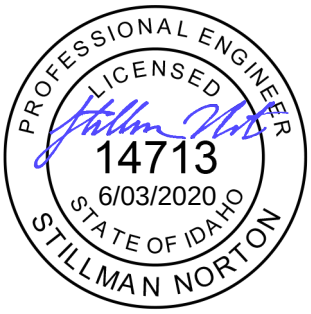
Contract Documents & Specifications

CITY OF ATHOL
WATER SYSTEM IMPROVEMENTS

Volume 1 of 2
Division 00 – Division 01



Funded by DEQ, IDOC, and USDA-RD
DEQ SRF Loan Project Number DW 1906
AIS & Wage Requirements Apply

JUNE 2020

PROJECT NO. 216064-001

PREPARED BY:

KELLER ASSOCIATES

601 Sherman Ave., Suite 1
Coeur d'Alene, ID 83814
(208) 758-8601

PREPARED FOR:

CITY OF ATHOL
IDAHO

30355 N. 3rd Street
Athol, ID 83801
(208) 683-2101

THIS PAGE LEFT BLANK INTENTIONALLY

TABLE OF CONTENTS

BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

BIDDING DOCUMENTS

00 11 16 Invitation for Bid
00 21 13 Instruction to Bidders
00 41 13 Bid Form
00 43 13 Bid Bond

CONTRACT FORMS

00 51 00 Notice of Intent to Recommend Award
00 52 13 Agreement between Owner and Contractor
00 55 00 Notice to Proceed
00 61 13.13 Performance Bond
00 61 13.16 Payment Bond
00 62 76 Application for Payment
00 65 16 Certificate of Substantial Completion
00 74 00 Agreement Supplements
00 94 39 Field Orders
00 94 49 Work Change Directives
00 94 63 Change Orders

CONDITIONS OF THE CONTRACT

00 62 76.10 Idaho State Tax Requirements
00 72 13 General Conditions
00 73 00 Supplementary Conditions

TECHNICAL SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

01 00 00 Special Provisions
01 11 00 Summary of Work
01 14 13 Access to Site
01 21 00 Measurement and Payment
01 25 13 Product Substitution Procedures
01 31 19 Project Meetings
01 32 16 Construction Progress Schedule
01 33 00 Submittal Procedures
01 35 53 Security Procedures
01 42 13 Abbreviations and Acronyms
01 42 19 Reference Standards
01 45 00 Quality Control
01 45 33 Special Inspection, Observation and Testing
01 50 00 Temporary Facilities and Controls
01 57 12 Construction Site Discharge
01 71 13 Mobilization
07 71 23.16 Construction Surveying
01 71 33 Protection of Adjacent Construction
01 74 30 Site Pressure Pipe Testing and Disinfection

DIVISION 01 – GENERAL REQUIREMENTS (CONTINUED)

01 77 00 Closeout Procedures
01 78 23 Operation and Maintenance Data

DIVISION 02 – EXISITING CONDITIONS

02 41 00 Demolition
02 43 16 Structure Raising
02 83 33.13 Lead-Based Paint Removal

DIVISION 03 – CONCRETE

03 11 00 Concrete Forming
03 20 00 Concrete Reinforcing
03 30 00 Cast-In-Place Concrete
03 60 00 Grouting

DIVISION 05 – METALS

05 12 00 Structural Steel Framing
05 50 00 Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry
06 17 53 Shop-Fabricated Wood Trusses

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 11 13 Bituminous Dampproofing
07 20 00 Thermal Protection
07 25 00 Weather Barriers
07 40 00 Roofing and Siding Panels
07 60 00 Flashing and Sheet Metal
07 71 00 Roof Specialties
07 92 00 Joint Sealants

DIVISION 08 – OPENINGS

08 11 13 Hollow Metal Doors and Frames
08 31 00 Access Doors
08 71 00 Door Hardware
08 91 00 Louvers

DIVISION 09 – FINISHES

09 29 00 Gypsum Board
09 90 00 Painting and Coating
09 97 13.24 Steel Water Storage Tank Painting

DIVISION 26 – ELECTRICAL

26 05 00 Electrical, General
26 05 19 Low-Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Supporting Devices
26 05 33 Raceways for Electrical Systems
26 05 33.16 Cabinets and Boxes for Electrical Systems

DIVISION 26 – ELECTRICAL (CONTINUED)

26 21 00 Service Entrance
26 22 00 Low Voltage Transformers
26 24 16 Panelboards
26 27 26 Wiring Devices
26 28 00 Overcurrent Protective Devices
26 32 13 Engine Generators
26 36 00 Transfer Switches
26 51 19 LED Interior Lighting
26 56 19 Exterior Lighting

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 31 11 Building Intrusion Detection

DIVISION 33 – UTILITIES

33 11 36 Submersible Centrifugal Well Pumps
33 16 23 Ground Level Steel Water Storage Tanks

DIVISION 40 – PROCESS INTERCONNECTIONS

40 05 00 Piping, General
40 05 07 Hangers and Supports for Process Piping
40 05 19 Ductile Iron Pipe and Fittings
40 05 51 Valves, General
40 05 57 Actuators for Process Valves and Gates
40 05 61 Gate Valves
40 05 64 Butterfly Valves
40 05 97 Piping Identification
40 63 43.A IO Schedules
40 67 00 Control Panels
40 67 00.A Panel List
40 70 00 Instrumentation and Control, General
40 70 00.A Device List
40 70 13 In-Line Liquid Flow Measuring Systems
40 73 00 Pressure Measuring and Detection Systems
40 79 23 Testing, Calibration, and Commissioning

APPENDICES

APPENDIX A – GEOTECHNICAL REPORT (SUPPLEMENTAL INFORMATION)

APPENDIX B – PERMIT INFORMATION

DRAWINGS (BOUND SEPARATELY)

THIS PAGE LEFT BLANK INTENTIONALLY

BIDDING DOCUMENTS

THIS PAGE LEFT BLANK INTENTIONALLY

CITY OF ATHOL
ATHOL, IDAHO
WATER SYSTEM IMPROVEMENTS PROJECT

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the City of Athol, Water System Improvements Project will be received by the City of Athol at City Hall, 30355 N 3rd Street P.O. Box 249, Athol, ID 83801, 3:00 pm local time by July 1, 2020 at which time the Bids received will be publicly opened and read.

Bids shall be on a bid item basis as indicated in the Bid Form.

The Project consists of construction of the various improvements to the City's water system, including raising the existing elevated reservoir (on Menser Ave and 6th St), replacing two existing storage tanks with a standpipe (near the City Cemetery), electrical improvements at the existing Bennett Well site (Bennett Ave and 2nd Ave), structural improvements and pump replacement at the existing Grove Well (Grove Ave and Pastime St) and water main replacement throughout the City. Work includes demolition, as well as construction of concrete structures (below grade), piping, HVAC, electrical and controls, site work, miscellaneous appurtenant work, and installation of mechanical equipment. Mechanical equipment includes pumps.

Bidding Documents may be purchased electronically from Keller's website (https://goo.gl/VWGyy7) through Quest CDN for a non-refundable fee of $15.00. Prospective bidders shall purchase digital documents from Quest CDN to receive addenda postings. Updated plan holder's list may also be obtained from Quest CDN.

A VIEWING copy of the documents is available on Keller's website at the following link, https://goo.gl/VWGyy7.

Questions and clarifications relative to this Work shall be directed in writing to the Engineer (Mr. Zachary Wallin, Keller Associates, zwallin@kellerassociates.com). Questions received less than seven days prior to the due date for the bids may not be answered. Responses will be issued by written addendum. Verbal responses will not be binding on the City, Engineer, or Bidder.

A pre-bid conference will be held at 10:00 AM PST on Wednesday, June 17, 2020 at the City of Athol at 30355 N 3rd Street, Athol, ID 83801. Attendance at the pre-bid conference is not mandatory. Representatives of Keller Associates and the Owner will be present to discuss the project.

In determining the lowest responsive bid, the Owner will consider all acceptable bids on a basis consistent with the bid package. The Owner will also consider whether the bidder is a responsible bidder.

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

Each Bid must be submitted on the prescribed forms and accompanied by Bid Security in the form of cash, a cashier's check, or a bid bond executed on the prescribed form, payable to the City of Athol, in an amount not less than five percent (5%) of the bid amount. The successful Bidder will be required to furnish Performance and Payment Bonds, each in the amount of not less than 100% of the contract price.

Each bidder must have a Public Works Contractors License in the State of Idaho prior to bid opening in accordance with Idaho law. All contractors and subcontractors performing work on the Project shall comply with Davis-Bacon wages applicable to the project and in effect at the time of bid is due.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

The Owner reserves the right to reject any or all Bid Proposals, to waive any formality in the Bidding Documents, and to make selection to the lowest responsive, responsible, and qualified Contractor as it may best serve the interest of the Owner.

City of Athol, Idaho

Publication Dates: June 3, 10, and 17, 2020

Modified from EJCDC® C-111, Suggested Advertisement for Bids for Construction Contracts.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Instructions to Bidders

TABLE OF ARTICLES

	Page
Article 1 - Defined Terms	2
Article 2 - Copies of Bidding Documents	2
Article 3 - Qualifications of Bidders	2
Article 4 – Site and Other Areas; Existing Site Conditions; Examination of Site; Owner's Safety Program; Other Work at the Site.	3
Article 5 – Bidder's Representations	5
Article 6 – Pre-Bid Conference	6
Article 7 - Interpretations and Addenda	7
Article 8 - Bid Security	7
Article 9 - Contract Times	8
Article 10 - Liquidated Damages	8
Article 11 - Substitute and "Or-Equal" Items	8
Article 12 - Subcontractors, Suppliers, and Others	9
Article 13 - Preparation of Bid	10
Article 14 - Basis of Bid; Comparison of Bids	11
Article 15 - Submittal of Bid	11
Article 16 - Modification and Withdrawal of Bid	12
Article 17 - Opening of Bids	12
Article 18 - Bids to Remain Subject to Acceptance	12
Article 19 - Evaluation of Bids and Award of Contract	13
Article 20 - Bonds and Insurance	13
Article 21 - Signing of Agreement	14
Article 22 - Sales and Use Taxes	14
Article 23 - Contracts to be Assigned	14
Article 24 – Wage Rate Requirements	14
Article 25 – American Iron and Steel (AIS)	14
Article 26 – Funding Agency Requirements	15
Article 27 – Project Sign	15
Article 28 – Energy Program Requirements	15

ARTICLE 1 - DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will 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. Issuing Office – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
B. Owner – City of Athol, 30355 N. 3rd Street, P.O. Box 249, Athol, ID 83801
C. Engineer – Keller Associates, Inc., 601 Sherman Avenue, Suite 1, Coeur d'Alene, ID 83814
D. Bidder – The individual or entity who submits the Bid directly to the Owner.
E. Successful Bidder - The lowest responsible BIDDER submitting a responsive bid to whom OWNER (on basis of OWNER's evaluation as hereinafter provided) makes an award.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents (electronic) for the deposit sum, if any, stated in the Advertisement for Bids may be obtained from Keller's website, as listed in the Advertisement for Bids, through Quest CDN.

2.02 Complete sets of Bidding Documents must 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.

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 establishing its qualifications such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. Evidence of Bidder's authority to do business in the State of Idaho.
B. Bidder's state or other contractor license number, if applicable.
C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of the Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 Site and Other Areas

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 Existing Site Conditions

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:
   a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
   b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
   c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
   d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in 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

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

C. Adequacy of Data: 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 5.03, 5.04, and 5.05 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 5.06 of the General Conditions.

4.03 Site Visit and Testing by Bidders

A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. To the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid at the pre-bid conference. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Project site visits inside the existing fence lines shall be conducted at the pre-bid conference.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. 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.

4.04 Owner's Safety Program

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 Other Work at the Site

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work including but not limited to American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference which apply to the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

E. consider the information known to Bidder itself; 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; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid 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 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. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents

ARTICLE 6 - PRE-BID CONFERENCE

6.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to 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 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 delivered to all parties recorded by Quest CDN as having received the Bidding Documents. Questions received less than

seven 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, supplement or change the Bidding Documents as deemed advisable by Owner or Engineer.

7.03 Questions shall be referred to the Project Engineer, Zachary Wallin, Keller Associates, Inc. at (208) 758-8601 or zwallin@kellerassociates.com.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 % of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order or a Bid bond (EJCDC No. C-430, 2013 Edition; included in these specifications) issued by a surety meeting the requirements of paragraphs 6.01 and 6.02of the General Conditions.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and 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 released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after 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.

8.03 The Bid security of other Bidders that 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 Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 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.

ARTICLE 10 -LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or- equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed "or-equal." Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. Each such request shall include Manufacturer's Certification letter for compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner. Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions after the Effective Date of the Contract.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

11.03 If an award is made, Contractor shall be allowed to submit proposed substitutes and "or-equals" in accordance with the General Conditions, unless otherwise noted.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 All Bidders shall include with the Bid a list of the Subcontractors or Suppliers proposed for the Work, as required by Idaho Code. If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

12.05 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

12.06 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06.

ARTICLE 13 - PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words “No Bid” or “Not Applicable.”

13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown. The corporate seal, if any, shall be affixed and attested by the corporate secretary or an assistant corporate secretary.

13.03 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person 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.

13.04 A Bid by an individual shall show the Bidder’s name and official address.

13.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

13.06 All names shall be printed in ink below the signatures.

13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.09 The Bid shall contain evidence of Bidder’s authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder’s state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARSION 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.

B. The total of all bid 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 13.03 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. Discrepancies between words and figures will be resolved in favor of the words.

D. Bidders shall submit a Bid on unit price basis for the Base Bid and include a separate price for each alternate described in the Bidding Documents as provided for in the Bid Form. The price for each alternate will be the amount added to the Bid if Owner selects the alternate. The Owner reserves the right to award any combination of alternates, regardless of the method in which the successful bidder is determined. In the comparison of Bids, alternates will be evaluated in the following manner to determine the successful bidder:

The lowest price considering the Base Bid plus Bid Alternates, in any combination of alternates with no specific priority for each alternate, that can be awarded within the Owner’s project budget. Alternative Bid items will be selected at Owner’s discretion.

14.02 Allowances

A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 15 - SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque sealed envelope plainly marked 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 envelope 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 for Bid. A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form.

15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be 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. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 After the date and time Bids are opened, a bid may only be withdrawn in accordance with Idaho Code 54-1904. If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

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, at 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 will reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive. Owner also reserves the right to waive all minor 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 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price and other factors considered. If detailed in the bid form, factors such as discounts, transportation costs, and life cycle costs may be used to determine which bidder, if any, is to be offered the award.

ARTICLE 20 - BONDS AND INSURANCE

20.01 Article 6 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 gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in in Paragraph 2.02 of the General Conditions.

21.02 This Contract is expected to be funded in part with funds provided by the United States Department of Agriculture, Rural Utilities Service (RUS). Refer to Supplementary General Conditions for Federal requirements.

21.03 Concurrence by RUS in the award of the Contract is required before the Contract is effective.

ARTICLE 22 – SALES AND USE TAXES

22.01 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.

ARTICLE 23 - CONTRACTS TO BE ASSIGNED

Not Used.

ARTICLE 24 – WAGE RATE REQUIREMENTS

24.01 If the contract cost is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

24.02 Federal prevailing wage rates of the Department of Labor apply to this project.

ARTICLE 25 – AMERICAN IRON AND STEEL (AIS)

25.01 Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States, except those iron and steel products specifically excluded (see SRF Form 6-B) or for which a waiver has been issued. The term “iron and steel products” means the following products made primarily

of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

25.02 Documentation including certificates of compliance (SRF Form 6-B) shall be submitted for approval prior to purchase of AIS iron and steel products.

ARTICLE 26 – FUNDING AGENCY REQUIREMENTS

26.01 The Bidder agrees to abide by the requirements of the Idaho Clean Water State Revolving Fund (SRF) Program as applicable to this project.

26.02 Refer to the Idaho Clean Water SRF Program specifications insert included in these specifications for program requirements.

ARTICLE 27 – PROJECT SIGN

27.01 A project sign is required for this project by the Idaho Department of Environmental Quality (IDEQ). Reference SRF insert 6-B.

ARTICLE 28 – ENERGY PROGRAM REQUIREMENTS

28.01 The Bidder agrees to provide cost documentation as specified in Section 01 33 00 – Submittal Procedures for Owner's participation in the SRF Green Project Reserve.

Bid Form

Project Identification: Athol Water System Improvements Project

Contract Identification and Number:

TABLE OF ARTICLES

	Page
Article 1 – Bid Recipient	1
Article 2 - Bidder's Acknowledgments	1
Article 3 - Bidder's Representations	1
Article 4 - Bidder's Certification	3
Article 5 - Basis of Bid	4
Article 6 - Time of Completion	10
Article 7 - Attachments to Bid	10
Article 8 - Defined Terms	10
Article 9 - Certifications and Naming of Subcontractors	10
Article 10 - Bid Submittal	15

ARTICLE 1 - BID RECIPIENT

1.01 This Bid Is Submitted To:
City of Athol
30355 N 3rd Street
Athol, ID 83801

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 the Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 - BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Advertisement and Instructions to Bidders, including without limitations those dealing with the dispositions of Bid security. The Bid will remain subject to acceptance for {} 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, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date

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 Federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work and including all American Iron and Steel requirements.

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 in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-5.03, and (2) reports and drawings of Hazard Environmental Conditions, if any, at the Site that have been identified in SC-5.06 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. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that any 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 and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is 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. 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.

I. 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.

J. Bidder will submit written evidence of its authority to do business in the State or other jurisdiction where the Project is located not later than the date of its execution of the Agreement.

K. The submission of this Bid constitutes as incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 - BIDDER'S CERTIFICATION

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on the behalf of any undisclosed individual or entity and is not submitted in conformity with any 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 price(s) indicated in the BID SCHEDULE shown below.

A. All specified cash allowances are included in the lump sum price(s) set forth in the BID SCHEDULE, and have been computed in accordance with Paragraph 13.02 of the General Conditions.

