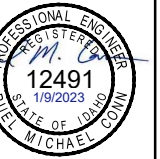
Plot Date: 1/9/2024 12:26 PM. Plotted By: William Holder
 Date Created: 2/25/23 JUB:COMCENTRALCLIENTS\POSTFALL\CITYPROJECTS\23-033_BIOSOLIDS\HOPPERDESIGN\CAD\SHEET\23-033_D-DW-101X.DWG

DEMOLITION OVERVIEW
 SCALE: 0 1'-6" 3'-0" 6'-0"
 3/8" = 1'-0" at Full Scale



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**BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 DEMOLITION PLAN**

FILE: 20-23-033_D-DW-101X
 JUB PROJ. #: 20-23-033
 DRAWN BY: WRH
 DESIGN BY: STK
 CHECKED BY: RMC
 ONE INCH
 AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
 LAST UPDATED: 1/9/2024
 SHEET: 8
 DRAWING: DX-DW-101





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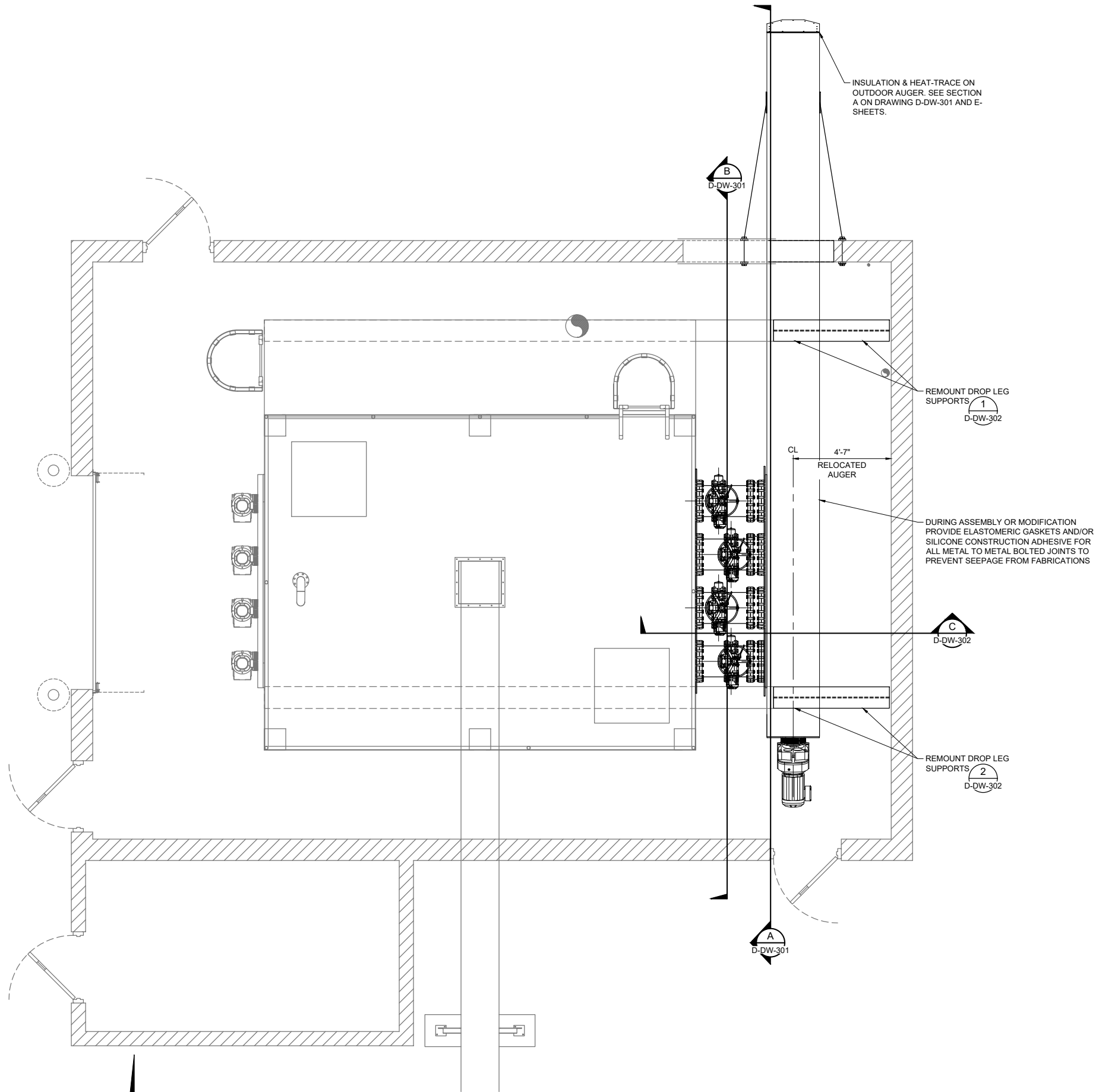


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**BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS**
PROCESS MECHANICAL (D)
BIOSOLIDS HOPPER
PLAN VIEW

FILE: 20-23-033_D-DW-101X
JUB PROJ. #: 20-23-033
DRAWN BY: WRH
DESIGN BY: STK
CHECKED BY: RMC
ONE INCH
AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
LAST UPDATED: 1/9/2024
SHEET: 9
DRAWING: D-DW-101



SLUDGE STORAGE AND LOADOUT AREA MODIFICATIONS

SCALE: 0 1'-6" 3'-0" 6'-0"

3/8"=1'-0" at Full Scale

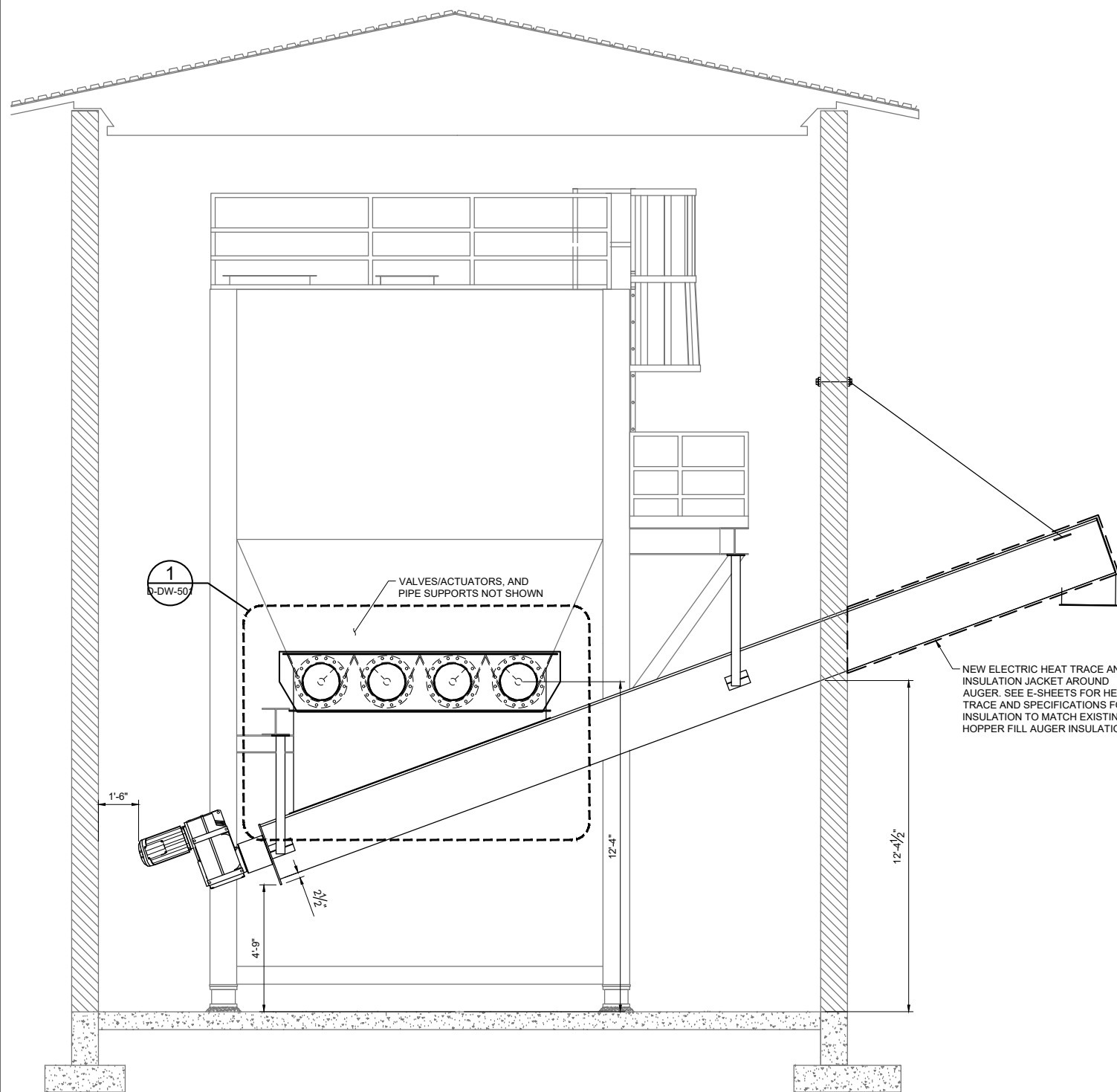
Plot Date: 1/9/2024 12:27 PM. Plotted By: William Holder
Date Created: 2/26/23 JUB: C:\CENTRAL\CLIENTS\ID\POSTFALLS\CITY\PROJECTS\20-23-033_BIOSOLIDS_HOPPER\DESIGN\CAD\SHEET\20-23-033_D-DW-101X.DWG

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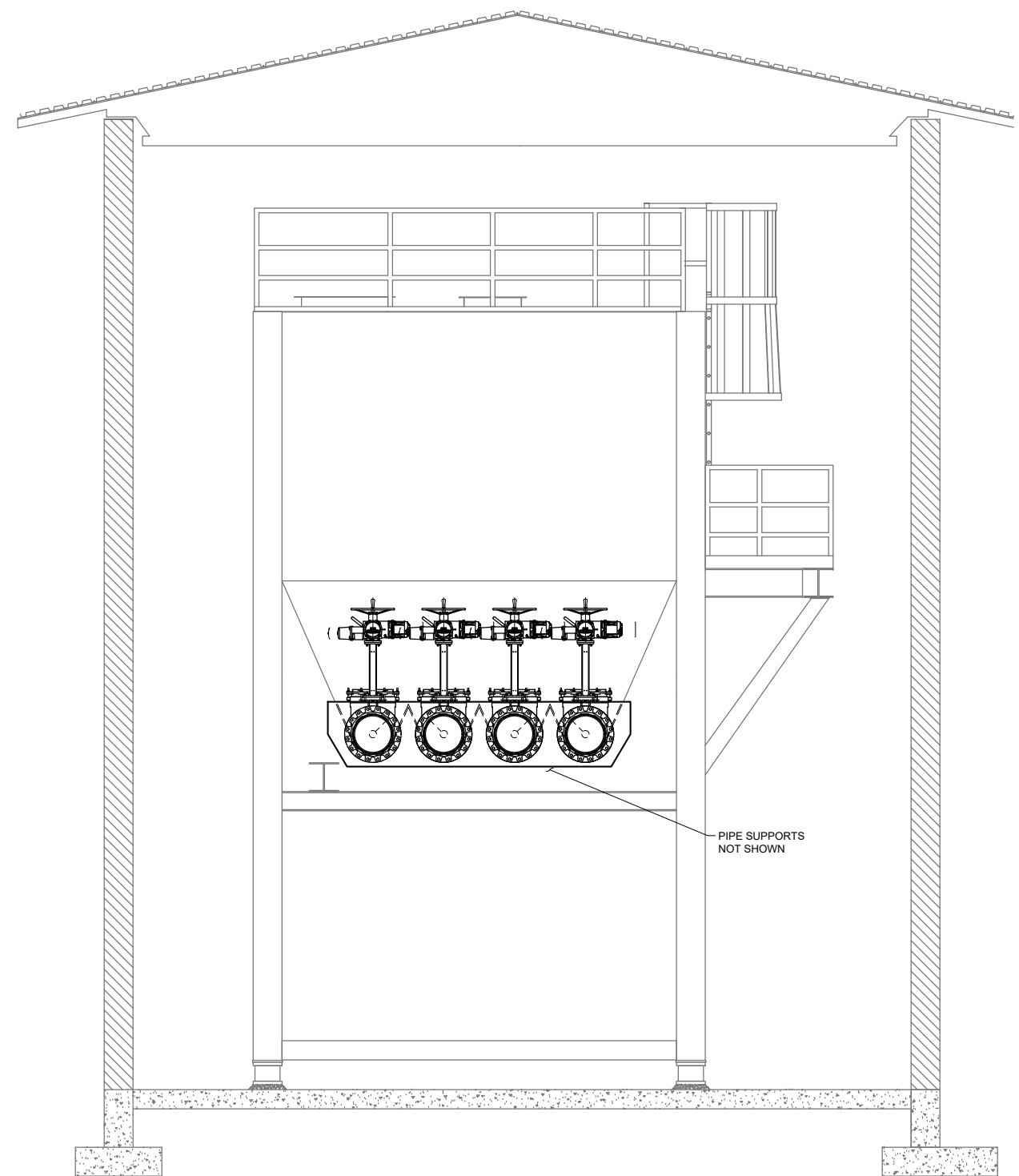
| NO. | REVISION | DESCRIPTION | BY | DATE |
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BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 BIOSOLIDS HOPPER
 SECTION VIEWS

| | |
|---|---------------------|
| FILE: | 20-23-033_D-DW-101X |
| JUB PROJ. #: | 20-23-033 |
| DRAWN BY: | WRH |
| DESIGN BY: | STK |
| CHECKED BY: | RMC |
| AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY | ONE INCH |
| LAST UPDATED: | 1/9/2024 |
| SHEET: | 10 |
| DRAWING: | D-DW-301 |