B. Unit Prices have been computed in accordance with paragraph 13.03.B of the General Conditions.

C. 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.

BASE BID SCHEDULE

PAY ITEM NO.	ITEM DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL PRICE
201.4.1.B.1	Clearing and Grubbing	LS	1		
201.4.1.C.1	Removal of Obstructions	LS	1		
201.4.1.D.1	Removal of Asphalt	SY	370		
306.4.1.D.1	Imported Trench Backfill	TON	15		
307.4.1.A.1	Miscellaneous Surface Restoration (Landscaping)	SY	400		
307.4.1.A.7	Miscellaneous Surface Restoration (Natural Ground)	SY	2,600		
307.4.1.E.1	Type C Surface Restoration (Gravel Roadway)	SY	325		
307.4.1.G.1	Type P Surface Restoration (Asphalt Roadway)	SY	370		
308.4.1.B.1	Pipe Boring and Jacking	LS	1		

BASE BID SCHEDULE					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
401.4.1.A.1	Water Main Pipe - Size 8" - Type PVC C-905 DR 18	LF	3,950		
401.4.1.B.1	Water Main Fitting-Size 8”- (Bends, Elbows, Tees, Crosses, Reducers, Caps, etc)	EA	24		
402.4.1.A.1	6” Tapping Valve and Sleeve	EA	6		
403.4.1.A.1	Hydrant	EA	4		
1001.4.1.A.1	Sediment Control	LS	1		
1103.4.1.A.1	Construction Traffic Control	LS	1		
2010.4.1.A.1	Mobilization	LS	1		
SP 050	Connect to Existing Pressure Water Mains	EA	6		
SP 075	Controls Improvements	LS	1		
SP 100	Existing Elevated Reservoir Improvements	LS	1		
SP 200	New Cemetery Standpipe	LS	1		
SP 800	1” Polyethylene (PE) Pressure Pipe for water service	LF	250		
SP 825	Water Service Connection	EA	36		
	TOTAL BASE BID				**$**

TOTAL BASE BID

_____

_____

_____

($_____)

(use words)

ADD ALTERNATIVE 1-5TH STREET AND GROVE AVE IMPROVEMENTS					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
201.4.1.B.1	Clearing and Grubbing	LS	1		
201.4.1.C.1	Removal of Obstructions	LS	1		
201.4.1.D.1	Removal of Asphalt	SY	220		
306.4.1.D.1	Imported Trench Backfill	TON	5		
307.4.1.A.1	Miscellaneous Surface Restoration (Landscaping)	SY	25		
307.4.1.A.7	Miscellaneous Surface Restoration (Natural Ground)	SY	1000		
307.4.1.E.1	Type C Surface Restoration (Gravel Roadway)	SY	360		
307.4.1.G.1	Type P Surface Restoration (Asphalt Roadway)	SY	220		
401.4.1.A.1	Water Main Pipe - Size 8" - Type PVC C-905 DR 18	LF	570		
401.4.1.A.2	Water Main Pipe - Size 10" - Type PVC C-905 DR 18	LF	1200		
401.4.1.B.1	Water Main Fitting-Size 8”- (Bends, Elbows, Tees, Crosses, Reducers, Caps, etc)	EA	10		
402.4.1.A.1	Valve-8”-Type-Gate Valve	EA	2		
402.4.1.A.1	6” Tapping Valve and Sleeve	EA	2		
403.4.1.A.1	Hydrant	EA	2		
1001.4.1.A.1	Sediment Control	LS	1		
1103.4.1.A.1	Construction Traffic Control	LS	1		
2010.4.1.A.1	Mobilization	LS	1		
SP 050	Connect to Existing Pressure Water Mains	EA	2		
SP 800	1” Polyethylene (PE) Pressure Pipe for water service	LF	200		

ADD ALTERNATIVE 1-5TH STREET AND GROVE AVE IMPROVEMENTS					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
SP 825	Water Service Connection	EA	9		
	TOTAL ALTERNATIVE 1 BID				**$**

TOTAL ALTERNATIVE 1 BID

_____

_____

_____(

$_____)

(use words)

ADD ALTERNATIVE 2-LORRAINE DRIVE LOOP					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
201.4.1.B.1	Clearing and Grubbing	LS	1		
201.4.1.C.1	Removal of Obstructions	LS	1		
201.4.1.D.1	Removal of Asphalt	SY	35		
306.4.1.D.1	Imported Trench Backfill	TON	20		
307.4.1.A.1	Miscellaneous Surface Restoration (Landscaping)	SY	150		
307.4.1.A.7	Miscellaneous Surface Restoration (Natural Ground/Railroad bed)	SY	1400		
307.4.1.E.1	Type C Surface Restoration (Gravel Roadway)	SY	700		
307.4.1.G.1	Type P Surface Restoration (Asphalt Roadway)	SY	35		
401.4.1.A.1	Water Main Pipe - Size 8" - Type PVC C-905 DR 18	LF	1300		
401.4.1.A.2	Water Main Pipe - Size 10" - Type PVC C-905 DR 18	LF	425		
401.4.1.B.1	Water Main Fitting-Size 8”- (Bends, Elbows, Tees, Crosses, Reducers, Caps, etc)	EA	11		

ADD ALTERNATIVE 2-LORRAINE DRIVE LOOP					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
401.4.1.B.1	Water Main Fitting-Size 10”-(Bends, Elbows, Tees, Crosses, Reducers, Caps, etc)	EA	5		
402.4.1.A.1	Valve-8”-Type-Gate Valve	EA	1		
402.4.1.A.1	Valve-10”-Type-Gate Valve	EA	2		
402.4.1.A.1	6” Tapping Valve and Sleeve	EA	1		
403.4.1.A.1	Hydrant	EA	3		
1001.4.1.A.1	Sediment Control	LS	1		
1103.4.1.A.1	Construction Traffic Control	LS	1		
2010.4.1.A.1	Mobilization	LS	1		
SP 050	Connect to Existing Pressure Water Mains	EA	2		
SP 500	Remove and Reset Fence	LF	20		
	TOTAL ALTERNATIVE 2 BID				**$**

TOTAL ALTERNATIVE 2 BID

_____

_____

_____

($_____)

(use words)

ADD ALTERNATIVE 3-BENNETT WELL IMPROVEMENTS					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
SP 300	Bennett Well Improvements	LS	1		
	TOTAL ALTERNATIVE 3 BID				**$**

TOTAL ALTERNATIVE 3 BID

_____

_____

_____

($_____)

(use words)

ADD ALTERNATIVE 4-GROVE WELL IMPROVEMENTS					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
SP 400	Grove Well	LS	1		
	TOTAL ALTERNATIVE 4 BID				**$**

TOTAL ALTERNATIVE 4 BID

_____

_____

_____

($_____)

(use words)

ADD ALTERNATIVE 5-WATER SERVICE, METER BOX AND METER SETTER REPLACEMENTS					
PAY ITEM NO.	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**UNIT PRICE**	**TOTAL PRICE**
SP 800	1" Polyethylene (PE) Pressure Pipe for water service	LF	1800		
SP 850	Meter Box	EA	45		
SP 875	Meter Setter	EA	45		
201.4.1.D.1	Removal of Asphalt	SY	2500		
307.4.1.A.1	Miscellaneous Surface Restoration (Landscaping)	SY	400		
307.4.1.A.7	Miscellaneous Surface Restoration (Natural Ground)	SY	2500		
307.4.1.G.1	Type P Surface Restoration (Asphalt Roadway)	SY	2500		
	TOTAL ALTERNATIVE 5 BID				**$**

TOTAL ALTERNATIVE 5 BID

_____

_____

_____

($_____)

(use words)

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 15.06 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 damage.

ARTICLE 7 - ATTACHEMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of the Bid:

A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);

B. List of Project References;

C. Evidence of authority to do business in the state or jurisdiction of the Project; or a written covenant to obtain such license within the time frame for acceptance of Bids;

D. Bidder Qualification Statement with Supporting Data, if required;

E. Manufacturers' Certification letter of compliance with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for all equals or substitutes approved by Addenda for American Iron and Steel products as provided in these Contract Documents.

ARTICLE 8 - DEFINED TERMS

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

ARTICLE 9 – CERTIFICATIONS & NAMING OF SUBCONTRACTORS

9.01 For convenience the "Compliance Statement & Certification of Non-Segregated Facilities" (Form RD 400-6), "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions" (Form AD-1048), and RD Instruction 1940-Q, Exhibit A-1, "Certification for Contracts, Grants, and Loans" are included as part of this bid form (Note: Lower tier, means lower tier to the owner). By signing the bid form the bidder represents that (s)he is also signing the below documents, as they apply, depending on the bid amount.

If the bid amount exceeds $10,000, then Compliance Statement (RD 400-6) applies (9.01.A of this part);

If the bid amount exceeds $25,000, then Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048) also applies (9.01.B of this part);

If the bid amount exceeds $100,000, then RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans also applies (9.01.C of this part).

A. Compliance Statement

USDA Form Approved, COMPLIANCE STATEMENT, **Form RD 400-6**

This statement relates to a proposed contract with the City of Athol

who expects to finance the contract with assistance from the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive Order No. 11246 (regarding equal employment opportunity), as amended by Executive Order No. 13672, 79 Fed. Reg. 42971 (July 21, 2014) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract. If the proposed contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, I □have, □have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

   I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

   I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for

my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods).

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e. quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

B. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – Lower Tier Covered Transactions

U.S. DEPARTMENT OF AGRICULTURE

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION - LOWER TIER COVERED TRANSACTIONS
USDA Form AD-1048

The following statement is made in accordance with the Privacy Act of 1974 (5 U.S.C. § 552(a), as amended). This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, and 2 C.F.R. §§ 180.300, 180.355, Participants' responsibilities. The regulations were amended and published on August 31, 2005, in 70 Fed. Reg. 51865-51880. Copies of the regulations may be obtained by contacting the Department of

Agriculture agency offering the proposed covered transaction. According to the Paperwork Reduction Act of 1995 an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0505-0027. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The provisions of appropriate criminal and civil fraud privacy, and other statutes may be applicable to the information provided.

Before signing the bid form, read instructions for Form AD-1048, available for download at: https://www.rd.usda.gov/files/AD1048-F-01-92.PDF

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

C. Certification for Contracts, Grants and Loans

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS
RD Instruction 1940-Q, Exhibit A-1

The bidder certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all sub awards at all tiers (including contracts, subcontracts,

and sub grants under grants and loans) and that all sub recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

9.02 Naming of Subcontractors

The sub-contractors to whom sub-contracts will be awarded if the bidder is awarded a contract are: (Insert "self" if properly licensed and so intended. Insert "Not required" if such specialty work is not required)

Plumbing Contractor

Name: _____

Address: _____

Contractor License Number: _____

Heating and Air Conditioning Contractor

Name: _____

Address: _____

Contractor License Number: _____

Electrical Contractor

Name: _____

Address: _____

Contractor License Number: _____

(Note: If the owner is a City, County or School District, failure to name the plumbing, HVAC and electrical subcontractors may render the bid "non-responsive" under State Law IC 67-2310)

ARTICLE 10 - BID SUBMITTAL

10.01 This bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____ SEAL, if required by State

By: _____
(Individual's Signature)

Doing Business As: _____

A Partnership

Partnership Name: _____ SEAL, if required by State

By: _____
(Signature of General Partner – Attach Evidence of Authority to Sign)

Name (typed or printed) _____

A Corporation

Corporation Name: _____

State or Jurisdiction of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability):

_____

By: _____
(Signature – Attach Evidence of Authority to Sign)

Name (typed or printed): _____

Title _____

SEAL, if required by State

Attest _____
(Signature of Corporate Secretary)

Date of Qualification to do business in _____ (State or Other Jurisdiction Where Project is Located) is _____ / _____ / _____

A Joint Venture

Name of Joint Venture: _____

First Joint Venture Name: _____ SEAL, If required by State

By: _____
(Signature of Joint Venture Partner – Attach Evidence of Authority to Sign)

Name (typed or printed): _____

Title: _____

Second Joint Venture Name: _____

By: _____
(Signature of 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 party to the venture should be in the manner indicated above.)

Bidder's Business Address: _____

_____

Business Phone No. ( ) _____

Business FAX No. ( ) _____

Business Email Address _____

State of Idaho Public Works License No. _____

DUNNS No. _____

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

_____

_____

10.02 Bid Submitted on _____ , 20 _____

BID BOND (Penal Sum Form)

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: City of Athol 30355 N 3rd Street, Athol, ID 83801

BID

Bid Due Date:

Description *(Project Name— Include Location)*:

BOND

Bond Number:

Date:

Penal sum _____ $ _____

(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: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: 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 the 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 the 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.

CONTRACT FORMS

THIS PAGE LEFT BLANK INTENTIONALLY

NOTICE OF AWARD

Date of Issuance:

Owner:	City of Athol	Owner's Contract No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	Water System Improvements Project

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____ .
[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____ *[subject to unit prices].* The following Add Alternative Bids _____ have been included within the contract amount, and are awarded as a part of this project.

[____] unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award or has been transmitted or made available to Bidder electronically. *[revise if multiple copies accompany the Notice of Award]*

☐ a set of the Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [____] counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

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 Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: City of Athol

Authorized Signature

By:

Title:

Copy: Engineer

THIS PAGE LEFT BLANK INTENTIONALLY

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

THIS AGREEMENT is by and between City of Athol ("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:

The Project consists of construction of the various improvements to the City's water system, including raising the existing elevated reservoir (on Menser Ave and 6th St), replacing two existing storage tanks with a standpipe (near the City Cemetery), electrical improvements at the existing Bennett Well site (Bennett Ave and 2nd Ave), structural improvements and pump replacement at the existing Grove Well (Grove Ave and Pastime St) and water main replacement throughout the City. Work includes demolition, as well as construction of concrete structures (below grade), piping, HVAC, electrical and controls, site work, miscellaneous appurtenant work, and installation of mechanical equipment. Mechanical equipment includes pumps.

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Water System Improvements Project

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Keller Associates, Inc.

3.02 The Owner has retained Keller Associates, Inc. ("Engineer") 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 *Contract Times: Days*

A. The Work will be substantially completed within 435 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and

Modified from EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.

completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions 30 days after substantial completion.

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 and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. 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):

1. Substantial Completion: Contractor shall pay Owner $2,500 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $2,500 for each day that expires after such time until the Work is completed and ready for final payment.

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

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 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, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed).

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

**Modified from EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.**

previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of Work completed (with the balance being retainage); and

b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of 6.0 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, 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 Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Contractor has carefully studied all reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Contractor has considered the information known to Contractor itself; 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; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies,

**Modified from EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.**

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.

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.

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. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 8, inclusive).
2. Performance bond (EJCDC C-610).
3. Payment bond (EJCDC C-615).
4. General Conditions (2013 EJCDC C-700).
5. Supplementary Conditions (EJCDC C-800).
6. 2017 Idaho State Public Works Construction.
7. Specifications as listed in the table of contents of the Project Manual.
8. Drawings consisting of ___ sheets with each sheet bearing the following general title: Water System Improvements Project.
9. Addenda (numbers ___ to ___, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages ___ to ___, inclusive).
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    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.

**Modified from EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.**

D. The Contract Documents may only be amended, modified, or supplemented as provided in 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. Unless expressly agreed to elsewhere in the Contract, 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, money that may become due and money that is 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 successors, assigns, and legal representatives to the other party hereto, its 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 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 anything 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

**Modified from EJCDC® C-520, Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies,
and American Society of Civil Engineers. All rights reserved.**

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 *Other Provisions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor in the Supplementary Conditions.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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

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:
_____	_____
_____	_____
_____	_____
	License No.: _____ *(where applicable)*

(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.)

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

THIS PAGE LEFT BLANK INTENTIONALLY

NOTICE TO PROCEED

Owner:	Athol, Idaho	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	Water System Improvements Project
		Effective Date of Contract:	

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__].

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____].

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions]

Owner**:**

Authorized Signature

By:

Title:

Date Issued:

Copy: Engineer

THIS PAGE LEFT BLANK INTENTIONALLY

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER: City of Athol,
30355 N 3rd Street, ID 83801

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

Modified from EJCDC® C-610, Performance Bond
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

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

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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

11. 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 a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

THIS PAGE LEFT BLANK INTENTIONALLY

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description: Water System Improvements Project

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

Modified from EJCDC® C-615, Payment Bond
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
   5.1 Claimants who do not have a direct contract with the Contractor,
      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
   7.2 Pay or arrange for payment of any undisputed amounts.
   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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 Construction 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.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

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

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the 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.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

THIS PAGE LEFT BLANK INTENTIONALLY

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE		**$**
2. Net change by Change Orders		**$**
3. Current Contract Price (Line 1 ± 2)		**$**
4. TOTAL COMPLETED AND STORED TO DATE (Column F total on Progress Estimates)		**$**
5. RETAINAGE:		
a.	**X _____ Work Completed**	**$**
b.	**X _____ Stored Material**	**$**
c. Total Retainage (Line 5.a + Line 5.b)		**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)		**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)		**$**
8. AMOUNT DUE THIS APPLICATION		**$**
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G total on Progress Estimates + Line 5.c above)		**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(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 the Work covered by prior Applications for Payment;
(2) Title to 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 the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

© 2013 National Society of Professional Engineers for EJCDC. All rights reserved.

Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A					B	C	D	E	F		
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Totals										

© 2013 National Society of Professional Engineers for EJCDC. All rights reserved.

Stored Material Summary

Contractor's Application

For (Contract):								Application Number:			
Application Period:								Application Date:			
A		B	C		D		E		F		G
Bid Item No.	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Storage Location	Description of Materials or Equipment Stored	Stored Previously		Amount Stored this Month ($)	Subtotal Amount Completed and Stored to Date (D + E)	Incorporated in Work		Materials Remaining in Storage ($) (D + E - F)
					Date Placed into Storage (Month/Year)	Amount ($)			Date (Month/ Year)	Amount ($)	
				Totals							

© 2013 National Society of Professional Engineers for EJCDC. All rights reserved.

THIS PAGE LEFT BLANK INTENTIONALLY

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	City of Athol	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of 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 Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. 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.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

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

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

THIS PAGE LEFT BLANK INTENTIONALLY

Form 6-B

Idaho Clean Water State Revolving Fund (CWSRF) Specifications Insert

A. GENERAL

The requirements contained herein apply to **all** projects either partially or completely funded by the CWSRF Program. In the event of conflict with other requirements contained elsewhere, the requirements contained herein shall control.

All applicable federal, state, and local laws shall be complied with during bidding and construction. The contractor is responsible for its own and its employees' acts or omissions under the laws and the contract and are jointly and equally responsible for the acts and omissions of their employees.

Copies of all documentation required by this specification insert and in Chapter 6 of this Handbook shall be kept by the loan recipient, who shall maintain the records until three years of loan repayments will have occurred.

B. COMPLIANCE WITH STATE AND LOCAL LAWS

The construction of the project, including the letting of subcontracts in connection herewith, shall conform to the applicable requirements of state and local laws and ordinances to the extent that such requirements do not conflict with federal laws and regulations.

C. MAINTENANCE OF EXISTING TREATMENT WORKS DURING CONSTRUCTION

Where construction consists of replacement or modification to any existing collection line, pumping facility or wastewater treatment works, the contractor shall provide for the maintenance of the works' conveyance of wastewater and its existing level of treatment at all times during construction, unless otherwise specified within these specifications.

D. ACCESS

The contractor shall provide for access to all sites of contract work for representatives of the Environmental Protection Agency (EPA) and the state Department of Environmental Quality (DEQ).

E. BONDING REQUIREMENTS

For construction or facility improvement contracts exceeding $100,000, the minimum requirements shall be as follows:

1. Bid guarantee: a bid guarantee from each bidder equivalent to five percent of the bid price. The "bid guarantee" shall consist of a firm commitment such as a bid bond, certified check, or other negotiable instrument accompanying a bid as assurance that the bidder will, upon acceptance of his bid, execute such contractual documents as may be required within the time specified.

2. Performance bond: a performance bond on the part of the contractor for 100 percent of the contract price. A "performance bond" is one executed in connection with a contract to secure fulfillment of all the contractor's obligations under such contract.

3. Payment bond: a payment bond on the part of the contractor for 100 percent of the contract price. A "payment bond" is one executed in connection with a contract to assure payment as required by law of all persons supplying labor and material in the execution of the work provided for in the contract.

F. INSURANCE

The contractor shall obtain such construction insurance (e.g., fire and extended coverage, workers' compensation, public liability, property damage, and "all risk" builder's risk) as is customary and appropriate unless identified more specifically elsewhere in these specifications.

G. SAFETY

Contractors are solely responsible for ensuring safety standards at the project site and for ensuring that all work will be conducted in a manner consistent with Occupational Safety and Health Administration Safety and Health Standards, 29 Code of Federal Regulations (CFR) Part 1926.

H. PROJECT SIGN

A sign may be produced and erected in a prominent location to adequately mark the project. (Signage costs are loan eligible.) The sign indicates that the project is funded by DEQ. Refer to Chapter 6 of the CWSRF Loan Handbook for sign specifications.

I. MODEL CONTRACT CLAUSES

As appropriate, the borrower shall include the following Model Contract Clauses, or their

equivalent, in each contract.

1. SUPERSESSION

The recipient and the contractor agree that this and the following clauses apply to that work eligible for CWSRF assistance to be performed under this contract and that these clauses supersede any conflicting provisions of this contract.

2. PRIVITY OF CONTRACT CLAUSE

This contract is expected to be funded in part with funds from the EPA and DEQ. Neither the United States, the State of Idaho nor any of its departments, agencies, or employees is, or will be a party to this contract or any lower tier contract.

3. AUDIT ACCESS TO RECORDS

a) The contractor (the person or entity under contract with the loan recipient to perform the work partially or fully paid for with CWSRF) shall maintain books, records, documents, and other evidence directly pertinent to performance on CWSRF-funded work under this contract in accordance with generally accepted accounting principles and practices consistently applied, and the applicable DEQ regulations in effect on the date of execution of this contract. The contractor shall also maintain the financial information and data used in the preparation or support of any cost submission required under applicable regulations for negotiated contracts or change orders and a copy of the cost summary submitted to the recipient. The DEQ, the EPA, the Comptroller General of the United States, the United States Department of Labor, and the recipient, or any of their authorized representatives shall have access to all such books, records, documents, and other evidence for the purpose of inspection, audit, and copying during normal business hours. The contractor will provide proper facilities for such access and inspection.

b) If this is a fixed price contract awarded through sealed bidding or otherwise on the basis of effective price competition, the contractor agrees to make paragraphs (a) through (g) of this clause applicable to all negotiated change orders and contract amendments affecting the contract price. In the case of all other types of prime contracts, the contractor agrees to make paragraphs (a) through (g) applicable to all contract awards in excess of $10,000, at any tier, and to make paragraphs (a) through (g) of this clause applicable to all change orders directly related to project performance.

c) Audits conducted under this provision shall be in accordance with generally accepted auditing standards and with established procedures and guidelines of the reviewing or audit agency.

d) The contractor agrees to disclose all information and reports resulting from access to records under paragraphs (a) and (b) of this clause to any of the agencies referred to in paragraph (a).

e) Records under paragraphs (a) and (b) above shall be maintained by the contractor during performance on DEQ assisted work under this contract and for three years after the recipient

makes final payment to the contractor and all other pending matters are closed.

f) Access to records is not limited to the required retention periods. The authorized representatives designated in paragraph (a) of this clause shall have access to records at any reasonable time for as long as the records are maintained.

g) This right of access clause applies to financial records pertaining to all contracts (except for fixed price contracts awarded through sealed bidding or otherwise on the basis of effective price competition), and all contract change orders regardless of the type of contract, and all contract amendments regardless of the type of contract. In addition, this right of access applies to all records pertaining to all contracts, contract change orders, and contract amendments:

(1) To the extent the records pertain directly to contract performance;

(2) If there is any indication that fraud, gross abuse, or corrupt practices may be involved; or

(3) If the contract is terminated for default or for convenience.

4. COVENANT AGAINST CONTINGENT FEES

The contractor assures that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee excepting bona fide employees or bona fide established commercial or selling agencies maintained by the contractor for the purposes of securing business. For breach or violation of this assurance, the recipient shall have the right to annul this agreement without liability or, at its discretion, to deduct from the contract price or consideration, or otherwise recover the full amount of such commission, percentage, and brokerage or contingent fee.

5. GRATUITIES

a) If the recipient finds after a notice and hearing that the contractor or any of the contractor's agents or representatives offered or gave gratuities (in the form of entertainment, gifts or otherwise) to any official, employee or agent of the recipient, DEQ or EPA in an attempt to secure a contract or favorable treatment in awarding, amending or making any determinations related to the performance of this contract, the recipient may, by written notice to the contractor, terminate this contract. The recipient may also pursue other rights and remedies that the law or this contract provides.

b) In the event this contract is terminated as provided in paragraph (a), the recipient may pursue the same remedies against the contractor as it could pursue in the event of a breach of the contract by the contractor, and as a penalty, in addition to any other damages to which it may be entitled by law, be entitled to exemplary damages in an amount which shall be not less than three nor more than ten times the costs the contractor incurs in providing any such gratuities to any such officer or employee.

6. CONTRACTS FOR PROFESSIONAL SERVICES

The following clause applies only to contracts for services.

a) The contractor is responsible for the professional quality, technical accuracy, timely completion, and coordination of all designs, drawings, specifications, reports and other services furnished by the contractor under this contract. If the contract involves environmental measurements or data generation, the contractor shall develop and implement quality assurance practices consisting of policies, procedures, specifications, standards and documentation sufficient to produce data of quality adequate to meet project objectives and to minimize loss of data due to unforeseen conditions or malfunctions. The contractor shall, without additional compensation, correct or revise any errors, omissions or other deficiencies in that contractor's designs, drawings, specifications, reports and other services.

b) The contractor shall perform the professional services necessary to accomplish the work specified in this contract in accordance with this contract and applicable DEQ requirements in effect on the date of execution of the assistance agreement for this project.

c) The owner's or DEQ's approval of drawings, designs, specifications, reports and incidental work or materials furnished shall not in any way relieve the contractor of responsibility for the technical adequacy of his work. Neither the owner's nor DEQ's review, approval, acceptance or payment for any of the services shall be construed as a waiver of any rights under this agreement or of any cause for action arising out of the performance of this contract.

d) The contractor shall be, and shall remain, liable in accordance with applicable law for all damages to the owner or DEQ caused by the contractor's negligent performance of any of the services furnished under this contract, except for errors, omissions or other deficiencies to the extent attributable to the owner, owner-furnished data or third party. The contractor shall not be responsible for any time delays in the project caused by circumstances beyond the contractor's control.

e) The contractor's obligations under this clause are in addition to the contractor's other express or implied assurances under this contract or state law and in no way diminish any other rights that the owner may have against the contractor for faulty materials, equipment or work.

7. ANTI- LOBBYING ACT

The contractor agrees to comply with the requirements of the federal Anti-Lobbying Act, Section 1352, Title 31, U.S. Code, which requires disclosure of lobbying activities. The Certification Form, "*Certification of Compliance with Anti-Lobbying Act*", (Attachment B see Section P - Submissions), must be signed by all contractors entering into contracts of $100,000 or greater. (For further information refer to http://www.gpo.gov/fdsys/granule/USCODE-2010-title31/USCODE-2010-title31-subtitleII-chap13-subchapIII-sec1352/

content-detail.html).

8. COMPLIANCE WITH COPELAND ACT REQUIREMENTS

The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated in this contract by reference.

9. SUBCONTRACTS

The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

10. CONTRACT TERMINATION: DEBARMENT

A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

11. WAGE RATE REQUIREMENTS UNDER THE CONSOLIDATED AND FURTHER CONTINUING APPROPRIATIONS ACT, 2013 (P.L. 113-6): REQUIRED DAVIS BACON CONTRACT CLAUSES:

a) Preamble: With respect to the Clean Water and Safe Drinking Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides subgrants or loans to eligible entities within the State. These eligible entities are referred to as subrecipients.

b) Davis-Bacon Requirements For Subrecipients That *Are* Governmental Entities: Typically, the subrecipients are municipal or other local governmental entities that manage the funds. For these types of recipients, the provisions of the Davis Bacon (DB) requirements set forth in Section I shall apply - these DB requirements are accessible at **http://www.deq.idaho.gov/media/60179667/srf-davis-bacon-conditions.pdf** and shall be incorporated in all contracts and subcontracts as model contract clauses. The DB requirements are incorporated into this specification through reference. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth therein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section II. 3.

c) Davis-Bacon Requirements For Subrecipients That Are *Not* Governmental Entities: Occasionally, the subrecipient may be a not for profit entity. For these recipients, the provisions set forth in Section II of the DB requirements shall apply - these DB requirements are accessible at **http://www.deq.idaho.gov/media/60179667/srf-davis-bacon-conditions.pdf** and shall be incorporated in all contracts and subcontracts as model contract clauses. The applicable DB requirements are incorporated into this specification through reference. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section II.3.

d) For Further Information: If a subrecipient requires general guidance, or has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact Idaho DEQ's Tim Wendland at tim.wendland@deq.idaho.gov or at 208-373-0439. The subrecipient may also obtain additional guidance from U.S. Department of Labor's (DOL) web site at **http:// www.dol.gov/whd/**

12. REQUIRED AMERICAN IRON AND STEEL CONTRACT CLAUSE

a) Preamble: In accordance with the current SRF Assistance AIS requirements, all of the iron and steel products used in the project shall be produced in the United States. This requires that all manufacturing processes, including application of coatings, must take place in the United States. The term "all manufacturing processes" includes processes such as melting, refining, forming, casting, rolling, drawing, finishing, fabricating and coating.

The term "iron and steel products" means products made of greater than 50% iron or steel measured by cost; the cost should be based on the material costs of the iron and steel products in the article (e.g. hydrants, valves). The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels. These products include, but are not limited to: lined or unlined pipes and fittings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, construction materials, manhole covers and other municipal castings.

b) Required AIS Construction Contract Clause: In order to ensure compliance with the AIS requirement, the following AIS contract language is part of these specifications and the construction contract:

"The Contractor acknowledges to and for the benefit of the City/District of ("Purchaser") and the Idaho State Department of Environmental Quality, that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure

(including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State."

13. REQUIRED NONDISCRIMINATION CONTRACT CLAUSE

As required by 40 CFR 33, Appendix A, the following clause shall be included as part of these specifications and the construction contract:
"The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR Part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies."

J. MISCELLANEOUS DAVIS BACON

1. It is important for the actual wage determination(s) to be physically included in the bid specifications/contract. Contractors need to see the minimum wages they will be required to pay while they develop their cost estimates for work to be performed.

2. As of July 2012, the website to locate current wage determinations is http://www.wdol.gov/dba.aspx#0.

3. *All* contracts and subcontracts shall include the DB Model Contract Clause either Section I or Section II, as applicable, from http://www.deq.idaho.gov/media/60179667/srf-davis-bacon-conditions.pdf (verbatim, in their entirety).

4. The default wage category is "heavy." If another category of work is performed that exceeds 10% of the total project cost or exceeds $1 million, then the project labor costs must use the additional wage category/ies (i.e., roads, buildings, residential). Additionally, the additional category/ies labor costs shall be supported with documentation.

K. MISCELLANEOUS AMERICAN IRON AND STEEL

1. On-site Data Records: The General Contractor shall develop and maintain an on-site materials compliance log containing current records of all iron and steel products arriving on the construction site. The log shall include the Purchase Order number and sufficient product information to enable tracking of the materials, such as product description, serial and lot numbers (if available), manufacturer's name, and origin of shipment including city and state. In addition, a separate log shall be maintained to track information related to de minimis

materials such as Purchase Order number, product description, current value of de minimis materials, and the running percentage of de minimis product value received to the total cost of materials for the project.

2. Manifests: To ensure information is consistent and valid, the Contractor shall compare the information contained on the manifests accompanying iron and steel products, with previously submitted AIS Product Compliance Letters.

3. Bidder's Certification of Compliance: An executed Bidder's Certification of Compliance, (Form AIS-1, see Section P - Submissions), covering all proposed steel and iron products, shall be furnished by bidders as part of the sealed bid; this Certification is required in order to constitute a valid bid.

4. AIS Products - Manufacturer Letter Certifying Product Compliance: Subsequent to the issuance of the Notice of Award, but prior to payment, Manufacturer Product Letter(s) of Compliance, shall be furnished by the Prime Contractor (`the Contractor') to the Owner or Owner's representative for iron and steel products. The lack of the ability of the Contractor to furnish letters certifying compliance of iron and steel products with AIS requirements will be justification for rejection of the product(s), and any related cost increases this may cause will be borne by the Contractor. The product certification shall assert that all manufacturing processes occurred in the USA (Form AIS-2, see Section P - Submissions). A copy of certifications for specific AIS products shall be required prior to reimbursement from SRF loan funds for the products.

5. AIS Information: For information regarding waivers, and further AIS clarifications and definitions, refer to the SRF CW Handbook, Chapter 6: www.deq.idaho.gov/media/1117872/ww-loan-handbook.pdf and the EPA AIS website: http://water.epa.gov/grants_funding/aisrequirement.cfm . For any AIS related questions Eliot Sherman of the EPA may be contacted at (202) 564-7381 sherman.eliot@epa.gov. For assistance with reviewing manufacturer product certification letters contact SRF_AIS@epa.gov with “cert letter review” as the subject. For a list of AIS Best Management Practices contact the State SRF Loan program, AIS designee: Kevin McNeill P.E. at Kevin.McNeill@deq.idaho.gov, or phone: (208) 373-0452.

L. SUSPENDED AND DEBARRED

The contractor agrees to comply with Subpart C of 2 CFR Part 180 and 2 CFR Part 1532 (Suspension and Debarment). The contractor or subcontractor shall not knowingly enter into covered transactions (any contract awarded to a subcontractor, supplier, or consultant where the expected amount of the contract is $25,000 or greater) with excluded persons. The contractor or subcontractor shall insert this condition into all lower tier covered transactions and ensure any subsequent lower tier covered transactions include this condition. Excluded parties may be verified at www.sam.gov.

M. BIDDER'S LIST

The successful bidder shall submit **Form 1. Bidder's List** (see Section P - Submissions) to the loan recipient who shall provide a copy to DEQ. The list shall provide specific contact information on the general contractor and all subcontractors including business name, contact, address, phone, email, date bid submitted; and shall outline the items of work for which they will be retained; and shall indicate if they are a Disadvantaged Business Enterprise (DBE). The completed form must be in-hand prior to DEQ issuance of the Authorization to Award.

N. EQUAL EMPLOYMENT OPPORTUNITY/ AFFIRMATIVE ACTION (EEO/AA)

The EEO/AA requirements only apply to contractor who has (1) 50 or more employees and (2) signs a contract, subcontract, or purchase order amounting to $50,000 or more.

1. Online Standard Form 100 (EEO-1): Successful bidders shall complete and submit the online form 100 to the Joint Reporting Committee within 30 days after the award of such a contract or purchase order, unless such person has submitted such a report within 12 months preceding the date of award. Subsequent reports shall be submitted annually on or before the 30th day of September. Failure to file timely, complete, and accurate reports as required constitutes non-compliance with contractors' or subcontractors' obligations under Executive Order 11246, as amended, and is grounds for the imposition of sanctions authorized by Executive Order 11246 and other rules and regulations issued pursuant thereto. Further information is available at: http://www.eeoc.gov/employers/eeo1survey/faq.cfm#top. The EEO-1 Form is available at: http://www.eeoc.gov/employers/eeo1survey/2007instructions.cfm.

2. The EEO Poster (EEOC-P/E-1): Successful bidders must post the EEO poster on site; the EEO poster may be ordered through the Equal Employment Opportunity Commission (EEOC) Website at: http://www1.eeoc.gov/employers/poster.cfm.

3. Contact the EEOC: It is the successful bidder's responsibility to contact the EEOC within 30 days of contract award. EEO Contact Information: EEO-1 Joint Reporting Committee P.O. Box 19100, Wash. D.C. 20036-9100; phone (866) 286-6440; Email: e1.techassistance@eeoc.gov.

O. DISADVANTAGED BUSINESS ENTERPRISE UTILIZATION

1. Policy

Consistent with the President's Policy Statement on Disadvantage Business Enterprises (DBEs) dated December 17, 1983, Executive Order 12432 and the Environmental Protection Agency's Procurement Under Assistance Agreements Regulation (40 CFR 33) dated May 28, 2008, all bidders shall be required to comply fully with these bid specifications toward the goal of equitable utilization of DBEs. DBEs consist of Minority Business Enterprises (MBE), Women Business Enterprises (WBE), and Small Business Enterprises (SBEs).

Such utilization may be through prime contracting, subcontracting, joint-venture, procurement

of supplies, material or equipment, or other business participation utilized in performing this project. In this regard all contractors shall take all necessary and reasonable steps to ensure DBEs have the maximum opportunity to compete for and/or perform contracts. Contractors shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of EPA assisted projects.

2. Fair Share

Fair Share is a reasonable amount of funds commensurate with total project funding, demographic factors, and the availability of DBE businesses. A fair share does not constitute an absolute goal, but a commitment on the part of the bidder to attempt to use minority and women's businesses by carrying out the five "Good Faith Efforts" described under 40 CFR 33 Subpart C.

3. Requirements

Bidders must take the following "Good Faith Efforts" in awarding subcontracts for supplies, construction or services and equipment:

a) Make DBEs aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

b) Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.

c) Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.

d) Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.

e) Use the services and assistance of the Idaho Transportation Department, Idaho Department of Environmental Quality's Fiscal Office, the Small Business Administration, and the Office of Minority Business Enterprise of the U.S. Department of Commerce, as appropriate.

f) If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

g) The successful bidder shall complete and submit a Sworn Statement of Compliance (Attachment A; see Section P - Submissions). The Loan Recipient shall forward a copy to DEQ prior to issuance of the Authorization to Award.

h) For additional information refer to website http://www.epa.gov/osdbu/grants.htm. For DBE questions, contact the SRF DBE Coordinator:

Charlie Parkins SRF DBE Coordinator,
Idaho Dept. Environmental Quality,
1410 N Hilton St., Boise Idaho 83706
Phone: (208) 373-0577
Charlie.Parkins@deq.idaho.gov

P. SUBMISSIONS (Copies of required forms follow this section).

1. Form to be submitted by all Bidders as part of the sealed bid:

FORM AIS-1 American Iron & Steel	Bidder's Certification of Compliance With American Iron And Steel (AIS) Provisions

2. Forms to be submitted by the Successful Bidder prior to issuance of the Authorization to Award:

Form 1.	Bidder's List of Subcontractors
ATTACHMENT A	Sworn Statement of Compliance with Disadvantaged Business Enterprise Utilization Requirements

3. Forms to be submitted by the Loan Recipient to DEQ with Requisitions for Reimbursement:

FORM AIS-2 American Iron & Steel	Manufacturer Product Letter(s) of Compliance with American Iron and Steel Provisions

4. Forms to be submitted by the Successful Bidder to the Loan Recipient prior to issuance of the Notice to Proceed:

ATTACHMENT B	Certification of Compliance with Anti-Lobbying Act (Anti-Lobbying Certification)
ATTACHMENT C	Disadvantaged Business Enterprises to be Utilized
ATTACHMENT D	Disadvantaged Business Enterprises Contacted
ATTACHMENT E	EPA FORM 6100-3/ DBE Subcontractor Performance Form
ATTACHMENT F	EPA FORM 6100-4/ DBE Subcontractor Utilization Form
ATTACHMENT G	Contractor's Compliance Statement (Executive Order #11246)
ATTACHMENT H	Certification of Non-Segregated Facilities

5. Form which may be submitted to DEQ by subcontractors after project completion:

After the contract is awarded and executed, the successful bidder shall provide the following form 6100-2 to all DBE subcontractors. Subcontractors may submit the form to DEQ upon project completion.