A SECTION VIEW - SLUDGE COLLECTION BOX AND INCLINED AUGER
 D-DW-101 SCALE: 0 1'-6" 3'-0" 6'-0"
 3/8"=1'-0" at Full Scale

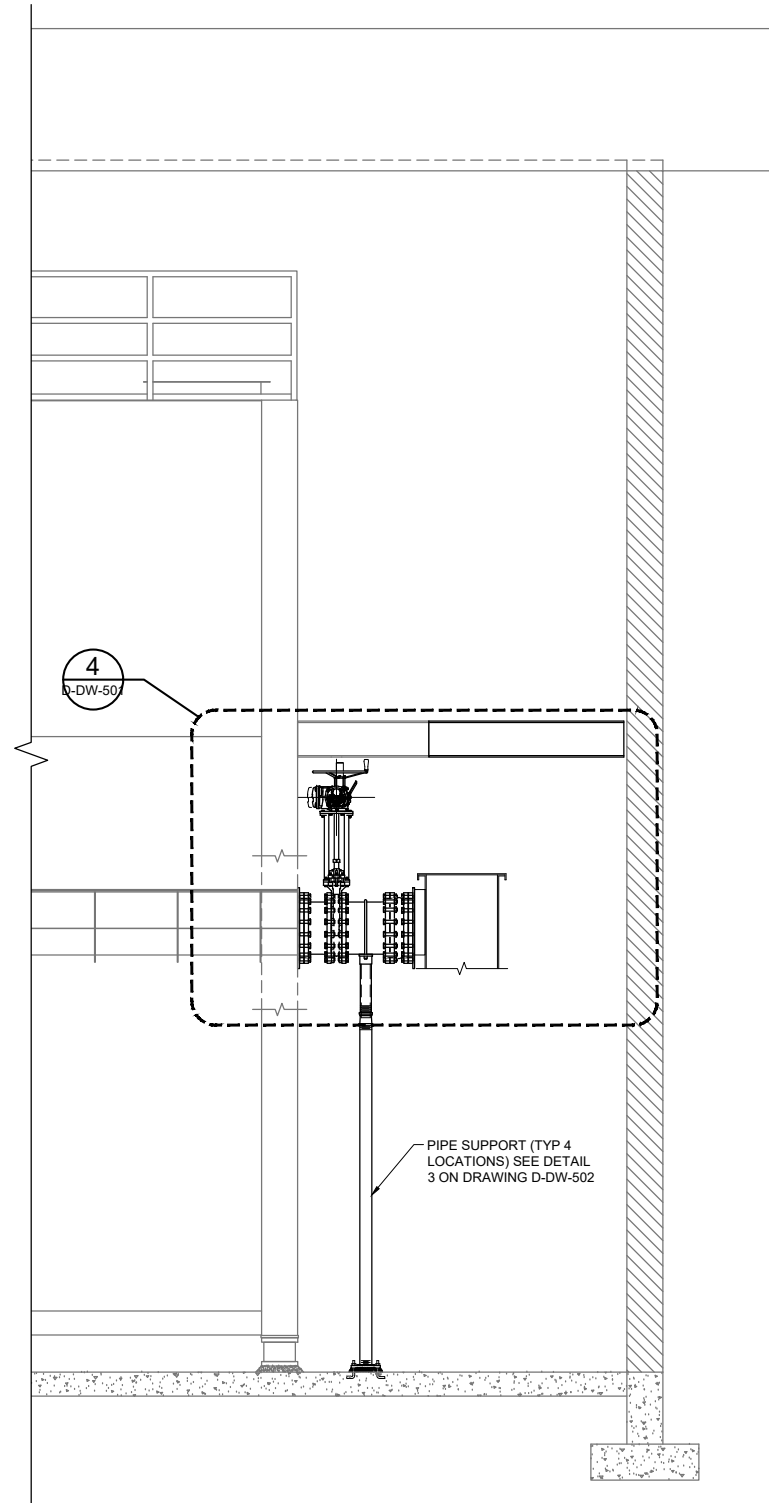


B SECTION VIEW - SLUDGE HOPPER AND ISOLATION VALVES
 D-DW-101 SCALE: 0 1'-6" 3'-0" 6'-0"
 3/8"=1'-0" at Full Scale

Plot Date: 1/9/2024 12:28 PM. Plotted By: William Holder
 Date Created: 2/22/23 JUB: COM/CENTRAL CLIENTS/ID/POSTFALLS/CITY PROJECTS/20-23-033_BIOSOLIDS HOPPER DESIGN/CAD SHEET/20-23-033_D-DW-101X.DWG

Plot Date: 1/9/2024 12:28 PM. Plotted By: William Holder
 Date Created: 2/22/2023 JUB: COM/CENTRAL/CLIENTS/ID/POSTFALL/CITY/PROJECTS/23-033_BIOSOLIDS/HOPPER/DESIGN/CAD/SHEET/23-033_D-DW-101X.DWG

C PIPING AND VALVE TRANSITION
 D-DW-101 SCALE: 0 1'-6" 3'-0" 6'-0"
 3/8"=1'-0" at Full Scale



1 DROP LEG SUPPORT RELOCATION
 DX-DW-101 SCALE: NOT TO SCALE



RELOCATED AND REMOUNT TO NEW BEAM (DRILL/BOLT)

RELOCATE AND REMOUNT TO NEW OR EXISTING BEAM. FABRICATE AS NECESSARY TO MODIFY/OFFSET DROP-LEG ANGLE TO CONNECT AT SPLICE IN W12x65 SUPPORT STRUCTURE. SEE: $\frac{7}{S-DW-501}$

2 DROP LEG SUPPORT RELOCATION
 DX-DW-101 SCALE: NOT TO SCALE



RELOCATED AND REMOUNT TO NEW BEAM (DRILL/BOLT)

RELOCATE AND REMOUNT TO NEW OR EXISTING BEAM. FABRICATE AS NECESSARY TO MODIFY/OFFSET DROP-LEG ANGLE TO CONNECT AT SPLICE IN W12x65 SUPPORT STRUCTURE. SEE: $\frac{7}{S-DW-501}$