ATTACHMENT I	EPA FORM 6100-2/ DBE Subcontractor Participation Form

To be submitted as part of the sealed bid; Recipient forwards a copy to DEQ

FORM AIS-1
Bidder's Certification of Compliance
With the Current SRF Assistance American Iron and Steel (AIS) Provisions

(To be submitted as part of the sealed bid)

Bidder's Statement of Certification

The Bidder acknowledges to and for the benefit of the ("Owner") for the ("Project") that the Bidder understands the project is being funded in part with SRF Assistance. "AIS" requirements specify that all iron and steel products used in the project shall be produced in the United States. Consistent with the terms of the Owner's bid solicitation and the provisions of SRF Assistance, the Bidder hereby represents and warrants to and for the benefit of the Owner that:

1. The Bidder has reviewed and understands the AIS requirements.

2. The Bidder certifies that the iron and steel goods used in the project will be produced in the United States in a manner that complies with the AIS requirements unless a waiver of the requirements is requested by the Owner and approved by the EPA.

3. The Bidder agrees to provide to the Owner reasonable, sufficient, and timely information, certification, or verification of the United States production of each component contained in Attachment 6 as a prior condition for approval of - and reimbursement for - materials received.

4. The undersigned hereby acknowledges that the iron and steel products utilized in this project will meet the current SRF Assistance AIS requirements, and that all required Manufacturer/Supplier Certification Statements or waivers from EPA will be obtained to document compliance with the AIS requirements.

Bidder Signature:_____ Date: _____

Title

Organization

FORM 1. BIDDER'S LIST

To be Submitted Prior to Authorization to Award; Recipient forwards a copy to DEQ.

Prime Contractor Information:	Items of Work Bid On	Date Bid Submitted	MBE/WBE Contractor
Business Name:			
Contact Name:			
Mailing Address:			
Phone:			
Email:			
Subcontractor Information:			
Business Name:			
Contact Name:			
Mailing Address:			
Phone:			
Email:			
Subcontractor Information:			
Business Name:			
Contact Name:			
Mailing Address:			
Phone:			
Email:			
Subcontractor Information:			
Business Name:			
Contact Name:			
Mailing Address:			
Phone:			
Email:			

COPY THIS PAGE IF ADDITIONAL SUBCONTRACTORS ARE NEEDED

To be Submitted Prior to Authorization to Award; Recipient forwards a copy to DEQ

ATTACHMENT A

SWORN STATEMENT OF COMPLIANCE WITH DISADVANTAGED BUSINESS ENTERPRISE (DBE) UTILIZATION REQUIREMENTS

To be eligible for award of this contract, each bidder must execute, and submit, as part of their proposal, and together with their bid, the following certification relating to DBE participation. The certification below shall be deemed a part of the resulting contract.

The bidder has taken the following "Good Faith Efforts" in awarding subcontracts:

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.
2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
5. Use the services and assistance of the Idaho Transportation Department, Idaho Department of Environmental Quality's Fiscal Office, SBA and the Minority Business Development Agency of the Department of Commerce, as appropriate.
6. If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

_____ _____

Signature Date

Name and title of Signer

Email Address

Loan Recipient receives from the Successful Bidder, who approves and submits to DEQ as supporting documentation for Pay Requests

FORM AIS-2

(Must be Provided on Company Letterhead)

Letter Certifying Compliance of Iron & Steel Products with Current SRF Assistance American Iron and Steel (AIS) Provisions

Date:

Company Name:

Address, City:

State, Zip:

Subject: **AIS Step Certification for Project** (name of project)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the AIS provisions as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1. Xxxxx
2. Xxxxx
3. Xxxxx

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

_____
Signature of Company Representative

_____
Date

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

ATTACHMENT B

Certification of Compliance with Anti-Lobbying Act

The undersigned certifies, to the best of his/her knowledge and belief that:

1. No federally appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federally funded grant, the making of any federally funded loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federally funded contract, grant, loan or cooperative agreement.

2. If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federally funded contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____
Signature

_____
Date

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

Attachment C
Disadvantaged Business Enterprises to be Utilized

Project

Name of Bidder

MBE = minority business enterprise
WBE = women's business enterprise
SBE = small business enterprise

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:
☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:
☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:

☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Contractor

Signature _____

Use additional pages if necessary.

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

Attachment D
Disadvantaged Business Enterprises Contacted

Project

Name of Bidder

MBE = minority business enterprise
WBE = women's business enterprise
SBE = small business enterprise

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted, if utilized

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:
☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted, if utilized

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:
☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Name of firm

Address

City State Zip Code

Phone

Description of work element or supplies

Amount to be contracted, if utilized

☐ MBE
☐ WBE
☐ SBE

☐ Joint Venture Percent:

☐ Other

☐ Subcontractor
☐ Supplier
☐ Manufacturer

Use additional pages if necessary.

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

ATTACHMENT E

EPA Form 6100-3/ DBE Subcontractor Performance Form[1]

Environmental
Protection Agency

This form is intended to capture the DBE[1] subcontractor's[2] description of work to be performed and the price of the work submitted to the prime contractor. An EPA Financial Assistance Agreement Recipient must require its prime contractor to have its DBE subcontractors complete this form and include all completed forms in the prime contractors bid or proposal package.

Loan recipients that initiate procurements after March 7, 2016 need not require/maintain these forms. While the use of these forms has been suspended, contractors are still required to comply with 40 CFR 33 --making good faith efforts (Subpart C), meeting Fair Share Objectives (Subpart D), and Recordkeeping and Reporting (Subpart E). The forms are no longer required because they are being revised by the EPA. Contractors may find them useful recording tools during the interim, as there is nothing that precludes their use.

Name of Subcontractor	Project Name
Address	Bid/Proposal/Contract No.
Name of Subcontractor	Email Address

Prime Contractor Name

Contract Item No.	Item of Work or Description of Services Bid to Prime	Price of Work Submitted to Prime Contractor

Contract Item No.	Item of Work or Description of Services Bid to Prime	Price of Work Submitted to Prime Contractor

DBE Certified by: ☐ DOT ☐ SBA ☐ Other

Meets/exceeds EPA certification standards?: ○ Yes ○ No ○ Unknown

Signature of Prime Contractor — Title

Print Name — Date

Signature of Subcontractor — Title

Print Name — Date

* State Office Address: DEQ Grants and Loans Program, DBE Coordinator
1410 N. Hilton, Boise, ID, 83706

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

EPA FORM 6100-3 (DBE Subcontractor Performance Form)

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

Environmental Protection Agency

Loan recipients that initiate procurements after March 7, 2016 need not require/maintain these forms. While the use of these forms has been suspended, contractors are still required to comply with 40 CFR 33 --making good faith efforts (Subpart C), meeting Fair Share Objectives (Subpart D), and Recordkeeping and Reporting (Subpart E). The forms are no longer required because they are being revised by the EPA. Contractors may find them useful recording tools during the interim, as there is nothing that precludes their use.

ATTACHMENT F

EPA Form 6100-4/ DBE Subcontractor Utilization Form[1]

Bid/Proposal/Contract No.	Project Name
Name of Prime Bidder/Proposer	E-mail Address
Address	
Telephone No.	Fax No.

The following subcontractors[2] will be used on this project:

Company Name, Address, Phone Number, and E-Mail Address	Type of Work to be Performed (e.g., construction, services, supplies)	Estimated Dollar Amount	Currently Certified as a Disadvantaged Business Enterprise?

I certify under penalty of perjury that the forgoing statements are true and correct. In the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302(c).

Signature of Prime Contractor

Print Name Title/Date

* State Office Address: DEQ Grants and Loans Program, DBE Coordinator
1410 N. Hilton, Boise, ID, 83706

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

EPA FORM 6100-4 (DBE Subcontractor Utilization Form)

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

ATTACHMENT G

CONTRACTOR'S COMPLIANCE STATEMENT (EXECUTIVE ORDER #11246)

Date

This statement relates to a proposed contract with (name of grantee):

who expects to finance the contract with assistance from the Environmental Protection Agency. I am the undersigned bidder or prospective contractor. I represent that:

I have ☐ I have not ☐ participated in a previous contract or subcontract subject to Executive Order 11246 of September 24, 1965 (regarding equal employment opportunity) or a preceding similar Executive Order. I agree to comply with all the provisions of this Executive Order and the rules, regulations and relevant orders of the Secretary of Labor. (60-1.4(b)(4))

Signature _____ Date _____

_____
Name and Title of Signer

Loan Recipient Receives from the Successful Bidder Prior to issuing Notice to Proceed

ATTACHMENT H

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to federally assisted construction contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity clause.)

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certified, further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or area, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed contractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such, certification in this file.

_____ _____

Signature Date

_____

Name and Title of Signer

DBE Subcontractor Prerogative to Submit to DEQ State Office upon Project Completion

Environmental Protection Agency

Loan recipients that initiate procurements after March 7, 2016 need not require/maintain these forms. While the use of these forms has been suspended, contractors are still required to comply with 40 CFR 33 --making good faith efforts (Subpart C), meeting Fair Share Objectives (Subpart D), and Recordkeeping and Reporting (Subpart E). The forms are no longer required because they are being revised by the EPA. Contractors may find them useful recording tools during the interim, as there is nothing that precludes their use.

ATTACHMENT I

EPA Form 6100-2/ DBE Program Subcontractor Participation Form

An EPA Financial Assistance Agreement Recipient must require its prime contractors to provide this form to its DBE subcontractors. This form gives a DBE[1] subcontractor[2] the opportunity to describe work received and/or report any concerns regarding the EPA-funded project (e.g., in areas such as termination by prime contractor, late payments, etc.). The DBE subcontractor can, as an option, complete and submit this form to the EPA DBE Coordinator at any time during the project period of performance.

Name of Subcontractor[2]	Project Name
Address	Bid/Proposal/Contract No.
Telephone Number	Email

Prime Contractor Name

Please use the space below to report any concerns regarding the above EPA-funded project (e.g., reason for termination by prime contractor, late payment, etc.).

Contract Item No.	Item of Work or Description of Services Received from the Prime Contractor	Amount Subcontractor was Paid by Prime Contractor

Contract Item No.	Item of Work or Description of Services Received from the Prime Contractor	Amount Subcontractor was Paid by Prime Contractor

Subcontractor Signature Title/Date

Print Name

* State Office Address: DEQ Grants and Loans Program, DBE Coordinator
1410 N. Hilton, Boise, ID, 83706

[1] A DBE is a Disadvantaged, Minority, or Woman Business Enterprise that has been certified by an entity from which EPA accepts certifications as described in 40 CFR 33.204-33.205 or certified by EPA. EPA accepts certifications from entities that meet or exceed EPA certification standards as described in 40 CFR 33.202.

[2] Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

The public reporting and recordkeeping burden for this collection of information is estimated to average three (3) hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

EPA FORM 6 100-2 (DBE Subcontractor Participation Form)

Davis-Bacon Conditions

Wage Rate Requirements

The recipient agrees to include in all agreements to provide assistance for the construction of treatment works carried out in whole or in part with such assistance made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.), or with such assistance made available under section 205(m) of that Act (33 U.S.C. 1285(m)), or both, a term and condition requiring compliance with the requirements of section 513 of that Act (33 U.S.C. 1372) in all procurement contracts and sub-grants, and require that loan recipients, procurement contractors and sub-grantees include such a term and condition in subcontracts and other lower tiered transactions. All contracts and subcontracts for the construction of treatment works carried out in whole or in part with assistance made available as stated herein shall insert in full in any contract in excess of $2,000 the contract clauses as attached hereto entitled "Wage Rate Requirements Under The Clean Water Act, Section 513." This term and condition applies to all agreements to provide assistance under the authorities referenced herein, whether in the form of a loan, bond purchase, grant, or any other vehicle to provide financing for a project, where such agreements are executed on or after October 30, 2009.

Preamble

With respect to the Clean Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides sub grants or loans to eligible entities within the State. Typically, the sub recipients are municipal or other local governmental entities that manage the funds. For these types of recipients, the provisions set forth under Roman numeral I, below, shall apply. Although EPA and the State remain responsible for ensuring sub recipients' compliance with the wage rate requirements set forth herein, those sub recipients shall have the primary responsibility to maintain payroll records as described in Section 3(ii)(A), below and for compliance as described in Section I-5.
Occasionally, the sub recipient may be a private for profit or not for profit entity. For these types of recipients, the provisions set forth in Roman Numeral II, below, shall apply. Although EPA and the State remain responsible for ensuring sub recipients' compliance with the wage rate requirements set forth herein, those sub recipients shall have the primary responsibility to maintain payroll records as described in Section II-3(ii)(A), below and for compliance as described in Section II-5.

ATTACHMENT 1

I. Requirements Under The Water Resources Reform and Development Act of 2014 (WRRDA) For Sub recipients That Are Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the Water Resources Reform and Development Act of 2014 (WRRDA) - with respect to State recipients and sub recipients that are governmental entities. If a sub recipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact **Region 10 SRF staff,** of EPA, - for guidance. The recipient or sub recipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the Water Resources Reform and Development Act of 2014 (WRRDA) -, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving. If a sub recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the sub recipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Sub recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the sub recipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The sub recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the sub recipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the sub recipient.

(ii) If the sub recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the sub recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The sub recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the sub recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the sub recipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Sub recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a sub recipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the sub recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the sub recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The sub recipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the sub recipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF - financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or -FY 2015 Water Resource Reform and Development Act, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in

more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

(ii)(A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The sub recipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State

recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to

make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or sub contractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the

Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of $100,000.

(a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The sub recipient**,** upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years

from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Sub recipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification

(a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."

(c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The sub recipient shall periodically review contractors and subcontractor's use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at http://www.dol.gov/whd/america2.htm.

II. Requirements Under The Water Resource Reform and Development Act of 2014 (WRDA) -) For Sub recipients That Are Not Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its DB responsibilities when DB applies to EPA awards of financial assistance under –FY 2014 Water Resource Reform and Development Act with respect to sub recipients that are not governmental entities. If a sub recipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient for guidance. If a State recipient needs guidance, the recipient may Region 10 SRF staff, EPA Grants Management Office for guidance. The recipient or sub recipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

Under these terms and conditions, the sub recipient must submit its proposed DB wage determinations to the State recipient for approval prior to including the wage determination in any solicitation, contract task orders, work assignments, or similar instruments to existing contractors.

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2015 Water Resource Reform and Development Act -, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund -. If a sub recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the sub recipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Sub recipients must obtain proposed wage determinations for specific localities at www.wdol.gov. After the Sub recipient obtains its proposed wage determination, it must submit the wage determination to **Idaho DEQ SRF, Tim Wendland, (208) 373-0439, tim.wendland@deq.idaho.gov** for approval prior to inserting the wage determination into a solicitation, contract or issuing task orders, work assignments or similar instruments to existing contractors (ordering instruments unless subsequently directed otherwise by the State recipient Award Official.)

(b) Sub recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the sub recipient shall monitor www.wdol.gov. on a weekly basis to ensure that the wage determination contained in the solicitation remains current. The sub recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the sub recipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the sub recipient.

(ii) If the sub recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the sub recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The sub recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(c) If the sub recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the sub recipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(d) Sub recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(e) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a sub recipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the sub recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the sub recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The sub recipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the sub recipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF - or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2015 Water Resouce Reform and Development Act -, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov. .

(ii)(A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request, and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall

be sent to the EPA Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The sub recipient(s) shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the

actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractors registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its

subcontractors) and Sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of $100,000.

(a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The sub recipient shall upon the request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (a)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(c) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Sub recipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification

(a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."

(c). The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor’s submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.

(d). The sub recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at http://www.dol.gov/whd/america2.htm.

Federal Labor Standards Provisions

U.S. Department of Housing and Urban Development
Office of Labor Relations

Applicability

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section l(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible, place where it can be easily seen by the workers.

(ii) (a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140.)

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(ii)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part

of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140.)

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section l(b)(2)(B) of the Davis-bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5 (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section l(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017.)

(ii) (a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i) except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149.)

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5 (a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph A.3.(ii)(b).

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph A.3.(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant ',to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by

the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs 1 through 11 in this paragraph A and such other clauses as HUD or its designee may by appropriate instructions require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1 01 0, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part: "Whoever, for the purpose of . . . influencing in any way the action of such Administration..... makes, utters or publishes any statement knowing the same to be false..... shall be fined not more than $5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. The provisions of this paragraph B are applicable where the amount of the prime contract exceeds $100,000. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in sub paragraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety. The provisions of this paragraph C are applicable where the amount of the prime contract exceeds $100,000.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96). 40 USC 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

"General Decision Number: ID20200069 01/03/2020

Superseded General Decision Number: ID20190069

State: Idaho

Construction Type: Heavy
HEAVY CONSTRUCTION, Including water and sewer line construction and heavy construction projects on treatment plants and industrial (power plants, manufacturing plants, processing plants, etc.) sites

County: Kootenai County in Idaho.