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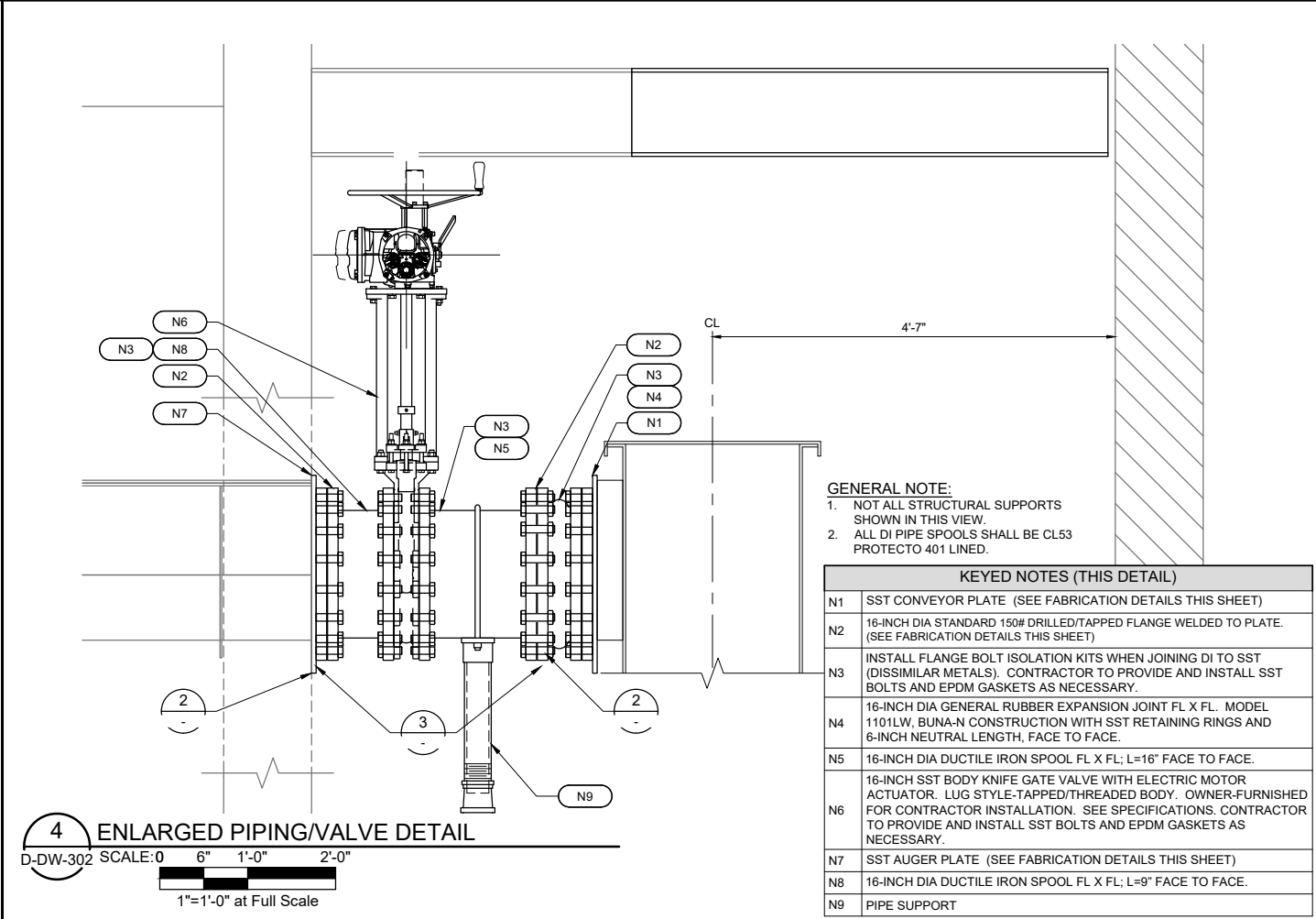
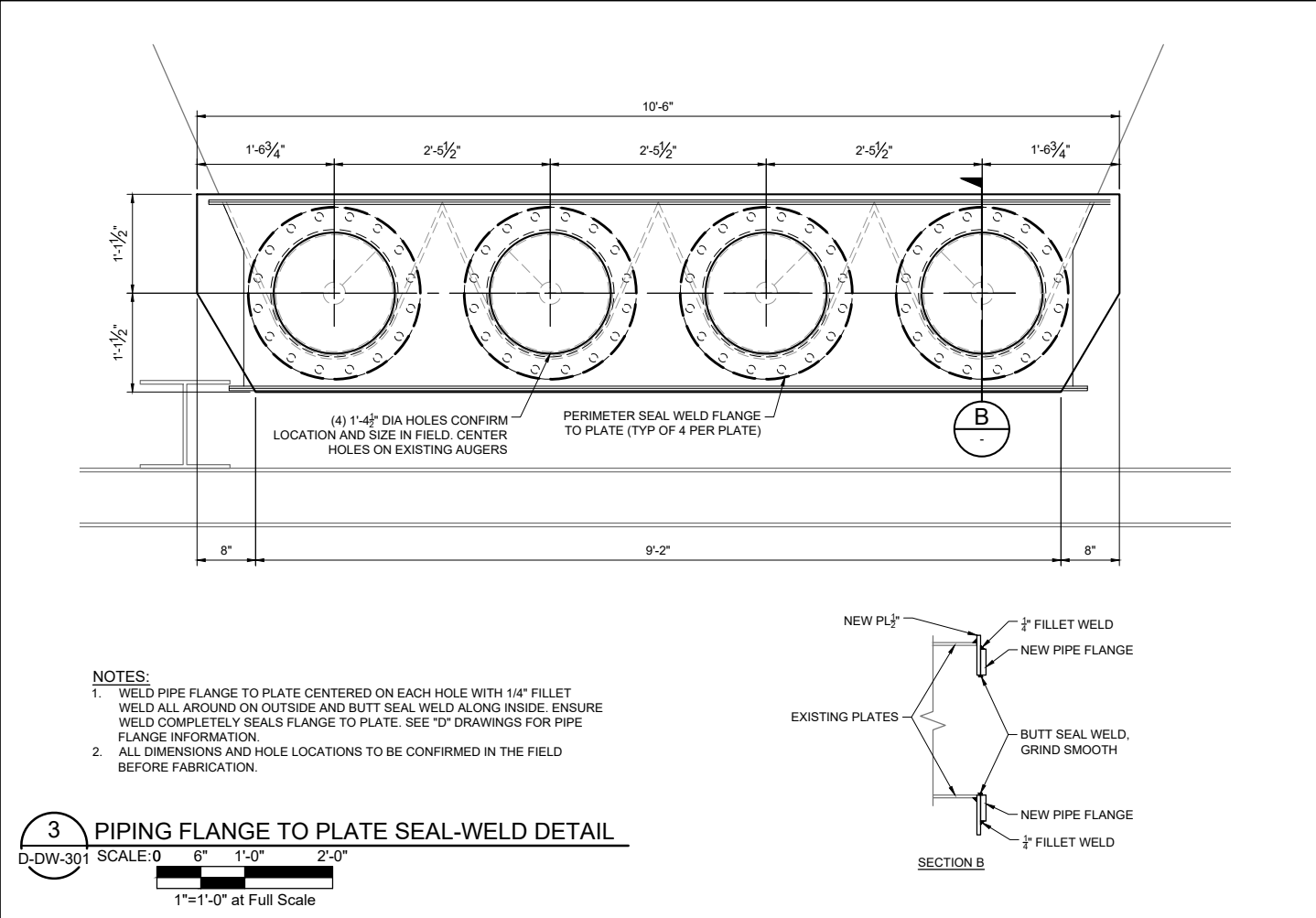
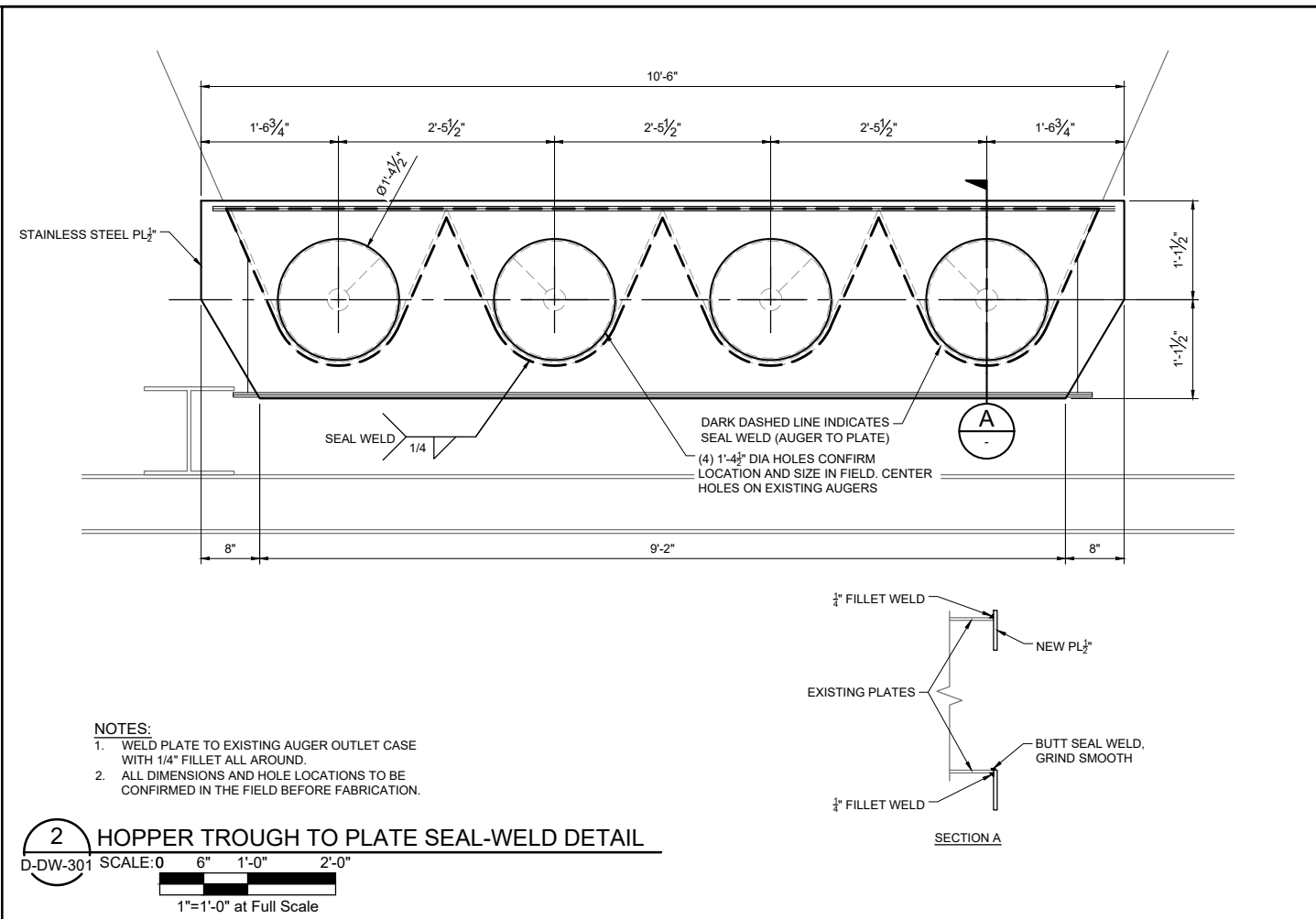
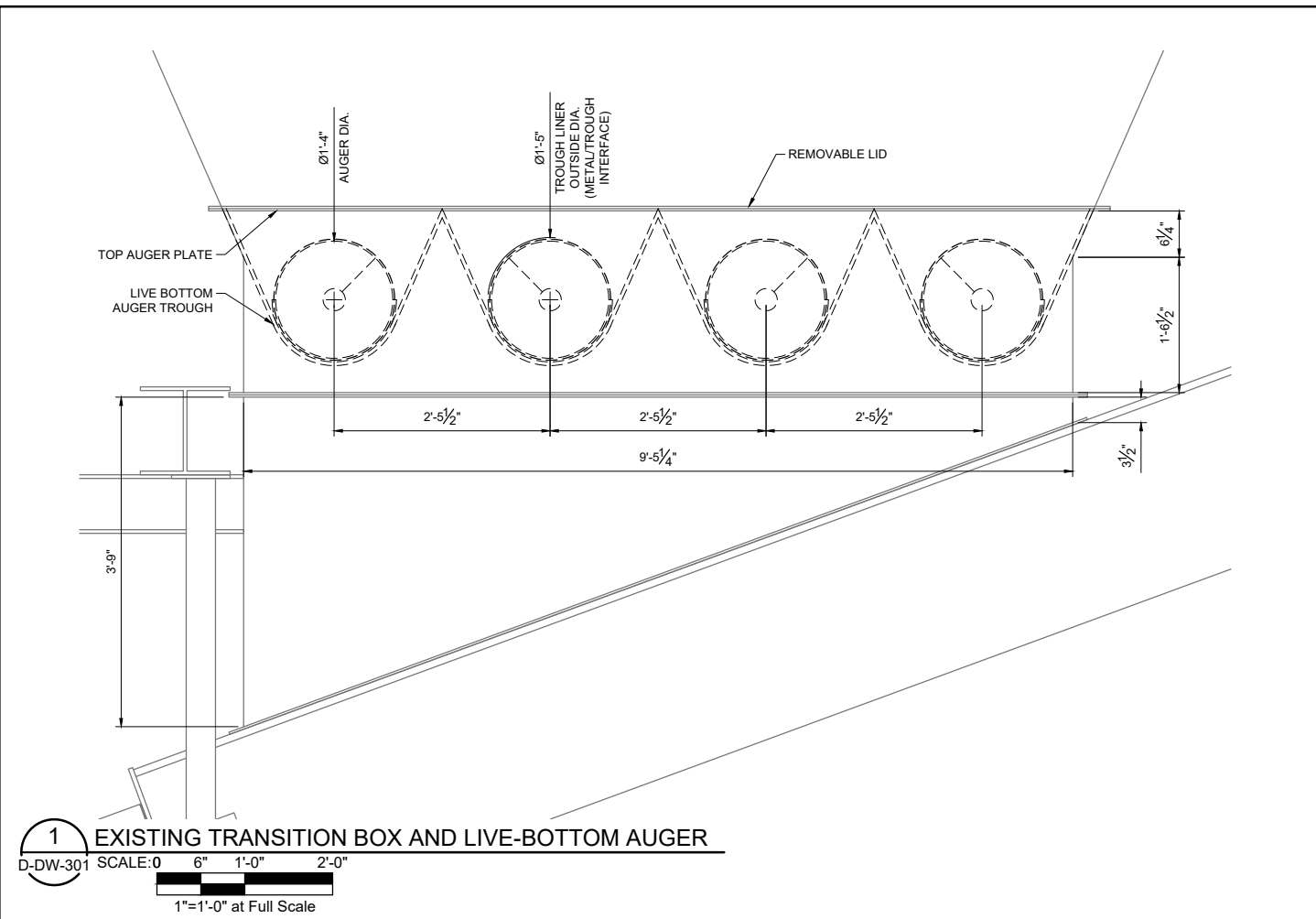
**BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 BIOSOLIDS HOPPER
 SECTION VIEWS**

FILE: 20-23-033_D-DW-101X
 JUB PROJ. #: 20-23-033
 DRAWN BY: WRH
 DESIGN BY: STK
 CHECKED BY: RMC
 AT FULL SIZE, IF NOT ONE INCH SCALE ACCORDINGLY
 LAST UPDATED: 1/9/2024
 SHEET: 11
 DRAWING: D-DW-302

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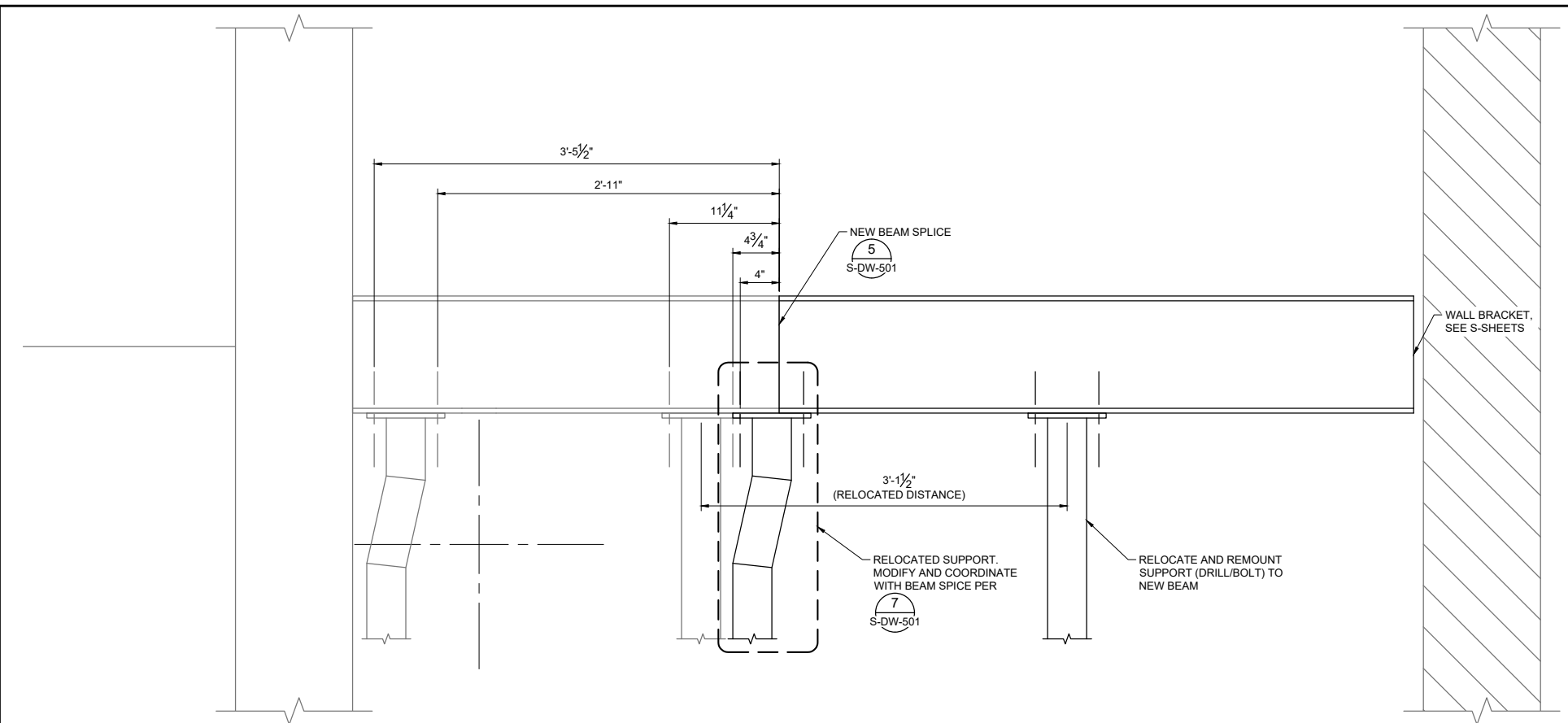
BIO-SOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 BIO-SOLIDS HOPPER
 SECTIONS AND DETAILS