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

ELEC0073-011 07/01/2019

	Rates	Fringes
ELECTRICIAN	$ 36.05	19.18

ENGI0370-039 06/01/2018

	Rates	Fringes
POWER EQUIPMENT OPERATOR:		
Scrapers (all), Grader/Blade		
GROUP 6	$ 29.04	15.95

ZONE PAY:

ZONE CENTERS: SPOKANE, PASCO, LEWISTON

ZONE 1: 0-45 Miles: Free
ZONE 2: 45 Miles & Over: $2.00

---

* LABO0238-034 06/01/2019

	Rates	Fringes
LABORER (MASON TENDER-Cement/Concrete)	$ 28.21	13.00

PLAS0072-003 06/01/2018

BENEWAH, BONNER, BOUNDARY, CLEARWATER, IDAHO (NORTH OF THE 46TH PARALLEL), KOOTENAI, LATAH, LEWIS AND NEZ PERCE AND SHOSHONE COUNTIES

ZONE 1:

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 29.07	14.13

Zone Differential (Add to Zone 1 rate): Zone 2 - $2.00

BASE POINTS: Spokane, Pasco, Lewiston, Wenatchee

Zone 1: 0-45 radius miles from the main post office

Zone 2: Over 45 radius miles from the main post office

PLUM0044-015 06/01/2018

	Rates	Fringes
PLUMBER		
Zone 1	$ 39.46	18.24

TEAM0690-002 06/01/2019

	Rates	Fringes
TRUCK DRIVER (DUMP)		
6 yds and under	$ 26.68	17.40
over 6 yds	$ 27.12	17.40

SUID2010-062 08/08/2012

	Rates	Fringes
CARPENTER (Form Work Only)	$ 22.42	9.10
CARPENTER, Excludes Form Work	$ 26.06	11.26
LABORER: Common or General	$ 18.04	6.60
LABORER: Grade Checker	$ 21.76	9.81
OPERATOR: Loader (Front End)	$ 22.58	6.51
OPERATOR: Backhoe/Excavator/Trackhoe	$ 20.24	0.54

TRUCK DRIVER: Water Truck.....$ 21.00 13.42

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

===

END OF GENERAL DECISION
"

Prime Contractor's Certification
Concerning Federal Labor Standards (Davis Bacon)

Local Government Name: City of Athol, Kootenai County, Idaho

CDBG Number and Project Name: ICDBG-19-I-06-PF

The undersigned prime contractor, having executed a contract with the City of Athol (Local Government)

in the amount $_____ for the construction of the above-identified project, certifies that:

1. He/she will comply with the Federal Labor Standards Provisions (e.g. Davis-Bacon Act, Copeland Act, Contract Work Hours and Safety Standards Act) and Prevailing Wage Decision(s) are included in the project's contract documents.

2. All laborers and mechanics employed on the project will be paid according to the appropriate Prevailing Wage Decision #ID20200069, MOD #0.

3. Corrections of any infractions of the Federal Labor Standards Provisions, including infractions by any subcontractors and any lower tier subcontractors, is this contractor's responsibility.

4. Neither this contractor, any subcontractor, nor any affiliates, have been declared ineligible to participate in federally funded construction projects.

5. Contractor agrees to obtain and forward all Subcontractors' Certification concerning Federal Labor Standards Provisions and Prevailing Wage requirements to the Local Government or Local Government's representative within ten (10) days after execution of any subcontract.

_____ _____
Prime Contractor Tax ID Number

_____
Address

_____ _____
City, State ZIP DUNS Number

_____
Prime Contractor Signature

_____
Date

Subcontractor's Certification
Concerning Federal Labor Standards (Davis Bacon)

Local Government Name: City of Athol, Kootenai County, Idaho

CDBG Number and Project Name: ICDBG-19-I-06-PF

The undersigned subcontractor, having executed a contract with _____ for
(Prime Contractor)

_____
(Nature of Work)

in the amount $_____ for the above-identified project, certifies that:

1. He/she will comply with the Federal Labor Standards provisions (e.g. Davis-Bacon Act, Copeland Act, Contract Work Hours and Safety Standards Act) and Prevailing Wage Decision(s) as per the project's contract documents.

2. All laborers and mechanics employed on the project will be paid according to the appropriate Prevailing Wage Decision #ID20200069, MOD #0.

3.

4. Corrections of any infractions of the Federal Labor Standards Provisions, including infractions by any lower tier subcontractors, is this subcontractor's responsibility.

5. Neither this subcontractor, nor any affiliates, have been declared ineligible to participate in federally funded construction projects.

6. This subcontractor agrees to forward a Subcontractor's Certification concerning Federal Labor Standards provisions and Prevailing Wage requirements to the Prime Contractor within ten (10) days after execution of any subcontract.

_____ _____
Subcontractor Tax ID Number

_____
Address

_____ _____
City, State ZIP DUNS Number

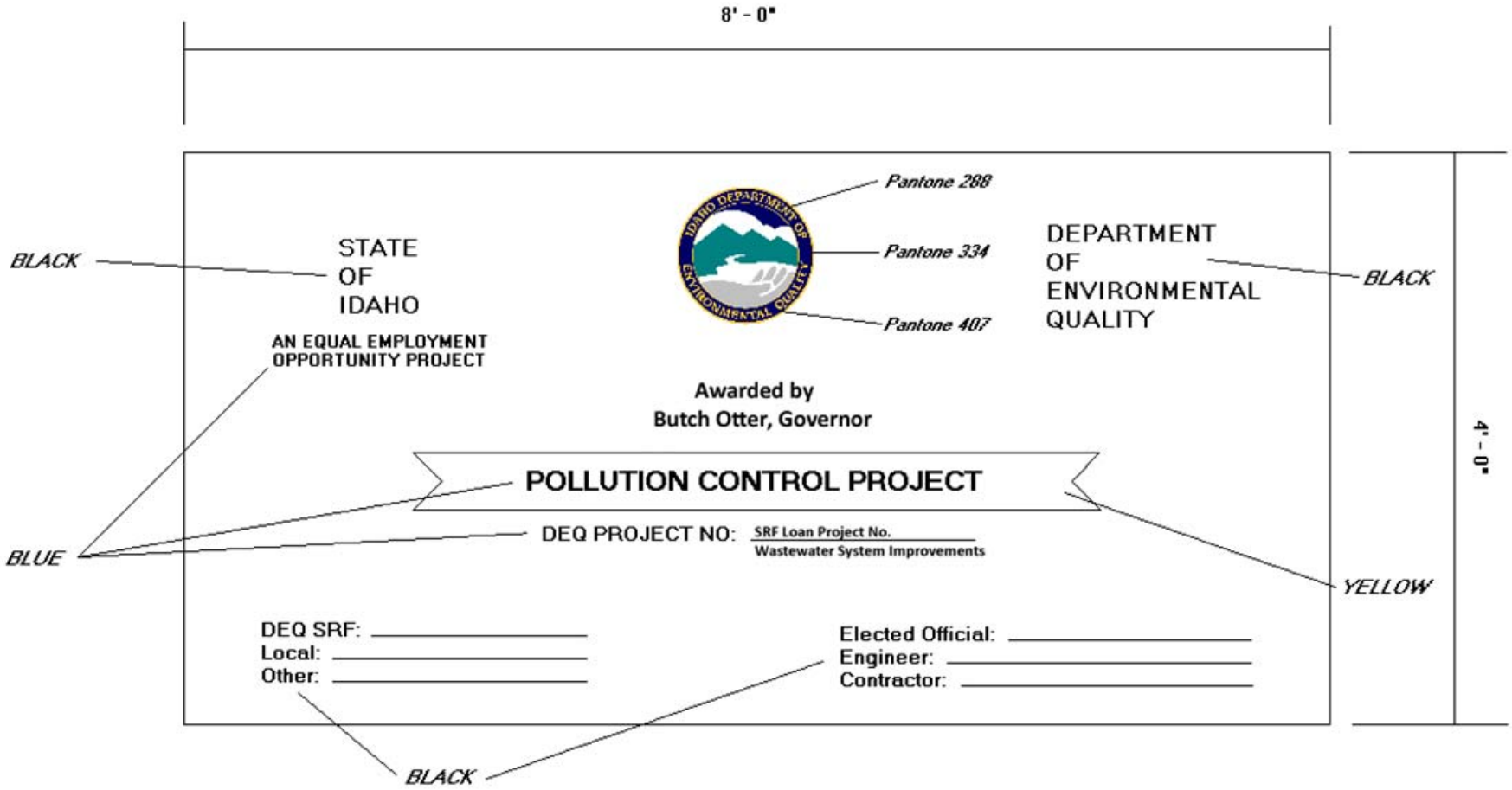
_____
Subcontractor Signature

_____
Date

THIS PAGE LEFT INTENTIONALLY BLANK

Form 6-E
Project Sign

1. A sign for identification of the project may be installed prior to commencement of construction at a location which is near the project site and amenable to public viewing.
2. The sign should be constructed of 4.0 feet by 8.0 feet exterior type high-density overlaid plywood or other sign material of equivalent quality and framed with 2.0 inch by 4.0 inch wood of suitable grade.
3. The DEQ logo should be painted on the sign in a manner similar to the attached detail drawing. The logo should be about 11.0 inches in diameter.
4. The sign should be painted with black or other visible dark lettering on a white background.
5. Information specified on the attached detail drawing should be displayed on the sign.
6. Lettering should be of professional quality and in accordance with the attached detail drawing; all lettering should be in proportion to the sizes shown.
7. Any additional information displayed on the sign should not detract from or displace the information required in the drawing.
8. The sign should be adequately supported with regard to site conditions and should be an adequate distance above the prevailing grade to permit public viewing.
9. The sign should be removed and appropriately disposed of when the construction is complete and accepted by DEQ.
10. The cost of preparation and erection of the sign is loan eligible.



Provide adequate supports for sign as site conditions may require and keep sign a proper distance above prevailing grade to permit public viewing.

Exterior-type high density overlaid plywood or other approved material suitable for signs.

NOTE:
Background and all other sign components not designated are painted white.

Idaho Department of Commerce – CDBG Sign Requirements

The contractor shall supply, erect and maintain a project sign. The sign shall be located prominently at the project site as directed by the project owner. The sign shall be maintained in good condition and removed six (6) months after the project is completed. The sign shall be identical to the one included in this bidding document in overall appearance and proportion. It is to be on 4’x8’ or 3’x6’ plywood or equivalent material. The sign should be secured into the ground or on a vertical surface.

City of Athol
WATER SYSTEM IMPROVEMENT PROJECT

FUNDED BY:

USDA Rural Development

Committed to the future of rural communities.

Donald J. Trump, President

Sonny Perdue, Secretary of Agriculture

This institution is an equal opportunity provider.

IDAHO COMMERCE

Department of Commerce

HUD / Community Development Block Grant

Brad Little, Governor

State of Idaho
Department of Environmental Quality

DRINKING WATER PROJECT

Awarded by Brad Little, Governor

DEQ PROJECT NO: SRF Loan Project No. DW 1906
Water System Improvements

AN EQUAL EMPLOYMENT OPPORTUNITY PROJECT

DEQ SRF: $700,000
City of Athol: $200,000
USDA-RD (Interim): $2,586,000
Idaho Department of Commerce: $500,000

Elected Official: Bill Hill
Engineer: Keller Associates, Inc.
Contractor:_____

Field Order _____

Date of Issuance:		Effective Date:	
Owner:	City of Athol	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	Water System Improvements Project

Contractor is hereby directed to promptly execute this Field Order, issued in accordance with General Conditions Paragraph 11.01, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

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

Description:

Attachments:

ISSUED:	RECEIVED:
By: _____ Engineer (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____
Date: _____	Date: _____

Copy to: Owner

THIS PAGE LEFT BLANK INTENTIONALLY

Work Change Directive No.

Date of Issuance:		Effective Date:	
Owner:	City of Athol	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	Water System Improvements Project

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] [decrease].

Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By:	By:	By:
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title:	Title:	Title:
Date:	Date:	Date:

Approved by Funding Agency (if applicable)

By: Date:

Title

THIS PAGE LEFT BLANK INTENTIONALLY

Change Order No. _____

Date of Issuance:		Effective Date:	
Owner:	City of Athol	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Keller Associates	Engineer's Project No.:	216064-001
Project:	Water System Improvements Project	Contract Name:	Water System Improvements Project

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

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES *[note changes in Milestones if applicable]*
Original Contract Price: $ _____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $ _____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $ _____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: _____ Date: _____

Title: _____

THIS PAGE LEFT BLANK INTENTIONALLY

CONDITIONS OF THE CONTRACT

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 00 62 76.10 - IDAHO STATE TAX REQUIREMENTS

PART 1 - GENERAL

1.1 TAX REPORTING REQUIREMENTS

A. In accordance with the provisions of Sections 54-1904A and 63-3624(g) of the Idaho Code, the owner is required to report all Public Works Contracts to the State Tax Commission. Excerpts from these Sections and appropriate Public Works Contract Report forms are included in this Section. The Contractor shall be responsible for completing the Public Works Contract Report (Form WH-5) within 30 days of the award of the contract. This form is included in this Section. Form WH-5 shall be submitted to the State Tax Commission with a copy given to the Owner and a copy to the Engineer. Said submittal shall be required as part of contract mobilization.

B. In addition, the Contractor will be required to complete the attached form "CONTRACTOR FOR PUBLIC WORKS TO PAY OR SECURE TAXES" at the time that the contract is awarded. Also, prior to releasing retainage, the Contractor shall be required to submit the attached "AFFIDAVIT OF PAYMENT OR SECUREMENT OF ALL TAXES" to the Engineer. At that time the Engineer will submit a "Request for Tax Release" to the State Tax Commission. Retainage cannot be released until the State Tax Commission issues a tax release stating that all taxes have been paid.

1.2 MATERIALS PURCHASED BY A PUBLIC WORKS AGENCY BUT INSTALLED BY THE CONTRACTOR

A. The Contractor owes use tax on materials purchased by a public works agency and installed by the Contractor according to Idaho Sales Tax Rule 12 and Idaho Code 63-3615(b).

1. The following equipment shall be pre-purchased and provided by the Owner: **None.**

2. Pre-purchased WWTP equipment qualifies for certain tax exemptions. Contact the Idaho State Tax Commission.

CONTRACTOR FOR PUBLIC WORKS TO PAY OR SECURE TAXES
(Idaho Code 63-1503)

"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 licenses 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 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,

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 taxing units to which said Contractor is liable."

CONTRACTOR

_____

By:_____

Name:_____

Address:_____

(Seal)
ATTEST:

_____

Name:_____

AFFIDAVIT OF PAYMENT OR SECUREMENT OF ALL TAXES

STATE OF_____
}ss.
County of_____

The Contractor,_____, being first duly sworn, on oath deposes and says that he is in conformance with Idaho Code 63-1502; that he is authorized to do business in the State of Idaho and that he can 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, now due or delinquent, including assessments, excises and license fees levied by the State of Idaho or any taxing unit within the State of Idaho.

DATED this_____day of_____ 20____.

SUBSCRIBED AND SWORN to before me this _____ day of _____, 20____.

Notary Public for _____

Residing at _____

Commission Expires _____

State of Idaho
DEPARTMENT OF REVENUE AND TAXATION
STATE TAX COMMISSION

PUBLIC WORKS CONTRACT TAX RELEASE

Section 54-1904A and G3-3624(f), Idaho Code, requires all Public Works Contracts to be reported to the State Tax Commission

Idaho State Tax Commission

WH-5 Public Works Contract Report

Ref. No. (State use only)

Idaho Code sections 54-1904A and 63-3624(g) require all public works contracts to be reported to the Tax Commission. This form must be filed with the Tax Commission within 30 days after a contract is awarded.

Contract awarded by (public body and address)

Contract awarded to (contractor's name and address)

State of incorporation	Federal Employer Identification Number (EIN)	Date qualifed to do business in Idaho
Business operates as ☐ Sole proprietorship ☐ Partnership ☐ Corporation ☐ LLC		Public Works contractor license number
Sole proprietor's Social Security number	Idaho sales/use tax 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 is not available at this time, please indicate date it will be: _____

ALL SUBCONTRACTORS

Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			
Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			
Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			
Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			

Refer to tax.idaho.gov for current form

EFO00168 04-28-11

EFO00234
04-27-11

Idaho State Tax Commission
REQUEST FOR TAX RELEASE

Date:_____

PART I -- AWARDING AGENCY INFORMATION:			
Name of agency	Mailing address		City, state, and ZIP Code
Contact name	Phone number	Email address	

PART II -- CONTRACTOR INFORMATION:			
Name of contractor	Mailing address		City, state, and ZIP Code
Federal EIN	Contact name	Phone number	Email address

PART III -- CONSTRUCTION/CONTRACT MANAGER INFORMATION (if applicable):			
Name of business	Mailing address		City, state, and ZIP Code
Federal EIN	Contact name	Phone number	Email address

Send a copy of the approved Tax Release to: Awarding Agency ☐ Contractor ☐ Construction Manager ☐

NOTE: *We will email all copies unless otherwise requested.*

PART IV -- PROJECT INFORMATION:			
Name of project		Location of project	
Description of project			
Project number assigned by awarding agency	Project start date	Project completion date	Final/closing contract amount (includes all change orders) $

Did any government entities supply materials which were installed by this contractor or its subs?: Yes ☐ No ☐

If YES, list these materials and their dollar values. (Attach additional information if needed.)

List materials	List dollar values of materials
	$
	$
	$

Send to: Contract Desk/Sales Tax Audit
Idaho State Tax Commission
PO Box 36
Boise ID 83722-0410

Phone: (208) 334-7618 • Fax: (208) 332-6619 • Email: **contractdesk@tax.idaho.gov**

NOTE: *Please allow 30 days to process a Tax Release Request. You must send a complete, signed Form WH-5 Public Works Contract Report to the Idaho State Tax Commission to complete this request.*

Refer to tax.idaho.gov for current form

ALL SUBCONTRACTORS (CONTINUED)

Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			
Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			
Name			Federal EIN
Address			Public works contractor number
City, State, ZIP	☐ LLC ☐ Sole proprietorship	☐ Corporation ☐ Partnership	Amount of subcontract $
Description of work			

SUPPLIERS

Use the space below to report major suppliers of materials and supplies; items removed from inventory; equipment purchased, rented, or leased for use in project; materials provided by government agency. Please indicate how sales or use tax was paid.

Name		Federal EIN	Total value $
Address		Materials and equipment purchased and used	
City, State, ZIP	Phone	☐ Tax paid to supplier ☐ Tax paid to state* ☐ No tax paid	
Name		Federal EIN	Total value $
Address		Materials and equipment purchased and used	
City, State, ZIP	Phone	☐ Tax paid to supplier ☐ Tax paid to state* ☐ No tax paid	
Name		Federal EIN	Total value $
Address		Materials and equipment purchased and used	
City, State, ZIP	Phone	☐ Tax paid to supplier ☐ Tax paid to state* ☐ No tax paid	
Name		Federal EIN	Total value $
Address		Materials and equipment purchased and used	
City, State, ZIP	Phone	☐ Tax paid to supplier ☐ Tax paid to state* ☐ No tax paid	

Refer to tax.idaho.gov for current form

* If tax was not paid to suppliers but **was** or **will be** reported as "items subject to use tax" under your permit number, indicate period of return on which payment **was** or **will be** reported: _____

If tax was paid to a state **other** than Idaho, name state next to "total value" box(es) above. If tax is due and has **not previously been reported**, attach payment to this form. **If you need more room, please photocopy this page.**

SIGN HERE	Authorized signature	Print name	Phone number	Date

File with the Idaho State Tax Commission, PO Box 36, Boise ID 83722-2210.

For more information, call (208) 334-7618 • Fax: (208) 332-6619 • E-mail: Contractdesk@tax.idaho.gov.

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

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Issued and Published Jointly by

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

National Society of Professional Engineers®

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved. 00 72 13

These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

Copyright © 2013:

National Society of Professional Engineers

1420 King Street, Alexandria, VA 22314-2794

(703) 684-2882

www.nspe.org

American Council of Engineering Companies

1015 15th Street N.W., Washington, DC 20005

(202) 347-7474

www.acec.org

American Society of Civil Engineers

1801 Alexander Bell Drive, Reston, VA 20191-4400

(800) 548-2723

www.asce.org

The copyright for this document is owned jointly by the three sponsoring organizations listed above. The National Society of Professional Engineers is the Copyright Administrator for the EJCDC documents; please direct all inquiries regarding EJCDC copyrights to NSPE.

NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

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 5
Article 2 – Preliminary Matters 6
2.01 Delivery of Bonds and Evidence of Insurance 6
2.02 Copies of Documents 6
2.03 Before Starting Construction 7
2.04 Preconstruction Conference; Designation of Authorized Representatives 7
2.05 Initial Acceptance of Schedules 7
2.06 Electronic Transmittals 8
Article 3 – Documents: Intent, Requirements, Reuse 8
3.01 Intent 8
3.02 Reference Standards 8
3.03 Reporting and Resolving Discrepancies 9
3.04 Requirements of the Contract Documents 10
3.05 Reuse of Documents 10
Article 4 – Commencement and Progress of the Work 10
4.01 Commencement of Contract Times; Notice to Proceed 10
4.02 Starting the Work 11
4.03 Reference Points 11
4.04 Progress Schedule 11
4.05 Delays in Contractor's Progress 11
Article 5 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions 12
5.01 Availability of Lands 12
5.02 Use of Site and Other Areas 13
5.03 Subsurface and Physical Conditions 14
5.04 Differing Subsurface or Physical Conditions 14
5.05 Underground Facilities 16
5.06 Hazardous Environmental Conditions at Site 17
Article 6 – Bonds and Insurance 19

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

6.01 Performance, Payment, and Other Bonds 19
6.02 Insurance—General Provisions 20
6.03 Contractor's Insurance 21
6.04 Owner's Liability Insurance 23
6.05 Property Insurance 24
6.06 Waiver of Rights 25
6.07 Receipt and Application of Property Insurance Proceeds 26
Article 7 – Contractor's Responsibilities 27
7.01 Supervision and Superintendence 27
7.02 Labor; Working Hours 27
7.03 Services, Materials, and Equipment 27
7.04 "Or Equals" 28
7.05 Substitutes 29
7.06 Concerning Subcontractors, Suppliers, and Others 30
7.07 Patent Fees and Royalties 32
7.08 Permits 33
7.09 Taxes 33
7.10 Laws and Regulations 33
7.11 Record Documents 33
7.12 Safety and Protection 34
7.13 Safety Representative 35
7.14 Hazard Communication Programs 35
7.15 Emergencies 35
7.16 Shop Drawings, Samples, and Other Submittals 35
7.17 Contractor's General Warranty and Guarantee 37
7.18 Indemnification 38
7.19 Delegation of Professional Design Services 39
Article 8 – Other Work at the Site 39
8.01 Other Work 39
8.02 Coordination 40
8.03 Legal Relationships 40
Article 9 – Owner's Responsibilities 41
9.01 Communications to Contractor 41
9.02 Replacement of Engineer 41
9.03 Furnish Data 41

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

9.04 Pay When Due 42
9.05 Lands and Easements; Reports, Tests, and Drawings 42
9.06 Insurance 42
9.07 Change Orders 42
9.08 Inspections, Tests, and Approvals 42
9.09 Limitations on Owner's Responsibilities 42
9.10 Undisclosed Hazardous Environmental Condition 42
9.11 Evidence of Financial Arrangements 42
9.12 Safety Programs 42
Article 10 – Engineer's Status During Construction 43
10.01 Owner's Representative 43
10.02 Visits to Site 43
10.03 Project Representative 43
10.04 Rejecting Defective Work 43
10.05 Shop Drawings, Change Orders and Payments 43
10.06 Determinations for Unit Price Work 44
10.07 Decisions on Requirements of Contract Documents and Acceptability of Work 44
10.08 Limitations on Engineer's Authority and Responsibilities 44
10.09 Compliance with Safety Program 44
Article 11 – Amending the Contract Documents; Changes in the Work 45
11.01 Amending and Supplementing Contract Documents 45
11.02 Owner-Authorized Changes in the Work 45
11.03 Unauthorized Changes in the Work 46
11.04 Change of Contract Price 46
11.05 Change of Contract Times 47
11.06 Change Proposals 47
11.07 Execution of Change Orders 48
11.08 Notification to Surety 48
Article 12 – Claims 49
12.01 Claims 49
Article 13 – Cost of the Work; Allowances; Unit Price Work 50
13.01 Cost of the Work 50
13.02 Allowances 52
13.03 Unit Price Work 53
Article 14 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work 54

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

14.01 Access to Work 54
14.02 Tests, Inspections, and Approvals 54
14.03 Defective Work 55
14.04 Acceptance of Defective Work 55
14.05 Uncovering Work 55
14.06 Owner May Stop the Work 56
14.07 Owner May Correct Defective Work 56
Article 15 – Payments to Contractor; Set-Offs; Completion; Correction Period 57
15.01 Progress Payments 57
15.02 Contractor's Warranty of Title 60
15.03 Substantial Completion 60
15.04 Partial Use or Occupancy 61
15.05 Final Inspection 61
15.06 Final Payment 62
15.07 Waiver of Claims 63
15.08 Correction Period 63
Article 16 – Suspension of Work and Termination 64
16.01 Owner May Suspend Work 64
16.02 Owner May Terminate for Cause 64
16.03 Owner May Terminate For Convenience 65
16.04 Contractor May Stop Work or Terminate 66
Article 17 – Final Resolution of Disputes 66
17.01 Methods and Procedures 66
Article 18 – Miscellaneous 67
18.01 Giving Notice 67
18.02 Computation of Times 67
18.03 Cumulative Remedies 67
18.04 Limitation of Damages 67
18.05 No Waiver 67
18.06 Survival of Obligations 67
18.07 Controlling Law 67
18.08 Headings 68

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. 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, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

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. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document 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, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice 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.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *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.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *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.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *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, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *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.

40. *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.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *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 a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *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 but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *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; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs 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 Article 10 or any other provision of the Contract Documents.

C. *Day*:

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

D. *Defective*:

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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. *Bonds*: 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 Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), 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;

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.

2.04 *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 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, 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 and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *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 2.03.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.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, 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.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, 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, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. No provision of any such standard specification, manual, reference standard, 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 part of the Contract Documents prepared by or for Engineer. 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 part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or 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) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) 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 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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 part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers 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 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; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

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.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *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 Contract 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Contract. 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 Contract, whichever date is earlier.

4.02 *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 such date.

4.03 *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.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 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 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. 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, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, 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 Times and Contract Price. 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.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

conditioned on such adjustment being 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, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *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.

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 permanent improvements are to be made 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, 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 any such claim, and against all 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 directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent 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 and adjacent areas 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 of 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 structures or land to stresses or pressures that will endanger them.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

5.03 *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 adjacent 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); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on 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.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site 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 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; 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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, 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 fall within any one or more of the categories described in Paragraph 5.04.A;

    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 Paragraph 13.03; and,

    c. 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.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

    a. Contractor knew of the existence of such condition at the time Contractor made a 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 otherwise; or

    b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

    c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent 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 do not warrant or guarantee 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 information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then 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 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

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 Paragraph 13.03;

c. 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; and

d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) 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 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. 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, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. 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, following the contractual change procedures in

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. 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 (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. 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 failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, 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. 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 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then 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 bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, 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.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

   a. Such insurance shall be maintained for three years after final payment.

   b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against 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. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; 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 (including as applicable those arising from both

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that 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.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, 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.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable 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 Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.
9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
10. not include a co-insurance clause.
11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
12. include performance/hot testing and start-up.
13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, 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 insureds thereunder, or

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the 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 Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, 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 or Contractor as trustee or fiduciary, 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 occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.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, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, 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 builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *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.

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.

7.02 *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, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *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, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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.

7.04 *"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 Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item 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 is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that 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, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

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.

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

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. 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:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. 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.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. 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 the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. 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.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. 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 money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *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.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *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.

7.10 *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 or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and 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 such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

7.12 *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, other work in progress, 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 Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

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 7.12.A.2 or 7.12.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 at its expense (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 protection 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 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *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.

7.14 *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.

7.15 *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.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the 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 and equipment 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 of that submittal, and that Contractor approves the 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 set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

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 7.16.D.

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall 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 7.16.D.

3. 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. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

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 or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample 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 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

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.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *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 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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;
6. the issuance of a notice of acceptability by Engineer;
7. any inspection, test, or approval by others; or
8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, 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 7.18.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 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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.

7.19 *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 Laws and Regulations.

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, 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, 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 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, 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.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. 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.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) 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 any such claims, and against all 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 damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *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.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *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 (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

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.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *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.

10.02 *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 10.08. 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.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. 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.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. 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, are set forth in Paragraph 7.19.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, 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 15.06.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 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes 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. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-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. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *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, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. 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, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, 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 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

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 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. 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;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *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.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work 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 13.01.C, 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, and 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

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 13.01.

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 6.05), 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication 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 that Contractor is required by the Contract Documents to purchase and maintain.

C. *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, expediters, 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 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here 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 Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole 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, Change Proposal, Claim, set-off, or other 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 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, 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.

13.02 *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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

B. *Cash Allowances*: Contractor agrees that:

1. 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

2. 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*: 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.

13.03 *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. Payments to Contractor for Unit Price Work will be based on actual quantities.

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. 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 the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price 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;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it 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.

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction 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.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

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, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages 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. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then 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, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages 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 pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *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, then 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.

14.07 *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, 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, then 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 14.07, 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, 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 incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

against payments due under Article 15. 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 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 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 during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *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, a warehouse bond, 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.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, 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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 13.03, 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; 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 money 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 stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Forty Five days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. 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;

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, 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, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *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 and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. 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 punch list.

15.04 *Partial Use or Occupancy*

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. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be 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 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work 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 15.03 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 6.05 regarding builder's risk or other property insurance.

15.05 *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

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *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, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) 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, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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 have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

to progress payments. 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 15.07. 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. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Forty five days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *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 Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

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 to 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.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

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 repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

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, 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 are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *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 written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and 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);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, 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 complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.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 the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds 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.

F. 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, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *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; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) 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 16.03.

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 are not intended to preclude Contractor from submitting a Change Proposal 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 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

ARTICLE 18 – MISCELLANEOUS

18.01 *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, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract 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.

18.03 *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. 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.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

18.08 *Headings*

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

Modified from EJCDC® C-700, Standard General Conditions of the Construction Contract.
Copyright © 2013 National Society of Professional Engineers, American Council of Engineering Companies, and American Society of Civil Engineers. All rights reserved.

Supplementary Conditions

These Supplementary Conditions amend or supplement the Agreement between Owner and Contractor (EJCDC C-520, 2013 Edition), and the Standard General Conditions of the Construction Contract (EJCDC C-700, 2013 Edition) and other provisions of the Contract Documents as indicated below. All provisions that are not so amended or supplemented remain in full force and effect.

AGREEMENT BETWEEN OWNER AND CONTRACTOR SUPPLEMENTS

Development of the Agreement between Owner and Contractor must be based on EJCDC C-520, 2013, as modified below:

- Delete paragraph 4.04 in its entirety and insert the following in its place:

  [Deleted]

- Amend paragraph 6.02.A.1.a by adding 95 to the blank.

- Amend paragraph 6.02.A.1.a by deleting the period at the end of the first sentence, replacing it with a semicolon, and by striking out the following text: “If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage;”

- Amend paragraph 6.02.A.1.b by adding 95 to the blank.

- Amend paragraph 6.02.B by inserting “of the entire construction to be provided under the Contract Documents” after “Substantial Completion.”

CERTFICATE OF OWNER'S ATTORNEY

PROJECT NAME: Athol Water System Improvements

CONTRACTOR NAME:

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Name Date

AGENCY CONCURRENCE

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency Representative Date

Name

GENERAL CONDITION
SUPPLEMENTS

The terms used in these Supplementary Conditions will have the meanings indicated 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.

SC 1.01.A.8 - <u>ADD</u> the following language at the end of last sentence of Paragraph 1.01.A.8:

The Change Order form to be used on this Project is EJCDC C-941. Agency approval is required before Change Orders are effective.

SC 1.01.A.48 - <u>ADD</u> the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC 1.01.A.49 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.48:

Abnormal Weather Conditions – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered Abnormal Weather Conditions.

SC 1.01.A.50 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.49:

Agency - The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development.

SC 1.01.A.51 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.50:

Engineer-The Engineer is further defined as Keller Associates, Inc., 601 Sherman Ave., Suite 1, Coeur d'Alene, ID 83814

SC 1.01.A.52 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.51:

Owner-The Owner is further defined as the City of Athol

SC 1.01.A.53 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.52:

51. *Manufacturer's Certification letter* is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the American

Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel requirements. Refer to Manufacturer's Certification Letter provided in these Contract Documents

SC 1.01.A.54 - <u>ADD</u> the following new Paragraph after Paragraph 1.01.A.53

52. AIS - refers to requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

SC 2.01 - <u>REMOVE</u> Paragraph 2.01.C in its entirety.

SC 2.02 - <u>AMEND</u> the first sentence of Paragraph 2.01.A to read as follows:

Owner shall furnish to Contractor five (5) copies of the Contract Documents (including one fully executed counterpart of the Agreement), and one copy in electric portable document format (PDF). Plans by Owner shall be half-size only.

SC 3.01 - <u>ADD</u> the following to Paragraph 3.01.A to read as follows:

In the event of conflict or discrepancy in the requirements and provisions as set out by the contract, or the specifications, or the plans, such conflict shall be reconciled by the acceptance of the following order of precedence for the various contract documents:

1. Change orders and written amendments to the Agreement;
2. The Agreement bearing the signature of the Owner and Contractor;
3. Addenda, with those of later date having precedence over those of earlier date;
4. The General Conditions of the Construction Contract as modified by Supplementary Conditions;
5. Division 01 of the Technical Specifications;
6. Divisions 02-43 of the Technical Specifications;
7. Drawings, including notes written thereon;
8. Other documents specifically enumerated in the Agreement as part of the Contract Documents.

SC 4.01.A - Amend the last sentence of Paragraph 4.01.A by <u>STRIKING OUT</u> the following words:

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 Contract, whichever date is earlier.

SC 4.05.C.2 - Amend Paragraph 4.05.C.2 by STRIKING OUT the following text: "abnormal weather conditions;" and inserting the following text:

Abnormal Weather Conditions;

(Strikethrough the paragraph SC-5.03 that does not apply.)

SC-5.01 - REMOVE Paragraph 5.01.B in its entirety.

SC-5.03 - ADD the following new paragraphs immediately after Paragraph 5.03.B:

C. The following reports of exploration and tests of subsurface conditions at or adjacent to the Site are known to the Owner:

A Geotechnical Report, found in Appendix A at the end of Volume 2 of the Specifications.

D. The following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilitates) which are at or adjacent to the Site are known to the Owner*:*

None

----------OR----------

SC-5.03 - DELETE Paragraphs 5.03.A and 5.03.B in their entirety and insert the following:

A. No reports or explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site are known to the Owner.

(Strikethrough the paragraph SC-5.06 that does not apply.)

SC-5.06 - DELETE Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to the Owner.

SC 6.03 - ADD the following new paragraph immediately after Paragraph 6.03.J.

K. The limits of liability for insurance required by Paragraph 6.03 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 6.03.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Applicable Federal, if applicable, (Longshoremen's)	Statutory
c. Employer's Liability	$1,00,000

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C 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 the Contractor:

a. General Aggregate (Per Project Limit)	$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

3. Automobile Liability under Paragraph 6.03.D of the General Conditions:

a. Bodily Injury:	
Each person	$1,000,000
Each Accident	$1,000,000
b. Property Damage	
Each Accident	$1,000,000

4. Excess or Umbrella Liability:

a. Per Occurrence	$2,000,000
b. General Aggregate	$2,000,000

5. List additional types and amounts of insurance that may be required by Owner.
Contractor's Pollution Liability

e. Per Occurrence	$1,000,000
f. General Aggregate	$1,000,000

SC 7.02.B - <u>ADD</u> the following new Paragraph after Paragraph 7.02.B:

Regular working hours will be 7:00 a.m. to 7:00 p.m. Monday through Friday. Contractor may deviate from this with approval from the Owner. Work on weekends shall only be approved by Owner on a case-by-case basis if absolutely required to complete a critical work sequence.

No work shall be performed on Owner's legal holidays. The City of Athol observes the following eleven (11) holidays: New Year's Day, Martin Luther King's Birthday, President's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving, Christmas Eve Day, and Christmas Day.

SC 7.03.D - <u>ADD</u> the following new Paragraph after Paragraph 7.03.C:

D. All iron and steel products must meet American Iron and Steel requirements.

SC 7.04.A - Amend the third sentence of Paragraph 7.04.A by <u>STRIKING OUT</u> the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted**.**

SC 7.04.A.1 - Amend the last sentence of Paragraph a.3 by <u>STRIKING OUT</u> "and;" and <u>ADDING</u> period at the end of Paragraph a.3.

SC 7.04.A.1 - <u>DELETE</u> paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:

[Deleted]

SC 7.04.B.1 - <u>ADD</u> the following new Subparagraph after Paragraph 7.04.B:

1. Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents. In addition, for the Deminimis Waiver, Contractor shall maintain an itemized list of incidental components and ensure that the cost is less than 5% of total materials cost for project; for the Minor Components Waiver, the Contractor shall maintain a list of products to which the minor components waiver applies and the cost of the non-domestically produced component is less than 5% of total materials cost of that product.

SC 7.05.A.3.a.4 - <u>ADD</u> the following new Paragraph after Paragraph 7.05.A.3.a.3:

4) comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

SC 7.06.A - Amend Paragraph 7.06.A by <u>ADDING</u> the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

SC 7.06.A.1 - DELETE paragraph 7.06.A.1 in its entirety and insert the following in its place:

[Deleted]

SC 7.06.B - DELETE paragraph 7.06.B in its entirety and insert the following in its place:

[Deleted]

SC 7.06.E - Amend the second sentence of Paragraph 7.06.E by STRIKING OUT the following:

"Owner may also require Contractor to retain specific replacements; provided, however, that".

SC 7.11.A - Amend Paragraph 7.11.A by INSERTING the following after "written interpretations and clarifications,":

Manufacturers' Certification letter is documentation provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. to various entities stating that the iron and steel products to be used in the project are produced in the United States in accordance with American Iron and Steel Requirements. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC 7.16.A.1.e - ADD the following new Paragraph after Paragraph 7.16.A.1.d:

e. obtained Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC 7.16.D.9 - ADD the following new Paragraph after Paragraph 7.16.D.8:

9. Engineer's review and approval of Shop Drawing or Sample shall include review of compliance with American Iron and Steel requirements, as applicable.

SC 7.17.E - ADD the following new Paragraph after Paragraph 7.17.D:

E. Contractor shall certify upon Substantial Completion that all Work and Materials has complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor's Certification Letter provided in these Contract Documents.