Plot Date: 1/9/2024 12:31 PM, Plotted By: William Holder
 Date Created: 2/26/2023, JUB: COM/CENTRAL/CLIENTS/ID/POSTFALLS/CITY/PROJECTS/23-033_BIO-SOLIDS-HOPPER/DESIGN/CAD/SHEET/20-23-033_D-DW-101X.DWG

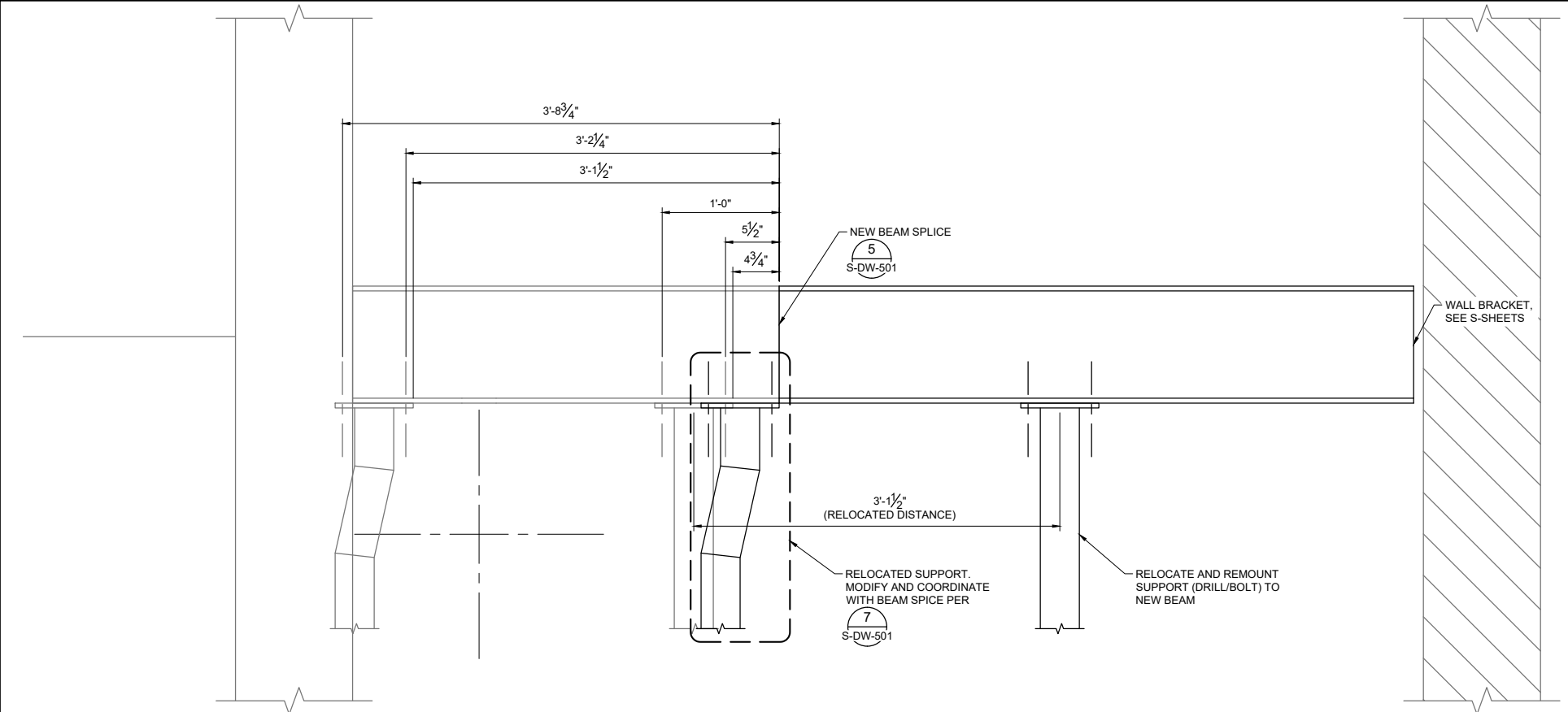
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1 UPPER INCLINED AUGER SUPPORTS (NEAR WALL) DETAIL
 SCALE: 0 4.5" 9" 1'-6"
 1 1/2"=1'-0" at Full Scale

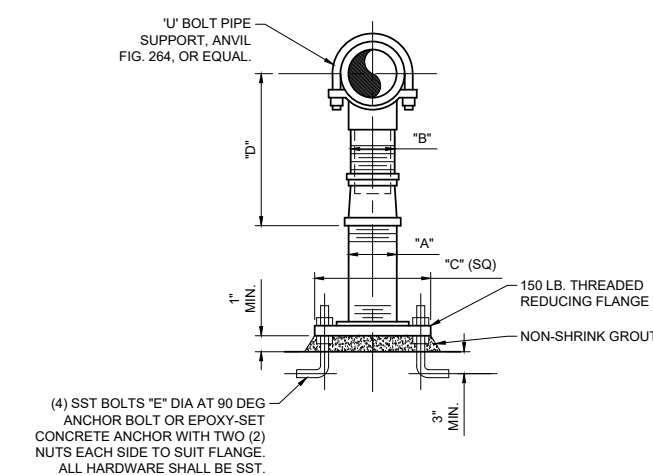


2 LOWER INCLINED AUGER SUPPORTS (NEAR MOTOR) DETAIL
 SCALE: 0 4.5" 9" 1'-6"
 1 1/2"=1'-0" at Full Scale

ADJUSTABLE PIPE SUPPORT
 APPROXIMATE DIMENSIONS IN INCHES

| PIPE SIZE | "A" | "B" | "C" (SQ) | "D" MINIMUM | "D" MAXIMUM | "E" DIA. |
|-----------|-----|-----|----------|-------------|-------------|----------|
| 4 | 4 | 3 | 7-1/4 | 12-1/4 | 16-3/4 | 5/8 |
| 6 | 4 | 3 | 7-1/4 | 13-3/4 | 18-1/4 | 5/8 |
| 8 | 4 | 3 | 7-1/4 | 14-5/8 | 19-7/8 | 5/8 |
| 10 | 4 | 3 | 7-1/4 | 15-13/16 | 20-5/16 | 5/8 |
| 12 | 4 | 3 | 7-1/4 | 16-13/16 | 21-5/16 | 3/4 |
| 14 | 4 | 3 | 12 | 19-1/8 | 23-5/8 | 3/4 |
| 16 | 4 | 3 | 12 | 20-1/8 | 24-5/8 | 3/4 |
| 18 | 6 | 4 | 12 | 21-5/16 | 25-13/16 | 3/4 |
| 20 | 6 | 4 | 12 | 23-5/16 | 27-13/16 | 3/4 |
| 24 | 6 | 4 | 12 | 24-5/16 | 28-13/16 | 3/4 |
| 30 | 6 | 4 | 12 | 26-7/16 | 30-15/16 | 7/8 |
| 36 | 6 | 4 | 12 | 29-7/16 | 33-15/16 | 7/8 |

* SEE MFR.



3 PIPE SUPPORT ADJUSTABLE
 SCALE: NOT TO SCALE

Plot Date: 1/9/2024 12:32 PM Plotted By: William Holder
 Date Created: 2/26/2023 JUB: COM CENTRAL CLIENT: ISD/POSTFALLS CITY PROJECT: 20-23-033_BIOSOLIDS HOPPER DESIGN: CAD SHEET: 20-23-033_D-DW-101X.DWG

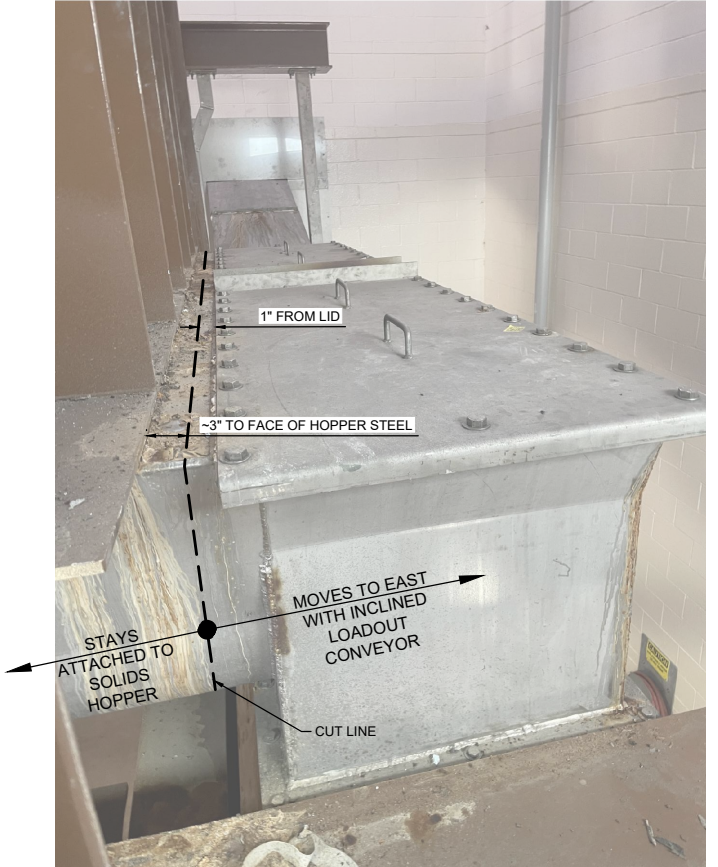
BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 PROCESS MECHANICAL (D)
 BIOSOLIDS HOPPER
 SUPPORT DETAILS



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**BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS**
 PROCESS MECHANICAL (D)
 BIOSOLIDS HOPPER
 SECTIONS AND DETAILS



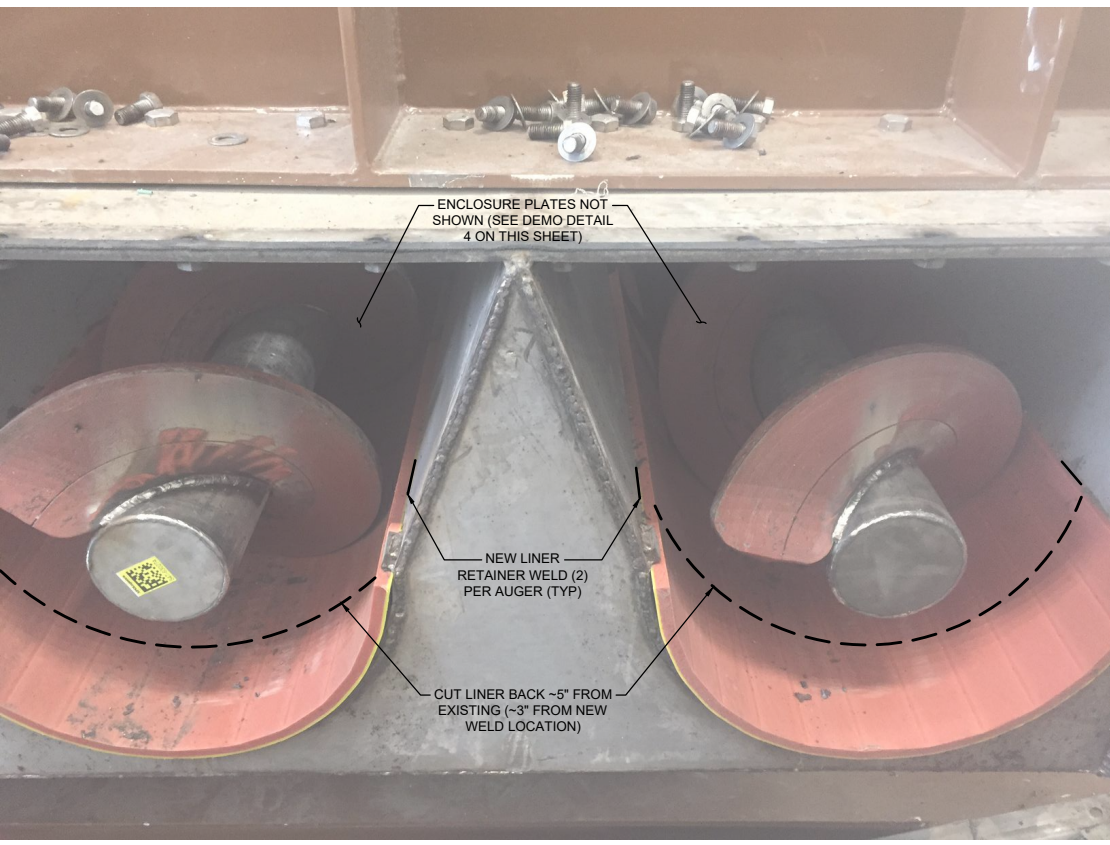
1 DEMOLITION PHOTO DETAIL
 SCALE: NOT TO SCALE