SC-10.03 - ADD the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. 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.

3. 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.

4. Liaison:

    a. Serve as Engineer’s liaison with Contractor. Working principally through Contractor’s authorized representative or designee, assist in providing information regarding the provisions and 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.

5. 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.

6. Shop Drawings and Samples:

    a. Record date of receipt of Samples and Contractor-approved Shop Drawings.

    b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

    c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Modifications: Consider and evaluate Contractor’s suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR’s

recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

8. 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 is defective, 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.

9. Inspections, Tests, and System Start-ups:

    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.

10. Records:

    a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

    b. 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.

    c. Maintain records for use in preparing Project documentation.

11. 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, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. 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.

13. 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 Contract Documents 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.

14. Completion:

a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch 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, or Suppliers.

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.

5. Advise on, issue directions regarding, or assume control over security or 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 10.10.A - <u>ADD</u> the following new Paragraph after Paragraph 10.09:

A. American Iron & Steel: A. "Services required to determine and certify that to the best of the Engineer's knowledge and belief all iron and steel products referenced in engineering analysis, the Plans, Specifications, Bidding Documents, and associated Bid Addenda requiring design revisions are either produced in the United States or are the subject of an approved waiver and services required to determine to the best of the engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates are either produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017).

SC 11.03 - <u>ADD</u> the following new Paragraph after Paragraph 11.03.A:

Unit Price work noted with Plan Quantities on the Bid Tab or Contract Documents shall be paid on a unit price basis based on actual quantities as determined by the engineer.

SC 11.03 - <u>ADD</u> the following new Paragraph after Paragraph 11.03.C:

Work described in the Contract Documents but not identified in the listing of unit price items shall be considered incidental to unit price work listed and the cost of incidental work included as a part of the unit price.

SC 11.03.D - REPLACE Paragraph 11.03.D to the General Conditions:

11.03.D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the total cost of a particular item of Unit Price Work amounts to 5 percent or more of the Contract Price at the time of award and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Bid Form; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may demand a Change in Contract Price. Such Change in Contract Price shall be based upon any increase or decrease in costs due solely to the variation above 120 percent or below 80 percent of the estimated quantity. If the quantity variation is such as to cause an increase in Contract Time necessary for completion, the Contractor may request an extension of Contract Time for the Delay in completion resulting from performing the quantity in excess of 120 percent of the estimated quantity. If the parties are unable to agree on the effect of any such variation in the quantity of unit price work, either the Owner or Contractor may make a claim for an adjustment in the Contract Price and/or Contract Time in accordance with paragraph 10.05.

SC 11.06.A.1 - Amend Paragraph 11.06.A.1 by INSERTING the following after *"within 15 days after the submittal of the Change Proposal."*:

Include supporting data (name of manufacturer, city and state where the product was manufactured, description of product, signature of authorized manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

SC 11.07.C - ADD the following new Paragraph after Paragraph 11.07.B:

All Contract Change Orders must be concurred in by Agency before they are effective.

SC 13.02.C - DELETE Paragraph 13.02.C in its entirety and insert the following in its place:

[Deleted]

SC 14.02.B - REPLACE Paragraph 14.02.B in its entirety and insert the following in its place:

Contractor shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspection and tests expressly required by the Contract Documents as identified in Paragraph 14.02.D.

SC 14.03.G - ADD the following new Paragraph after Paragraph 14.03.F:

G. Installation of Materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

SC 15.01.B - AMEND the second sentence of paragraph 15.01.B.1 by striking out following text "a bill of sale, invoice, or other."

SC 15.01.B.3 - ADD the following language at the end of paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC 15.01.B.4 - ADD the following new Paragraph after Paragraph 15.01.B.3:

4. The Application for Payment form to be used on this Project is EJCDC C-620. The Agency must approve all Applications for Payment before payment is made.

SC 15.01.B.5 - ADD the following new Paragraph after Paragraph 15.01.B.4:

5. By submitting Materials for payment, Contractor is certifying that the submitted Materials are compliant with American Iron and Steel requirements. Manufacturer's Certification letter for Materials satisfy this certification. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC 15.01.C.2.d - ADD the following new Paragraph after Paragraph 15.01.C.2.c:

d. the Materials presented for payment comply with American Iron and Steel.

SC 15.01.D.1 - DELETE Paragraph 15.01.D.1 in its entirety and insert the following in its place:

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC 15.02.A - Amend Paragraph 15.02.A by STRIKING OUT the following text:

"no later than seven days after the time of payment by Owner" and insert "no later than the time of payment by Owner."

SC 15.03.A - Amend Paragraph 15.03.A by <u>ADDING</u> the following text to the end of the Paragraph:

Services required to determine and certify that to the best of the Contractor's knowledge and belief all substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates, and those installed for the project are either produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

SC 18.09 - <u>ADD</u> the following new paragraph after Paragraph 18.08:

Tribal Sovereignty. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of any Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.

SC-18.13 - <u>ADD</u> the following after Article 18.12. with the title "Temporary Construction Project Sign Requirements"

Contractor will provide a temporary construction project sign as shown in the contract documents. The cost of the sign will be identified in the Bid Schedule, or if not specifically identified in the Bid Schedule, the cost for the sign shall be included in other items.

SC-18.14 - <u>ADD</u> the following after Article 18.13 with the title "Additional Construction Requirements"

The following additional construction requirements will be adhered to by the contractor:

A. The Contractor shall comply with EPA's regulations regarding the Construction General Permit under the National Pollutant Discharge Elimination System.

B. All construction activities shall be in accordance with the "Catalog of Storm Water Best Management Practices for Idaho Cities and Counties" by the Idaho Department of Environmental Quality.

C. Refueling of equipment and storage of petroleum products is forbidden within 300 feet of any waterway or wetland.

A. The Contractor will employ measures to control and minimize dust resulting from construction activities.

SC-18.15 - ADD the following after Article 18.14 with the title "Counterparts and Originals":

The owner-contractor agreement may be simultaneously executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument. Exact reproductions of the executed instrument shall be considered as valid and admissible for all purposes as if the reproduction was a counterpart original.

SC 19 - ADD Article 19 titled "FEDERAL REQUIREMENTS"

SC 19.01 - ADD the following language as Paragraph 19.01 with the title "Agency Not a Party":

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

SC 19.02 - ADD the following sections after Article 19.01 with the title "Contract Approval":

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Attachment GC-A) before Owner submits the executed Contract Documents to Agency for approval.

B. Concurrence by Agency in the award of the Contract is required before the Contract is effective.

SC 19.03 - ADD the following language after Article 19.02.B with the title "Conflict of Interest":

A. Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

SC 19.04 - ADD the following language after Article 19.03.A with the title "Gratuities":

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

SC 19.05 - <u>ADD</u> the following language after Article 19.04.B with the title "Audit and Access to Records":

A. Owner, Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the Agreement, for the purpose of making audits, examinations, excerpts, and transcriptions. Engineer shall maintain all required records for three years after final payment is made and all other pending matters are closed.

SC 19.06 - <u>ADD</u> the following language after Article 19.05.A with the title "Small, Minority and Women's Businesses":

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

SC 19.07 - <u>ADD</u> the following after Article 19.06.A with the title "Anti-Kickback":

A. Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

SC 19.08 - <u>ADD</u> the following after Article 19.07.A with the title "Clean Air and Pollution Control Acts":

A. If this Contract exceeds $100,000, compliance with all applicable standards, orders, or requirements issued under section 306 of the Clean Air Act (42 U.S.C. 1857(h) and 42 USC 7401et. seq.), section 508 of the Clean Water Act (33 U.S.C. 1368) and Federal Water Pollution Control Act (33 USC 1251 et seq.), Executive Order 11738, and Environmental Protection Agency regulations is required. Contractor will report violations to the Agency and the Regional Office of the EPA.

SC 19.09 - <u>ADD</u> the following after Article 19.08 with the title "State Energy Policy":

A. Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

SC 19.10 - <u>ADD</u> the following after Article 19.09 with the title "Equal Opportunity Requirements":

A. If this Contract exceeds $10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

B. Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract is to be performed. The hours of minority and female employment and training

must be substantially uniform throughout the length of the Contract, and in each trade, and Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting Contractor's goals shall be a violation of the Contract, the Executive Order, and the regulations in 41 CFR part 60-4. Compliance with the goals will be measured against the total work hours performed.

C. Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the Contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the subcontractor; employer identification number; estimated dollar amount of subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

SC 19.11 - <u>ADD</u> the following after Article 19.10.C with the title "Restrictions on Lobbying":

A. Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

SC 19.12 - <u>ADD</u> the following after Article 19.11.A with the title "Environmental Requirements":

When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

A. Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

B. Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on the latest

Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.

C. Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact or human remains shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO, and/or appropriate Tribal Cultural Resource Office.

D. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

E. Mitigation Measures – The following environmental mitigation measures are required on this Project: {Insert mitigation measures here}.

SC 19.13 - <u>ADD</u> the following new Paragraph after Paragraph 19.12:

Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. The deminimis and minor components waiver apply to this contract.

SC 19.14 - <u>ADD</u> the following new Paragraph after Paragraph 19.13:

Definitions:
"Assistance recipient" is the entity that receives funding assistance from programs required to comply with Section 746 Division A Title VII of the Consolidated Appropriations Act of 2017 (Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. This term includes owner and/or applicant.

"Certifications" means the following:

- *Manufacturers'* certification is documentation provided by the manufacturer or fabricator to various entities stating that the iron and steel products to be used in the

project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a supplier, distributor, vendor, etc. vs. from the manufacturer or fabricator directly, then the supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certification letters to the parties purchasing the products.

- *Engineers*' certification is documentation that plans, specifications, and bidding documents comply with AIS.
- *Contractors'* certification is documentation submitted upon substantial completion of the project that all iron and steel products installed were produced in the United States.

"Coating" means a covering that is applied to the surface of an object. If a coating is applied to the external surface of a domestic iron or steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any coating processes that are applied to the external surface of iron and steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the coating processes occur, provided that final assembly of the product occurs in the United States. This exemption only applies to coatings on the *external surface* of iron and steel components. It does not apply to coatings or linings on internal surfaces of iron and steel products, such as the lining of lined pipes. All manufacturing processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

"Construction materials" are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel".
Note: Mechanical and electrical components, equipment and systems are not considered construction materials. See definition of mechanical and electrical equipment.

"Consulting engineer" is an individual or entity with which the owner has contracted to perform engineering/architectural services for water and waste projects funded by the programs subject to AIS requirements).

"De minimis incidental components" are various miscellaneous low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of incidental components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc.
Costs for such de minimis incidental components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

"General contractor" is the individual or entity with which the applicant has contracted (*or is expected to*) to perform construction services (or for water and waste projects funded by the programs subject to AIS requirements).
This includes bidders, contractors that have received an award from the applicant and any party having a direct contractual relationship with the owner/applicant. A general contractor is often referred to as the prime contractor.

"Iron and steel products" are defined as the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be produced in the United States. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

"Manufacturers" meaning a supplier, fabricator, distributor, materialman, or vendor is an entity with which the applicant, general contractor or with any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the applicant, contractor or a subcontractor.

"Manufacturing processes" are processes such as melting, refining, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic iron and steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin. Raw materials, suchas iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

"Mechanical equipment" is typically that which has motorized parts and/or is powered by a motor. "Electrical equipment" is typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does apply to mechanical equipment.

"Minor components" are components *within* an iron and/or steel product otherwise compliant with the American Iron and Steel requirements. This is different from the de minimis definition where de minimis pertains to the entire project and the minor component definition pertains to a single product. This waiver, would allow non-domestically produced miscellaneous minor components comprising up to five percent of the total material cost of an otherwise domestically produced iron and steel product to be used. However, unless a separate waiver for a product has been approved, all other iron and steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS

requirements only minor components within said product and the iron or steel components of the product must be produced domestically.
Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of minor components could include items such pins and springs in valves/hydrants, bands/straps in couplings, and other low cost items such as small fasteners etc.

"Municipal castings" are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

"National Office" refers to the office responsible for the oversight and administration of the program nationally. The National Office sets policy, develops program regulations, and provides training and technical assistance to help the state offices administer the program. The National Office is located in Washington, D.C.

"Owner" is the individual or entity with which the general contractor has contracted regarding the work, and which has agreed to pay the general contractor for the performance of the work, pursuant to the terms of the contract for water and waste projects funded by the programs subject to AIS requirements. For the purpose of this Bulletin, this term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the programs subject to the AIS requirements.

"Pass through Entities" is an entity that provides a subaward to a loan and/or grant recipient to carry out part of a Federal program. Examples are grantees utilizing the Revolving Loan Program and Household Water Well Program and Alaska Native Tribal Health Consortium (ANTHC) or the State of Alaska from the RAVG Program.

"Primarily iron or steel" is defined as a product made of greater than 50 percent iron or steel, measured by cost. The cost should be based on the material costs. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and steel, the AIS requirements do not apply.

For example, the cost of a fire hydrant includes:
(1) The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and
(2) The cost to pour and cast to create those components (e.g. labor and energy).

Not included in the cost are:
(1) The additional material costs for the non-iron and steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and
(2) The cost to assemble the internal workings into the hydrant body.

"Produced in the United States" means that the production in the United States of the iron or steel products used in the project requires that all manufacturing processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

"Project" is the total undertaking to be accomplished for the applicant by consulting engineers, general contractors, and others, including the planning, study, design, construction, testing, commissioning, and start-up, and of which the work to be performed under the contract is a part. A project includes all activity that an applicant is undertaking to be financed in whole or part by programs subject to AIS requirements. The intentional splitting of projects into separate and smaller contracts or obligations to avoid AIS requirements is prohibited.

"Reinforced Precast Concrete" may not consist of at least 50 percent iron or steel, but the reinforcing bar and wire must be produced in the United States and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the United States.

"Steel" means an alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

"Structural steel" is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

"Ultimate recipient" is a loan or grant recipient receiving funds from a pass- through entity. Examples include: (1) a loan recipient from the Revolving Loan Fund; (2) a loan recipient from the Household Water Well Program; and (3) a grant recipient from ANTHC or the State of Alaska from the RAVG Program.

"United States" means each of the several states, the District of Columbia, and each Federally Recognized Indian Tribe.

ENGINEER'S CERTIFICATION OF FINAL PLANS AND SPECIFICATIONS

PROJECT NAME: Athol Water System Improvements

The final Drawings and Specifications, other assembled Construction Contract Documents, bidding related documents (or requests for proposals or other construction procurement documents), and any other Final Design Phase deliverables, comply with all requirements of the U.S. Department of Agriculture, Rural Utilities Service, to the best of my knowledge and professional judgment.

If the Engineers Joint Contract Documents Committee (EJCDC) documents have been used, all modifications required by RUS Bulletin 1780-26 have been made in accordance the terms of the license agreement, which states in part that the Engineer "must plainly show all changes to the Standard EJCDC Text, using 'Track Changes' (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions." Such other means may include attachments indicating changes (e.g. Supplementary Conditions modifying the General Conditions). In addition, all changes to this attachment have been identified by 'Track Changes'.



06/03/2020

Engineer — Date

Stillman Norton, PE Project Manager

Name and Title

THIS PAGE LEFT BLANK INTENTIONALLY

TECHNICAL SPECIFICATIONS

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 00 00 – SPECIAL PROVISIONS

PART 1 - NOTES TO CONTRACTORS

1.1 SCOPE OF WORK

A. Work generally consists of installing new water mains, water tank replacement, raising of existing elevated reservoir, electrical improvements, pump replacement, surface restoration, asphalt paving, and traffic control as indicated in Section 01 11 00.

B. The Work to be performed under this Contract shall consist of furnishing tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be provided by the Contractor as though originally so indicated, at no increase in cost to the Owner.

C. The Contractor is responsible to follow the provisions of these Contract Documents, including but not limited to: the following of Plans and Specifications, including the Idaho Standards for Public Works Construction (ISPWC) 2017 Edition; the timely, complete, and accurate submittal of shop drawings; the work of and correlation with his subcontractors and suppliers, timely performance of the Contract, and timely payment of suppliers and subcontractors. Nothing stated in the Contract Documents or Specifications shall be construed to relieve the Contractor of these basic responsibilities.

1.2 SUBSTANTIAL COMPLETION

A. Substantial Completion is defined as the successful completion of all work, with passing test results, of the water mains and paving, and final cleanup.

1.3 USE OF DRAWINGS, STANDARD PLANS AND SPECIFICATIONS

A. Except as modified herein and in the drawings, the various work called for on the project will be performed as provided in the ***Drawings, 2017 Edition of the Idaho Standards for Public Works Construction (ISPWC)***. The Contractor is required to be a current holder of the ISPWC. The Contractor shall keep a copy of the standards at the site.

B. Contractor shall also comply with all state water quality standards, including separation distances for potable water and non-potable utilities (IDAPA 58.01.08).

1.4 WORK BY OTHERS

A. Interference with Work on Utilities: The Contractor shall cooperate fully with all utility forces of the Owner or forces of other public or private agencies engaged in the construction, relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the Work so as to minimize interference with said construction.

1.5 PUBLIC WORKS CONTRACTOR'S LICENSE

A. In accordance with Idaho Code 54-1902 any Contractor, Subcontractor, or Specialty Contractor is required to have a current license as a Public Works Contractor in the State of Idaho in order to submit a bid or proposal on this contract.

1.6 CODES AND STANDARDS

A. Where codes and standards are referred to, they are the current approved codes. It is the duty of the Contractor to obtain from its supplier any material on this work to submit evidence, if requested, that provided material is in compliance with the applicable codes and standards.

1.7 STATE AND LOCAL LAWS

A. Conform to all applicable State and local laws in carrying out obligations under the contract.

B. Meet the requirements and recommendations of the Manual of Accident Prevention in Construction; Associated General Contractors of America, Inc., and Occupational Safety and Health Act.

1.8 PERMITS

A. The Contractor shall be responsible to obtain and pay for all construction and inspection permits required by the State of Idaho, Lakes Highway District, Kootenai County, and the City of Athol.

B. Electrical, HVAC, and plumbing permits shall be obtained from the Idaho Division of Building Safety, and the State will charge a permit fee based on the cost of materials and labor for the electrical, HVAC, and plumbing work. State permits may be obtained online at dbs.idaho.gov.

C. The Contractor shall be responsible to obtain and pay for all Idaho Transportation Department Permitting, including but not limited to the Encroachment Permit and associated Utility Permit Packet. A copy of the permit and permit packet can be found in Appendix B at the end of Volume 2 of the Specifications.

D. The Contractor shall coordinate all permit and insurance requirements with the Lakes Highway District a minimum of two weeks prior to construction activities on District Right-of-Way. Contractor shall provide site plan to District, and any required insurance documents.