2 DEMOLITION PHOTO DETAIL
 SCALE: NOT TO SCALE



3 CONVEYOR DRAIN DETAIL
 SCALE: NOT TO SCALE



4 DEMOLITION PHOTO DETAIL
 SCALE: NOT TO SCALE



5 DEMOLITION PHOTO DETAIL
 SCALE: NOT TO SCALE

Plot Date: 1/9/2024 12:35 PM. Plotted By: William Holder
 Date Created: 2/22/2023 JUB: COMCENTRALCLIENT\ID\POSTFALLS\CITY\PROJECTS\20-23-033_BIOSOLIDS\HOPPER\DESIGN\CAD\SHEET\20-23-033_D-DW-101X.DWG

| SYMBOL | | DESCRIPTION | | SYMBOL | | DESCRIPTION | | ABBREVIATIONS | | REFERENCE SYMBOLS | |
|--------|---|-------------|---|-----------|--|-------------|--|---------------|------------------------------------|-------------------|--|
| | | | | SCHEMATIC | | PLAN | | | | | |
| | LED LUMINAIRE, WITH EMERGENCY BATTERY PACK | | CONDUIT EXPOSED | | GROUND ROD IN GROUND ROD BOX | | TRANSFORMER, PLAN VIEW SHOWN TO SCALE | | AAMP - AMPERE | | VAULT CALLOUT N-NEW E-EXISTING F-FUTURE R-REPLACE |
| | LED LUMINAIRE | | CONDUIT UNDER FLOOR OR UNDERGROUND | | CURRENT TRANSFORMER, NUMBER INDICATES NUMBER OF C.T.'S. PLAN VIEW SHOWN TO SCALE | | MOTOR, NUMBER INDICATES HORSEPOWER | | AL - ALARM | | EQUIPMENT CALLOUT N-NEW E-EXISTING F-FUTURE R-REPLACE |
| | LED LUMINAIRE | | TYPE-SOOW CABLE | | TRANSFORMER, PLAN VIEW SHOWN TO SCALE | | OVERTEMPERATURE CUTOUT | | AF - AMPERE FRAME | | DUCT BANK CALLOUT |
| | LED LUMINAIRE | | EXISTING CONDUIT ROUTED UNDERGROUND | | MOTOR, NUMBER INDICATES HORSEPOWER | | LOCAL EQUIPMENT CONTROL PANEL - MCP, LCP, FACP | | AIC - AMPS INTERRUPTING CAPACITY | | CONDUIT IDENTIFICATION POWER FEEDER CONDUIT & WIRE TAG, SEE SCHEDULE |
| | LED LUMINAIRE, WITH EMERGENCY BATTERY PACK | | UNDERGROUND PRIMARY POWER | | FULL VOLTAGE STARTER/NEMA SIZE MS = MOTOR STARTER CONTACT BP = BYPASS CONTACTOR IC = ISOLATION CONTACTOR | | MAGNETIC MOTOR STARTER W/ DISCONNECT | | ALT - ALTERNATOR | | SIGNAL CONDUIT & WIRE TAG, SEE SCHEDULE |
| | EMERGENCY WALL PACK | | MC-HL CABLE WITH XP SEAL FITTINGS | | MAINTAINED ON/OFF SWITCH | | MAGNETIC MOTOR STARTER | | AO - ANALOG OUTPUT POINT (PLC) | | TELEPHONE CONDUIT & WIRE TAG |
| | LED LUMINAIRE | | CONDUIT FLEXIBLE | | DISCONNECT SWITCH, NON FUSED (60A) INDICATES AMPERAGE RATING | | MAGNETIC MOTOR STARTER | | AS - AMPERE SWITCH | | GROUND ELECTRODE SYSTEM |
| | LED LUMINAIRE, WITH EMERGENCY BATTERY PACK | | HEAT TAPE ON PIPING | | DISCONNECT SWITCH, FUSED 200 = SWITCH RATING, 100 = FUSE RATING | | MAGNETIC MOTOR STARTER | | AT - AMPERE TRIP | | SPARE CONDUIT |
| | EMERGENCY WALL PACK | | MANUFACTURERS CORD/CABLE | | DISCONNECT SWITCH, FUSED 200 = SWITCH RATING, 100 = FUSE RATING | | MAGNETIC MOTOR STARTER | | ATS - AUTOMATIC TRANSFER SWITCH | | LETTER INDICATES CONTINUATION OF CONDUIT XXX. THE LETTER "N" SIGNIFIES MULTIPLE CONDUIT CONTINUATIONS. |
| | LED LUMINAIRE, POLE MOUNTED | | CONDUIT TURNED UP OR TOWARD | | TIME DELAYED CONTACTS (TIME DELAY TO OPEN) | | MAGNETIC MOTOR STARTER | | BC - BATTERY CHARGER | | SHEET KEYED NOTE |
| | LIGHTED EXIT SIGN, BACK OR END MOUNTED. SHADED AREA INDICATES FACE, ARROW INDICATES DIRECTIONAL ARROW. | | CONDUIT TURNED DOWN OR AWAY | | TIME DELAYED CONTACTS (TIME DELAY TO CLOSE) | | MAGNETIC MOTOR STARTER | | BH - BLOCK HEATER | | WIRING DIAGRAM DETAIL LOCATION |
| | LED LUMINAIRE, WALL MOUNTED | | CONDUIT CAPPED | | INDICATING LIGHT: A = AMBER G = GREEN W = WHITE B = BLUE R = RED | | MAGNETIC MOTOR STARTER | | BIL - BLUE INDICATING LIGHT | | ADDENDUM NUMBER |
| | LED LUMINAIRE, WALL MOUNTED WITH EMERGENCY BATTERY PACK | | CONDUIT SEALS. CLASS 1. DIV.1 EXPLOSION PROOF | | PUSH TO TEST INDICATING LIGHT TRANSFORMER TYPE | | MAGNETIC MOTOR STARTER | | BP - BYPASS CONTACTOR | | DETAIL AREA |
| | SPECIAL PURPOSE RECEPTACLE - AS NOTED | | CONDUIT HOME RUN 3/4", 2#12 & 1#12 GND. TO PANEL L, CKT. 7 UNLESS SHOWN OTHERWISE | | EV=ELECTRICAL VAULT, PV=POWER VAULT SV= SIGNAL VAULT | | MAGNETIC MOTOR STARTER | | CB - CIRCUIT BREAKER | | DETAIL NUMBER |
| | DUPLEX RECEPTACLE Y=NOTATIONS FOR ALL RECEPTACLE TYPES: GFI = GROUND FAULT CIRCUIT INTERRUPTER (GFCI) HT = HEAT TRACE RECEPTACLE W = WEATHER PROOF COVER I = ISOLATED GROUND C = CEILING MOUNTED RECEPTACLE SW= SPLIT CIRCUITING +X" = INDICATES CENTERLINE MOUNTING HEIGHT ABOVE FINISHED FLOOR OR GRADE | | CONDUIT HOME RUN - SEE SCHEDULE | | HAND SWITCH | | MAGNETIC MOTOR STARTER | | CGD - COMBUSTIBLE GAS DETECTOR | | DETAIL NUMBER IF PHOTO, ARROW DENOTES DIRECTION TAKEN |
| | QUAD RECEPTACLE | | VAULT/HANDHOLE WITH DESIGNATION | | EMERGENCY STOP SWITCH (PUSH/PULL) | | MAGNETIC MOTOR STARTER | | CP - CONTROL PANEL | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | SURFACE POWER/DATA RACEWAY. | | JUNCTION BOX | | PRESSURE SWITCH, NORMALLY CLOSED | | MAGNETIC MOTOR STARTER | | CPT - CONTROL POWER XFMR | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | DATA OUTLET | | TRANSFER SWITCH | | FLOW SWITCH, NORMALLY CLOSED | | MAGNETIC MOTOR STARTER | | CTL - CONTROL | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | THERMOSTAT | | POWER CAPACITOR | | LIMIT SWITCH, NORMALLY OPEN | | MAGNETIC MOTOR STARTER | | CV - CHECK VALVE | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | HUMIDISTAT | | FULL VOLTAGE NON-REVERSING STARTER, NEMA SIZE 1 FVR = FULL VOLTAGE REVERSING | | LEVEL SWITCH, CLOSES ON RISING LEVEL | | MAGNETIC MOTOR STARTER | | DB - DIRECT BURIED | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | CABLE TV CONNECTION POINT | | VARIABLE FREQUENCY CONTROLLER | | TS-TEMP. SWITCH, (SEE DWG. FOR OPERATION) | | MAGNETIC MOTOR STARTER | | DE - DOUBLE END | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | PANELBOARD | | SOLID STATE STARTER, REDUCED VOLTAGE WITH ISOLATION & BYPASS CONTACTORS | | TC-THERMOCOUPLE, T-THERMOSTAT | | MAGNETIC MOTOR STARTER | | D.E - DEAD END | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | TERMINAL | | FUSE | | PRESSURE TRANSMITTER | | MAGNETIC MOTOR STARTER | | DEM - DEMAND | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | TERMINAL IN MCP | | AMMETER (WHM-WATT HOUR METER) | | SPEED INDICATOR | | MAGNETIC MOTOR STARTER | | DF - DEMAND FACTOR | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | TERMINAL REMOTE DEVICE OR PANEL | | VOLTMETER | | FLOW TRANSMITTER | | MAGNETIC MOTOR STARTER | | DI - AC DIGITAL INPUT POINT (PLC) | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |
| | KURT KEY INTERLOCK | | METER & SWITCH: A = AMP, V = VOLT | | DOOR SECURITY SWITCH | | MAGNETIC MOTOR STARTER | | DO - AC DIGITAL OUTPUT POINT (PLC) | | DETAIL NUMBER SHEET ON WHICH DETAIL APPEARS |

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AEI
 AEI Engineering
 Incorporated
 19406
 STATE OF IDAHO
 MATTHEW L. BARKER
 01/09/24

| REVISION | DATE | BY | DESCRIPTION |
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BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS

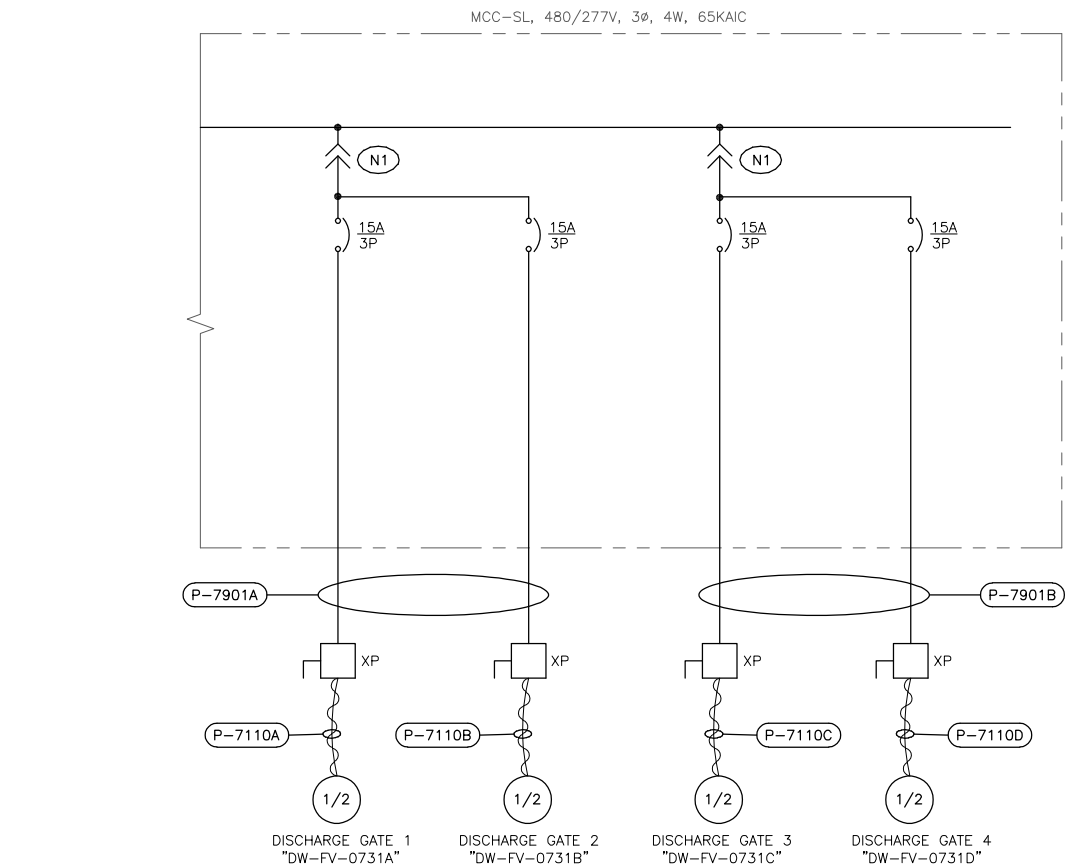
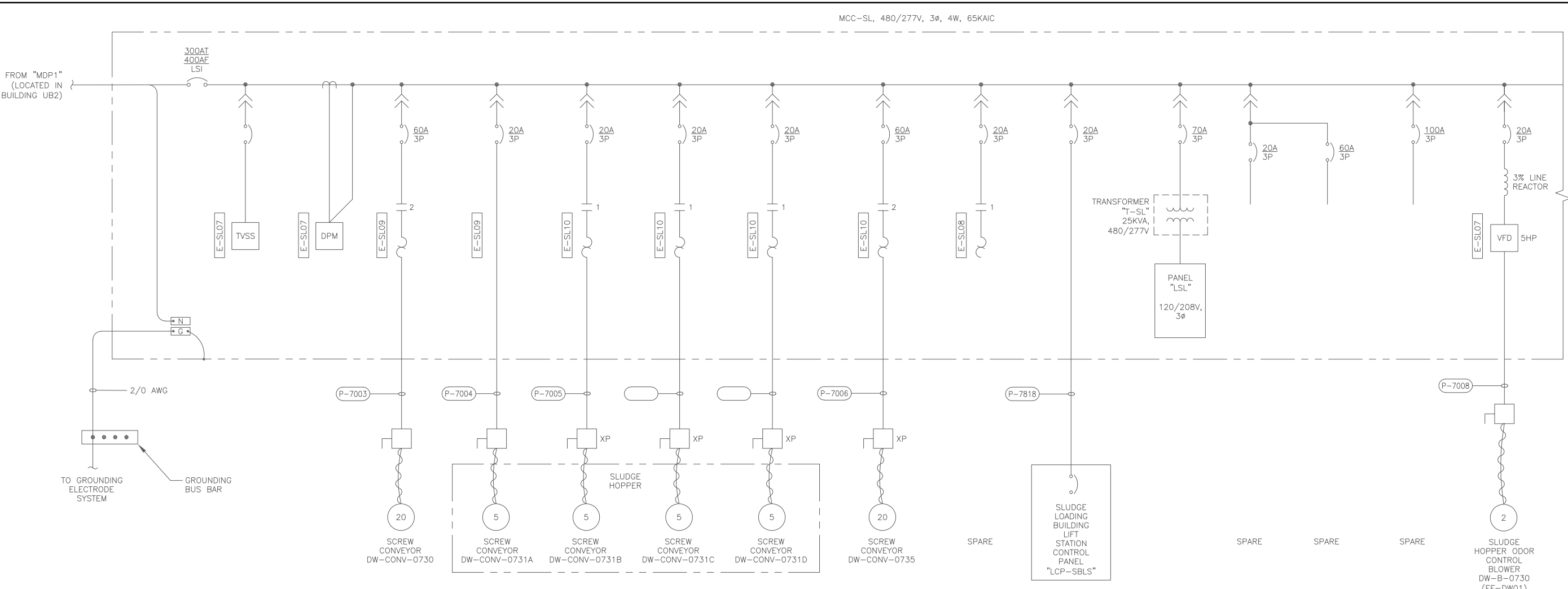
ELECTRICAL LEGEND

FILE: M23115-E-001
 JUB PROJ #: 20-23-033
 DRAWN BY: TJS
 DESIGN BY: MLB
 CHECKED BY: RJW
 AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
 LAST UPDATED: 01/09/24
 SHEET: 15
 DRAWING: E-001

| ELECTRICAL LEGEND | | | |
|-------------------|---|--------|---|
| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION |
| \$x | WALL MOUNTED TOGGLE SWITCH, SINGLE POLE, SINGLE THROW, MOUNTED AT 48" TO TOP OF PLATE UNLESS OTHERWISE NOTED X=NOTATIONS FOR SWITCHES: 2 = DOUBLE POLE 3 = 3-WAY 4 = 4-WAY D = DIMMER K = KEY OPERATED P = SWITCH WITH PILOT LIGHT WP = WEATHER PROOF COVER OC = OCCUPANCY SENSOR SW = SPLIT CIRCUITING +X" = INDICATES MOUNTING HEIGHT TO TOP OF PLATE, ABOVE FINISHED FLOOR OR GRADE | | |
| \$a, \$b | INDICATES SWITCHES a & b MOUNTED IN SEPARATE BOXES WITH SEPARATE COVER PLATES. | | |
| \$a, b, c | INDICATES MULTIPLE SWITCHES IN GANGED BOX WITH COMMON COVERPLATE. "a,b,c" INDICATES NUMBER OF INDIVIDUAL SWITCHES AND FIXTURES CONTROLLED. | | |
| SYMBOL | SECURITY | SYMBOL | FIRE PROTECTION |
| | MOTION DETECTOR | | FIRE ALARM CONTROL PANEL |
| | DOOR CONTACTS | | SMOKE DETECTOR, CEILING MOUNTED |
| | END OF LINE RESISTOR | | ADDRESSABLE FIRE ALARM SYSTEM RELAY |
| | KEYPAD | | HEAT DETECTOR |
| | PTZ CAMERA | | FIRE ALARM HORN STROBE, WALL MOUNTED C=CEILING MOUNTED |
| | | | FIRE ALARM STROBE |
| | | | FIRE ALARM PULL STATION |
| | | | FIRE ALARM HORN |

GENERAL NOTES

- THIS IS A STANDARD LEGEND SHEET. THEREFORE SOME ABBREVIATIONS OR SYMBOLS THAT APPEAR ON THIS SHEET MAY NOT BE USED ON THIS PROJECT.
- THE ELECTRICAL PLAN DRAWINGS ARE GENERALLY DIAGRAMMATIC. THE LOCATION OF EQUIPMENT IS APPROXIMATE UNLESS DIMENSIONED. EXACT LOCATIONS AND ROUTING OF CONDUITS AND WIREWAYS SHALL BE GOVERNED BY STRUCTURAL CONDITIONS AND PHYSICAL INTERFERENCES AND BY LOCATIONS OF ELECTRICAL TERMINATIONS ON EQUIPMENT.
- NOT ALL CONDUIT MAY BE SHOWN OR CALLED OUT FOR CLARITY. SEE CONDUIT AND WIRE SCHEDULE FOR ADDITIONAL CONDUIT.



| MCC-SL LOAD CALCULATION | | | |
|--|---------------|---------------|---------------|
| 277/480V, 3Ø, 4W | | | |
| | Ø A | Ø B | Ø C |
| M SCREW CONVEYOR (20 HP) (DW-CONV-0730) | 7,171 | 7,171 | 7,171 |
| M SCREW CONVEYOR (5 HP) (DW-CONV-0731A) | 2,018 | 2,018 | 2,018 |
| M SCREW CONVEYOR (5 HP) (DW-CONV-0731B) | 2,018 | 2,018 | 2,018 |
| M SCREW CONVEYOR (20 HP) (DW-CONV-0735) | 7,171 | 7,171 | 7,171 |
| M SLUDGE HOPPER ODOR BLOWER (2 HP) (DW-B-0730) | 903 | 903 | 903 |
| TRANSFORMER "T-SL" | 3,130 | 1,570 | 1,570 |
| M SLUDGE BUILDING LIFT STATION (2-2HP) | 2,000 | 2,000 | 2,000 |
| M DISCHARGE GATE 1 | 500 | 500 | 500 |
| M DISCHARGE GATE 2 | 500 | 500 | 500 |
| M DISCHARGE GATE 3 | 500 | 500 | 500 |
| M DISCHARGE GATE 4 | 500 | 500 | 500 |
| Total Connected Load (VA): | 26,411 | 24,851 | 24,851 |
| + 25% of Largest Motor: | 1793 | 1793 | 1793 |
| Total Code Load (VA): | 28,204 | 26,644 | 26,644 |
| Total Code Load (Amps): | 102 | 97 | 97 |

NOTES: (for this sheet)
 (N1) REPLACE SPARE SPACES 5A-5D WITH TWO NEW 2-SIDE-BY-SIDE CIRCUIT BREAKERS.

1038 W. Davidson Avenue
 Coeur d'Alene, ID 83814
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JUB
J-U-B ENGINEERS, INC.

7825 Meadowlark Way
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 Phone: 208.762.8787
 www.jub.com

Professional Engineer
 LICENSED
 19406
 STATE OF IDAHO
 MATTHEW L. BARKER
 01/09/24

| NO. | FOR BID | DATE |
|-----|---------|----------|
| 0 | | 01/09/24 |

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**BIOSSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS**

ONE-LINE DIAGRAM AND LOAD CALCULATION

FILE: M23115-E-DW-001
 JUB PROJ #: 20-23-033
 DRAWN BY: TLS
 DESIGN BY: MLB
 CHECKED BY: RJW

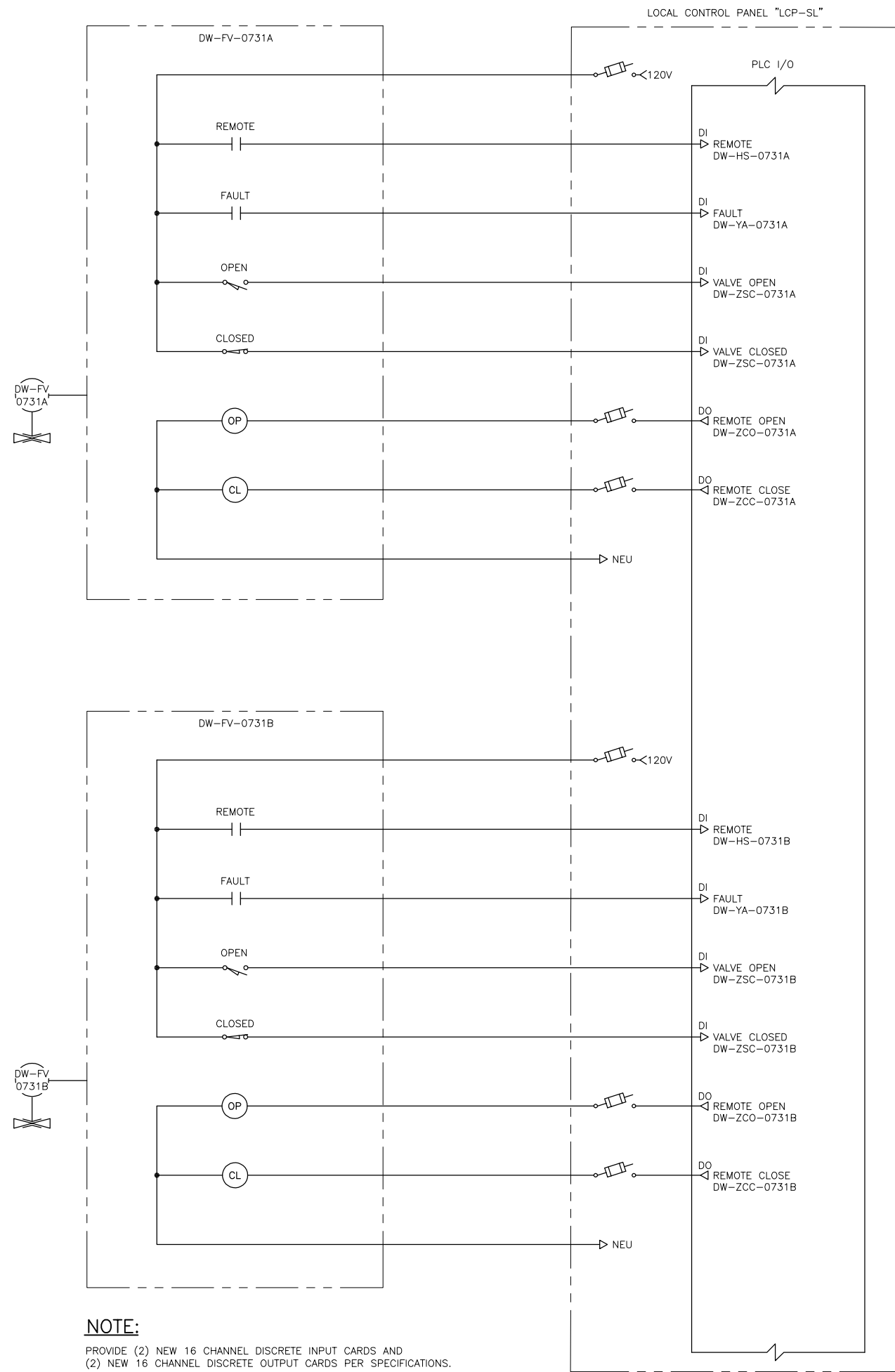
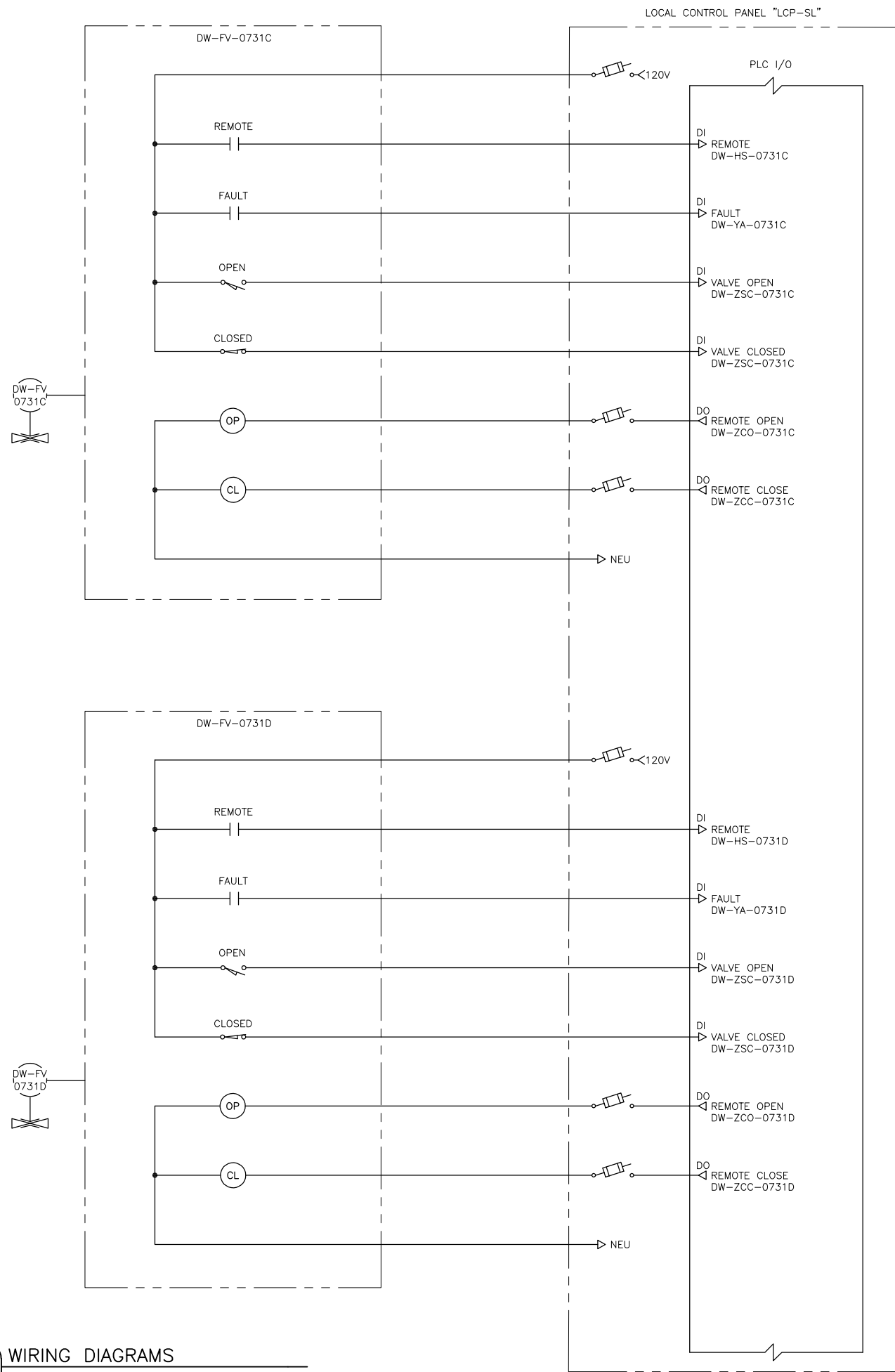
ONE INCH
 AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
 LAST UPDATED: 01/09/24

SHEET: **16**
 DRAWING: **E-DW-001**

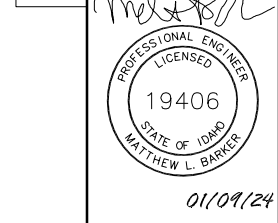
4.1 ONE-LINE DIAGRAM AND LOAD CALCULATION
 NOT TO SCALE

Plot Date: 1/9/2024 8:36 AM Plotted By: Ter Schawwender
 Date Created: 2/6/2023 S:\2023\M23115-JUB-POST FALLS WBF BIOSOLIDS LCPPEL IMPROVEMENTS\DRAWINGS\M23115-E-DW-001.DWG

4.1 WIRING DIAGRAMS
 NOT TO SCALE



NOTE:
 PROVIDE (2) NEW 16 CHANNEL DISCRETE INPUT CARDS AND
 (2) NEW 16 CHANNEL DISCRETE OUTPUT CARDS PER SPECIFICATIONS.



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|-----|----------|----------|
| 0 | 01/09/24 | 01/09/24 |

**BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS**

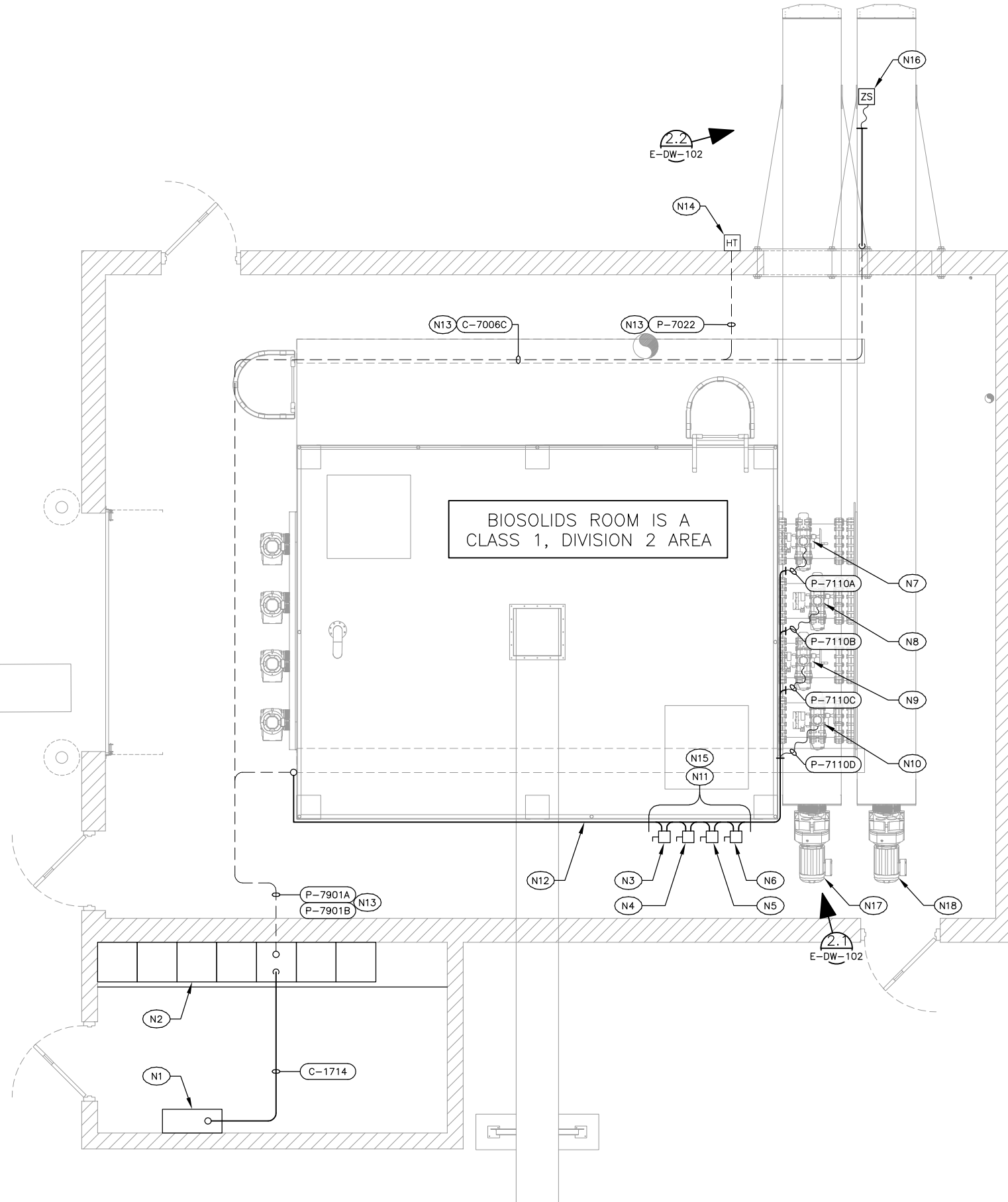
WIRING DIAGRAMS

Plot Date: 1/9/2024 8:42 AM Plotted By: Ter Schawwender
 Date Created: 01/02/24 S:\2023\M23115-JUB-POST FALLS VBE BIOSOLIDS LCPPEL IMPROVEMENTS\DRAWINGS\M23115-E-DW-101.DWG

4.1

DEWATERING AND SLUDGE STORAGE AREA
 POWER AND CONTROL PLAN

SCALE: 3/8"=1'-0"



NOTES: (for this sheet)

- (N1) LOCAL CONTROL PANEL "LCP-SL".
- (N2) MOTOR CONTROL CENTER "MCC-SL".
- (N3) DW-FCV-0731A DISCONNECT.
- (N4) DW-FCV-0731B DISCONNECT.
- (N5) DW-FCV-0731C DISCONNECT.
- (N6) DW-FCV-0731D DISCONNECT.
- (N7) DW-FCV-0731A.
- (N8) DW-FCV-0731B.
- (N9) DW-FCV-0731C.
- (N10) DW-FCV-0731D.
- (N11) ADD ADDITIONAL UNISTRUT SUPPORT AS NECESSARY FOR DISCONNECT RACK.
- (N12) CONDUIT TO BE ROUTED ON HOPPER STRUCTURE AT LEAST 8' ABOVE FINISHED FLOOR.
- (N13) EXISTING CONDUIT.
- (N14) EXISTING HEAT TRACE CONTROLLER. REVISE HEAT TRACE CIRCUITS, CONDUCTORS AND CONDUITS AS REQUIRED FOR CONVEYOR RELOCATION. PROVIDE NEW HEAT TRACE FREEZE PROTECTION FOR EXTERIOR PORTION OF THE RELOCATED CONVEYOR PER SPECIFICATION.
- (N15) DISCONNECT, KILLARK XEDS-30, OR APPROVED EQUAL.
- (N16) CONVEYOR ZERO SPEED SENSOR. REVISE CONDUIT AND EXTEND CONDUCTORS AS REQUIRED TO NEW LOCATION.
- (N17) EXISTING CONVEYOR LOCATION.
- (N18) NEW CONVEYOR LOCATION.

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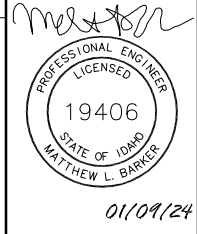
Matthew L. Barker
 PROFESSIONAL ENGINEER
 LICENSED
 19406
 STATE OF IDAHO
 MATTHEW L. BARKER
 01/09/24

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| 0 | FOR BID | 01/09/24 |
| | BY: RJB | |

BIOSOLIDS HOPPER MODIFICATIONS
 CITY OF POST FALLS
 DEWATERING AND SLUDGE STORAGE AREA
 POWER AND CONTROL PLAN

| |
|--|
| FILE: M23115-E-DW-101 |
| JUB PROJ #: 20-23-033 |
| DRAWN BY: TLS |
| DESIGN BY: MLB |
| CHECKED BY: RJB |
| AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY |
| LAST UPDATED: 01/09/24 |
| SHEET: 19 |
| DRAWING: E-DW-101 |



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| | | BY: APR |

BIOSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS

PROCESS AND INSTRUMENTATION DIAGRAMS (I)
LEGEND

INSTRUMENT LINE SYMBOLS

| | |
|--|---|
| | PROCESS OR DEVICE CONNECTION |
| | ELECTRICAL SIGNAL |
| | ANALOG MILLIAMP SIGNAL |
| | SOFTWARE OR DATA LINK |
| | SONIC, ELECTROMAGNETIC, OR OPTICAL SIGNAL |
| | PNEUMATIC SIGNAL |
| | HYDRAULIC SIGNAL |
| | CAPILLARY TUBE |
| | MULTI-CONDUCTORS |
| | FIBER OPTIC |
| | ETHERNET |

INSTRUMENT FUNCTION SYMBOLS

| | | |
|--|--|---|
| FIELD MOUNTED DISCRETE DEVICES | | NON-ADJUSTABLE OR NOT ACCESSIBLE |
| | | ADJUSTABLE BUT NOT ACCESSIBLE TO OPERATOR |
| | | ADJUSTABLE OR ACCESSIBLE TO OPERATOR |
| PRIMARY SHARED DISPLAY OR SHARED CONTROL FUNCTION TYPICALLY LOCATED AT MCC OR EQUIPMENT CONTROL PANEL | | NON-ADJUSTABLE OR NOT ACCESSIBLE |
| | | ADJUSTABLE BUT NOT ACCESSIBLE TO OPERATOR |
| | | ADJUSTABLE OR ACCESSIBLE TO OPERATOR |
| ALTERNATE SHARED DISPLAY OR SHARED CONTROL FUNCTION TYPICALLY LOCATED AT LOCAL CONTROL PANEL PLC I/O AND FUNCTIONS | | NON-ADJUSTABLE PLC FUNCTION |
| | | PROGRAMMER ADJUSTABLE PARAMETERS NOT ACCESSIBLE TO OPERATOR |
| | | OPERATOR ADJUSTABLE SETPOINTS THROUGH PLC INPUT PANEL |
| COMPUTER SYSTEMS, TYPICALLY THE PLANT SCADA SUPERVISORY AND CONTROL FUNCTIONS | | NON-ADJUSTABLE SCADA FUNCTION |
| | | PROGRAMMER ADJUSTABLE PARAMETERS NOT ACCESSIBLE TO OPERATOR |
| | | OPERATOR ADJUSTABLE SETPOINTS THROUGH SCADA INPUT PANEL |
| | | INTERLOCK LOGIC OR SEQUENTIAL CONTROL |
| | | PILOT LIGHT |
| | | MOTOR OR DEVICE |

AAA - FUNCTION
BBB - SYSTEM
CCC - LOOP NUMBER
DDD - DESCRIPTION

MECHANICAL EQUIPMENT SYMBOLS

| | | | |
|--|----------------------------|--|------------------|
| | DIAPHRAM PRESSURE SEAL | | REDUCER |
| | CENTRIFUGAL PUMP | | SUBMERSIBLE PUMP |
| | METERING PUMP | | VERTICAL PUMP |
| | ROTARY LOBE PUMP | | MIXER |
| | ROTARY LOBE BLOWER | | STRAINER |
| | PROGRESSIVE CAVITY PUMP | | COMPRESSOR |
| | GEAR PUMP | | GENERATOR |
| | POSITIVE DISPLACEMENT PUMP | | MOTOR |
| | AUTO STRAINER | | WEIR GATE |
| | | | SLIDE GATE |

VALVE KEY

| | | | |
|--|--------------------------|--|-----------------------------|
| | N.O. GATE VALVE | | N.C. BUTTERFLY VALVE |
| | HAND OPERATED SLIDE GATE | | DIAPHRAGM VALVE |
| | STOP GATE | | DIAPHRAGM VALVE, FLANGED |
| | CHECK VALVE | | MULTI-PORT VALVE, 4 WAY |
| | N.O. PLUG VALVE | | PRESSURE RELIEF VALVE |
| | N.C. BALL VALVE | | AIR RELIEF VALVE |
| | NEEDLE SAMPLE VALVE | | MUD VALVE |
| | PINCH VALVE | | INJECTION QUILL |
| | PNEUMATIC ACTUATOR | | PRESSURE RELIEF VALVE |
| | SOLENOID ACTUATOR | | PRESSURE REDUCING REGULATOR |
| | WEIR GATE | | |
| | HOSE BIB | | |
| | CLEANOUT | | |

MISCELLANEOUS

EQUIPMENT TAG: XX-XX-XX-X

LINE NUMBER: X, CONTINUATION SHEET: XX, LINE CONTINUATION: X XX

EQUIPMENT STATUS: (E)-EXISTING, (F)-FUTURE, (R)-RELOCATED

NOTE: ALL EQUIPMENT WITH NO STATUS IS NEW.

| MISC. | MISC. | METERS |
|-------|-------|--------|
| | | |
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| 0 | | 01/09/24 |

**BIO-SOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS**

PROCESS AND INSTRUMENTATION DIAGRAMS (I)
DEWATERING AREA

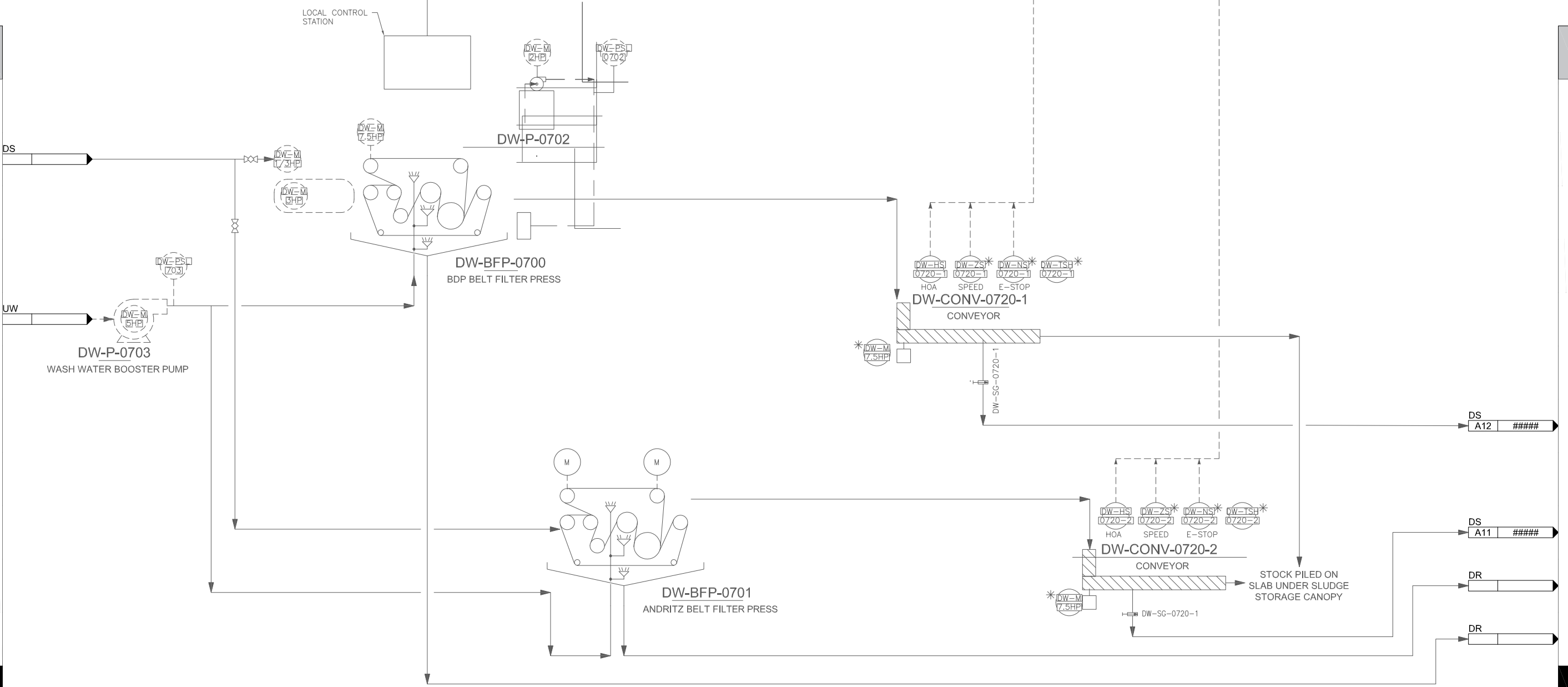
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JUB PROJ #: 20-23-033
DRAWN BY: TLS
DESIGN BY: MLB
CHECKED BY: RLW

ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
LAST UPDATED: 01/09/24

SHEET: **22**
DRAWING: **I-701**

LEGEND

- * INDICATES EQUIPMENT AND INSTRUMENTATION SUPPLIED BY THE EQUIPMENT MANUFACTURER
- (R) INDICATES EXISTING EQUIPMENT TO BE RELOCATED.
- (E) INDICATES EXISTING EQUIPMENT OR INSTRUMENTATION.



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| NO. | DATE | BY | DESCRIPTION |
|-----|----------|----|-------------|
| 0 | 01/09/24 | TL | FOR BID |

**BIOSSOLIDS HOPPER MODIFICATIONS
CITY OF POST FALLS**
PROCESS AND INSTRUMENTATION DIAGRAMS (I)
DEWATERING AREA

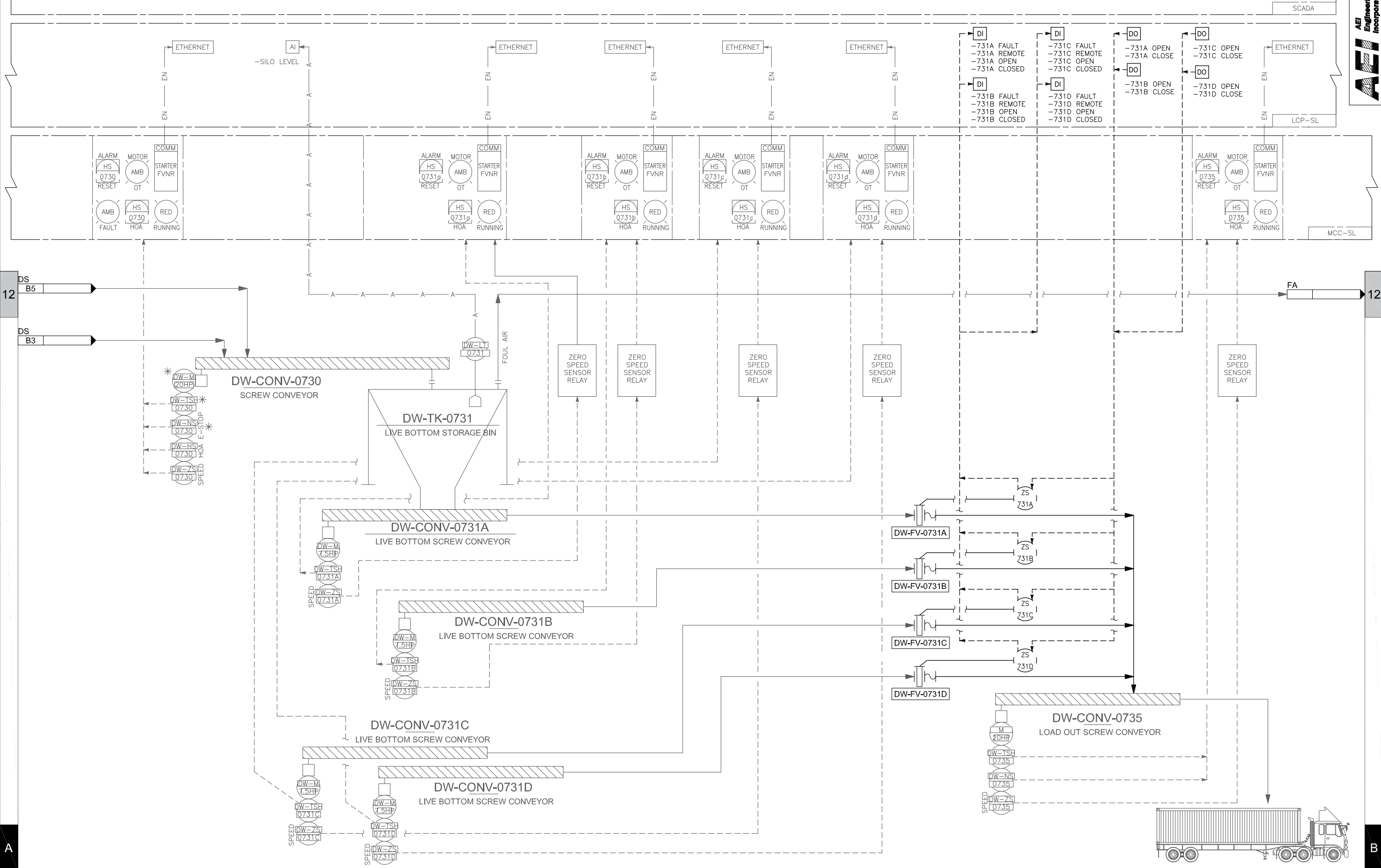
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JUB PROJ #: 20-23-033
DRAWN BY: TLS
DESIGN BY: MLB
CHECKED BY: RJW

ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
LAST UPDATED: 01/09/24

SHEET: **23**
DRAWING: **I-702**

LEGEND

- * INDICATES EQUIPMENT AND INSTRUMENTATION SUPPLIED BY THE EQUIPMENT MANUFACTURER
- (R) INDICATES EXISTING EQUIPMENT TO BE RELOCATED.
- (E) INDICATES EXISTING EQUIPMENT OR INSTRUMENTATION.



Plot Date: 1/9/2024 8:34 AM Plotted By: Ter Schawwender
Date Created: 01/11/2023 3:02:23 PM
S:\2023\M23115-I-702 - SUB - POST FALLS WBF - BIOSSOLIDS HOPPER IMPROVEMENTS\DRAWINGS\M23115-I-701-2.DWG