Lakes Highway District
11341 Ramsey Rd, Hayden ID 83835
(208) 772-7527

1.9 POTHOLING PRIOR TO EXCAVATION

A. The Contractor shall ***pothole utility crossings and connections in a nondestructive manner at least 1000 feet in front of excavation or a minimum of two days of work progress whichever is longer***. The primary purpose of potholing will be to confirm utility depths and coordinate connection requirements. Report immediately any potential utility conflicts to the Owner's authorized representative. The Contractor shall deflect pipe and over-excavate (for as much as an additional two feet of depth) to avoid unnecessary use of vertical fittings. The Contractor shall not be compensated for additional fittings that could have been avoided with advanced potholing and over-excavation. Potholing shall be considered incidental to construction.

B. The Contractor shall note the location and depth of every utility crossing (including services and abandoned utilities) and connections to existing waterlines on the Contractor's record drawings.

1.10 SEQUENCE OF ACTIVITIES

A. The following is a suggested sequence of construction activities. The Contractor may submit an alternative plan, subject to approval from the Owner. The Contractor will be responsible for any additional costs that may be required as a result of using an alternative plan.

1. Requirements

a. Provide 48hour notification prior to disruption, shut-off or connection to water system. the Contractor shall inform and receive approval from the City Engineering Division. Any connection points shall be exposed at least 24 hours prior to connection, to verify location and fitting requirements.

b. At least 24 hours prior to shut-off, the Contractor shall notify all affected properties utilizing flyers, door hangers or letters. Notifications shall contain at a minimum: date and time of shutoff, anticipated duration, Contractor's name and phone number, and an emergency contact person and phone number. A copy of the notification shall be provided to the City Engineering Division. Contractor will also notify each customer the morning of the shutdown, and 30 minutes before the disruption. The Contractor shall inform the customer of the estimated length of the disruption. Provide Contractor phone number, including contact information for non-business hours.

c. Where temporary water service is not provided, notification shall also include instructions to consume only bottled water during the shutdown and only bottled water or boiled tap water until notified the tap water is safe to drink.

d. Water mains shall not be depressurized for any length of time without providing temporary water services to affected residences. Bottled water is an acceptable means of temporary water service for depressurization events for connecting new waterlines to the existing system that have **very** short durations and affect **Less than 10** services. Coordinate with the City and affected customers at least 48 hours in advance of the depressurization event.

e. Flushing water line of Chlorinated water will be disposed of by flushing water to a location approved by the Owner. Heavily chlorinated water (above normal system residuals) shall be flushed through an IDEQ-approved dechlorinator.

f. At least one tank must be kept online, and only one well may be taken offline at a time. The existing cemetery tanks cannot "float on the system", and must be removed and replaced with the new standpipe prior to improvements at the elevated reservoir.

2. Phasing for Tank Improvements

a. The following is a suggested sequence of construction activities. The Contractor may submit an alternative plan, subject to approval from the Owner. The Contractor will be responsible for any additional costs that may be required as a result of using an alternative plan.

1) Isolate the existing cemetery tanks from the system, and remove the cemetery tanks.

2) Construct the new cemetery standpipe, and connect it to the existing water system.

3) Concurrently, begin construction on the existing elevated reservoir (after isolating the reservoir), while performing site civil and electrical improvements at the cemetery standpipe.

4) Complete all improvements at the elevated reservoir and any remaining improvements at the cemetery standpipe.

3. Phasing for Water Main Improvements

a. The following is a suggested sequence of construction activities. The Contractor may submit an alternative plan, subject to approval from the Owner. The Contractor will be responsible for any additional costs that may be required as a result of using an alternative plan. Contractor to provide disruption/temporary water plan to City and engineer for review.

1) Complete construction of new waterlines and connections to the existing water system.

2) Maintain existing waterlines in service during construction of new waterlines.

3) Disinfect and pressure test new waterlines.

4) With passing pressure test, begin flushing new waterlines and perform bacteriological testing.

5) Complete pressure testing and locate wire integrity testing before paving.

6) With passing bacteriological tests, open appropriate valves to turn new waterline into existing water system.

1.11 CONSTRUCTION AND PROGRESS SCHEDULE

A. The Contractor is responsible for preparing a construction schedule in the form of a bar chart showing a critical path conforming to the phasing conditions herein. The schedule shall include start date, completion date, days for completion, float, and time restrictions as stated herein.

B. A 14-day look-ahead schedule shall be updated by the Contractor weekly prior to project meetings with the Owner. The overall project schedule shall be updated at least monthly.

1.12 GENERAL COORDINATION

A. Work shall be coordinated with the City of Athol Public Works Department, applicable regulatory agencies, and affected utilities. No work may begin on any part of the project without forty-eight (48) hour prior notice to Owner's authorized representative.

B. Coordinate activities to minimize disruption of services (including trash collection, postal service, school buses, and emergency vehicles).

1. Provide uninterrupted access for trash collection. If the Contractor's work prevents access, the Contractor shall move individual household trash containers, bags, and other items to an accessible location acceptable to the solid waste hauler. The empty containers shall be returned to the household after pick-up. The Contractor shall replace any lost or damaged containers.

2. Coordinate with the US Postal Service and provide access for mail delivery to all properties during construction. Contractor shall provide temporary mailboxes in a location that provides access for mail delivery for mailboxes moved to accommodate construction.

3. Coordinate with the School District, school bus service provider to minimize disruption of these services and plan alternate routes. Contractor shall notify two weeks prior to start of construction.

4. Emergency services (police, fire, & paramedic) access shall be provided at all times during construction. Coordinate with these agencies as needed to keep team informed as to status of project, access, and special concerns.

C. Coordinate with the Water Department (208) 777-9857 for developing public notices and door hangers. Any public notifications will be approved by the Owner prior to distribution.

1. The Owner will provide a mailing notice to affected water users two weeks prior to start of Contractor's work.

2. Contractor shall be responsible to produce and distribute City-approved door hangers 48 hours in advance of the work. Contractor will also be responsible for any coordination or communication with the local residences if a shut-down is needed.

D. Coordinate with all utility (T-Mobile) at the elevated reservoir site for removal and replacement of equipment at utility's cost.

1. Contractor to provide a schedule with pertinent construction activities at the elevated reservoir site to the utility, within 21 calendar days of notice of award.

a. Provide schedule updates to the utility as needed.

Contact: Kimberly Spongberg
kimberly.Spongberg@caawireless.com
913-940-0780

1.13 INSPECTION COORDINATION

A. The Contractor shall notify the appropriate agency when materials are on site or inspection of the work is required. Work subject to approval by any governmental agency must be approved prior to backfilling trenches for pipe, placing of aggregate base, and/or placing of concrete/asphalt.

B. The Contractor shall coordinate with the Owner's representative so that an authorized representative may be present to observe all meaningful activities. These activities include, but are not limited to:

1. potholing at locations where water main will be connecting to the existing system

2. installation of fittings, valves, and thrust restraints (prior to backfill)

3. pressure tests of water piping

4. installation of structures (air release vaults and cleanouts)

5. water sample collection for bacteria testing

6. asphalt paving, concrete pours

7. opening of valves.

C. Observation, approval, and final acceptance of all water construction shall be by the Owner's authorized representative. Such observation shall not relieve the Contractor from the responsibility of performing the work in an acceptable manner in accordance with the approved construction plans and specifications.

D. The Contractor shall provide copies of all tests required by the contract. Test results shall be furnished with a certification letter.

1.14 WATER DISRUPTION & TEMPORARY WATER

A. Water mains shall not be depressurized for any length of time without providing temporary water services to affected residences. Bottled water is an acceptable means of temporary water service for depressurization events for connecting new waterlines to the existing system that have **very** short durations and affect **Less than 10** services **and less than 2 hours**. Coordinate with the City and affected customers at least 48 hours in advance the depressurization event.

B. **Customer Notification.** The Contractor shall notify each customer of potential water disruption 48 hours in advance of the water disruption, the morning of the shutdown, and 30 minutes before the disruption. The Contractor shall inform the customer of the estimated length of the disruption. The Contractor shall also use door hangers to alert the customer of the scheduled water service disruption.

Where temporary water service is not provided, notification shall also include instructions to consume only bottled water during the shutdown and only bottled water or boiled tap water until notified the tap water is safe to drink.

1.15 TRAFFIC CONTROL

A. Construction traffic control shall adhere to the requirements of ISPWC Section 1103. The Contractor shall provide a traffic control plan and obtain a permit to work within right-of-way from the City. No work shall commence until a permit is issued and all approved traffic control is in place. The proposed traffic control plans are for bidding purposes and the contractor will ultimately be responsible for developing an acceptable plan.

1.16 VEHICULAR AND PEDESTRIAN ACCESS

A. Vehicular access shall be maintained to each residence/business during the execution of the work, except when work is immediately adjacent to a driveway of a residence. When driveway access will be restricted, notify the resident/business 48 hours in advance and arrange for an alternate parking location with the owner (on- or off-street) within 75 feet of the property. Access restrictions shall be limited to work hours only, except during placement of concrete curb, gutter, sidewalk, and driveways.

B. Pedestrian access shall be maintained to and through the project work area, and to each residence.

C. The Contractor shall only open up the amount of trench that can be backfilled and compacted by the end of the work day. At the end of the work day, the trench shall be drivable by motor vehicles, except for the last 10 feet of the trench where installation of pipe is occurring. Equipment shall be placed to block the trench. The trench shall be secured in accordance with OSHA standards.

1.17 PERMITS AND FEES

A. The Contractor shall obtain, adhere to, and bear the fees of all permits associated with the construction of the Project.

1. Stormwater Management Plan – Contractor shall be responsible for all stormwater runoff and management within the project area.

1.18 SALVAGING MATERIALS

A. The Owner reserves the right to salvage any material that is removed from utilities in the Right-of-Way. Once removed and excavated, the Owner will inspect the existing components and remove from the project the existing components that are to remain property of the Owner. All items not removed from the project by the Owner will become the property of the Contractor, and shall be disposed of in accordance with local, state, and federal laws. Contractor shall contact the Resident Project Representative to schedule the inspection of components.

1.19 LANDSCAPE AND SPRINKLER IRRIGATION

A. The Contractor shall repair, to equal or better condition, any landscaping and irrigation damaged or disturbed during construction.

B. The Contractor shall digitally photograph the landscaping prior to beginning work at locations where it is anticipated that landscaping may be affected by construction. The Contractor shall also digitally photograph the repaired landscaping at the completion of the Work. The digital photographs of the pre- and post-landscaping shall be supplied to the Owner. The files shall be named with the street name and house number.

C. During the irrigation season, landscape sprinkler irrigation shall be maintained throughout the excavation area. Landscape irrigation to undisturbed landscaped areas shall not be disrupted for more than 1 day, unless otherwise agreed to in writing by the property owner.

D. The Contractor shall be responsible to pay for and replace to equal or better condition any landscaping that dies due to Contractor's Work.

E. The Contractor shall backfill landscaped areas within public right of way to within a 1 inch of the existing grade. The remainder of the backfill shall be topsoil to support sod and other vegetation (dry land mix equivalent to the City's drainage standards). Irrigation sprinkler work shall be incidental to miscellaneous surface repair for the project.

1.20 DRIVEWAY CROSSINGS

A. Contractor shall provide access to residences houses at all times of construction. Advance notification of trench work/access disruption in front of residences shall occur 24 hours in advance of the work via communication or door hangers. This work is considered incidental to the project.

1.21 FLUSHING OF WATER MAINS

A. Chlorinated water will be disposed of by flushing water to a location approved by the Owner. Heavily chlorinated water (above normal system residuals) shall be flushed through an IDEQ-approved dechlorinator.

B. Contractor shall record the approximate time, duration, and flow rates for all flushing activities and report this to the Owner's representative.

1.22 GROUNDWATER CONDITIONS AND DEWATERING

A. Groundwater is not expected in the project area. Water discharged from dewatering operations must meet IDEQ requirements. The Contractor must obtain a Short-Term Activity Exemption before beginning any dewatering activity. To expedite the process, the following procedure shall be followed:

1. Contractor shall provide information on proposed method of sediment control, duration of work, etc. for Short Term Activity Exemption application.

2. IDEQ will review and approve each activity exemption by FAX or e-mail to the Contractor. After installation of sediment control measures, Contractor may start dewatering operations upon notification of Short Term Activity Exemption approval by DEQ and once the notice has been sent to the Owner.

B. Groundwater containing turbidity or sediment shall be discharged into a sediment pond, through a filter fabric, straw bales, or other suitable means of removing sediment.

C. Groundwater dewatering will be considered incidental to the installation of other items; no separate payment will be made for dewatering.

1.23 CULTURAL RESOURCES

A. The term “cultural resources” herein applies to any potential historical architectural, archeological, or cultural resources discovered on site.

B. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 relating to the preservation of cultural resources and fair compensation to the Contractor for delays resulting from such cultural resources investigations.

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The Owner will issue a Stop Work Order directing the Contractor to cease all construction operations at the location of such potential cultural resources find.

2. Such Stop Work Order shall be effective until such time as a qualified archeologist can be called to assess the value of these potential cultural resources and make recommendations to the State Historical and Preservation Office (SHPO). Any Stop Work Order shall contain the following:

a. A clear description of the work to be suspended;

b. Any instructions regarding issuance of further orders by the Contractor for material services;

c. Guidance as the action to be taken on subcontracts;

d. Any suggestions to the Contractor as to minimization of his costs;

e. Estimated duration of the temporary suspension.

3. If the archeologist determines that the potential find is a bona fide cultural resource, at the direction of the SHPO, the Owner shall extend the duration of the Stop Work Order in writing, and the Contractor shall suspend work at the location of the find.

D. Equitable adjustment of the construction contract time shall be made in the following manner: If the work temporarily suspended is on the "critical path", the total number of days for which the suspension is in effect shall be added to the number of allowable contract days.

1.24 ENVIRONMENTAL PROTECTION

A. Contractor shall comply with all applicable environmental protection regulations. The Contractor shall be liable for delays to the work and costs incurred by the Owner for the Contractor's failure to comply.

1.25 PIPELINE FILLING AND TESTING:

A. Potable Water

1. Contractor is responsible for filling pipelines with potable water for pressure and bacteria testing. Contractor is responsible to pay for City water, furnishing and installing any chemicals, fittings, taps, saddles, or valves necessary for testing. No additional payment will be made.

1.26 GENERAL CONTRACTOR NOTES

A. Contractor shall use commercial sources for uncrushed aggregate, crushed aggregate, and concrete aggregates compliant with City standards and ISPWC.

B. Compaction requirements shall be in accordance with the with the plan details and City standard details. If compaction requirements are not called out compaction shall be required per Section 202.3.9 (Classes of Compaction and Density Requirements) of the ISPWC Specifications unless otherwise modified in the special provisions. All compaction work, including watering and drying shall be considered incidental to the project work and no additional payment shall be made.

C. All testing of asphalt pavement, soil and compaction to assure the requirements of the contract documents are satisfied shall be provided by the Contractor at the Contractor's expense in accordance with the appropriate standards. Any inspection or testing by the Owner does not relieve the Contractor of responsibility for the quality and work conformance with original Contract requirements. The Contractor shall provide and pay for the services of a materials testing laboratory to perform the following testing on the following page:

D.

Test Required	Frequency of Testing
Pipe Bedding Aggregate Suitability	One for each Aggregate Source
Trench Backfill Material Suitability	One for each Aggregate Source
¾" Crushed Base Aggregate Suitability	One for each Aggregate Source
Imported Trench Backfill Suitability	One for each Aggregate Source
Trench Backfill Lower Zone Compaction	One test per 300 linear feet of Trench for each 18-inch lift of backfill placed
Trench Backfill Upper Zone Compaction	One test per 300 linear feet of Trench for each 12-inch lift of backfill placed
Subgrade Road Compaction	One test per 750 – 1,000 square feet
Asphalt Pavement Compaction	One test per 750 – 1,000 square feet
Curb and Gutter	One test per 75 – 100 linear feet

E. The Contractor may coordinate staging needs with the City of Athol. Contractor will be responsible for securing additional staging area if needed. The staging area shall provide secure storage of all materials for the project.

F. The Contractor shall restore all areas disturbed by the Contractor during the project, including all staging areas, to pre-construction conditions.

G. The Contractor shall provide competent on-site supervision during any and all construction activities by their forces or Subcontractors. If for any reason the superintendent needs to be replaced by the general Contractor, a written notice must be submitted to the Owner within five (5) working days before the event occurs.

1.27 MODIFICATIONS AND SUPPLEMENTS TO ISPWC

A. Supplement the 2017 ISPWC with the technical specifications indicated in the Table of Contents

1.28 MODIFICATIONS TO THE ISPWC

A. DELETE ISPWC – Division 100 General Conditions in its entirety. (RE: 00 72 13 – General Conditions)

B. Supplement or revise the 2017 ISPWC in accordance with the following:

Section 201 – Clearing and Grubbing

REPLACE Paragraph 3.1.B.1 with the following:

1. Clearing and grubbing shall extend to no more than 3 feet outside of the construction limits. The clearing and grubbing operation shall be conducted in a manner which will not damage any vegetation outside of the clearing and grubbing limits. All brush, roots, and other debris within the grubbing limits shall be removed to a depth of 8-inches. Completely remove stumps and other debris protruding through the subgrade surface. The Contractor shall chop all brush and debris resulting from the Clearing and Grubbing operation and haul to a disposal site located by the Contractor off-site. Burning of debris on-site will not be allowed.

REPLACE Paragraph 3.1.B.7 with the following:

7. Areas within the limits of the project shall be stripped to remove topsoil containing organic material before construction begins over such areas. The topsoil shall not be used in construction of onsite fills or trench backfills. The topsoil shall be hauled to a disposal site located by the Contractor off-site. Dispose of materials at locations that comply with all Federal, State, and Local regulations.

Section 202 – Excavation and Embankment

ADD Paragraph 3.9.D as follows:

D. Material & Compaction Testing: All soils testing of samples submitted by the Contractor will be done by an independent testing laboratory mutually agreed upon by the Contractor and Owner and at the Contractor's expense. If tests indicate work does not meet specific compaction requirements, remove work, replace, and retest at the Contractor's expense.

1. Qualifications of testing company

a. 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.

b. 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.

2. Frequency of Compaction Tests

a. Curbs and sidewalks: In horizontal plane, test at start with subsequent tests a maximum of every 250 feet. At landscape islands test each island at one location. At every horizontal location, obtain one test at subgrade. Perform subsequent tests every 12 inches of compacted depth and at top of backfill or when materials or procedures change. Perform a minimum of two (2) tests at finished grade.

b. Parking and vehicle areas, roadways: In horizontal plane, test each backfill area with subsequent test for every 2,500 square feet of backfill surface area. At every horizontal location, obtain one test at subgrade. Perform subsequent tests every 12 inches of compacted depth and at top of backfill or when materials or procedures change.

c. Concrete slabs for lift station and equalization basin: In horizontal plane, test each backfill area with subsequent test for every 1,000 square feet of backfill surface area. At every horizontal location, obtain one test at subgrade. Perform subsequent tests every 12 inches of compacted depth and at top of backfill or when materials or procedures change.

d. Linear foundations and footings: In horizontal plane, test at start with subsequent tests a maximum of every 100 feet, and where elevation changes between adjacent footings. At every horizontal location, obtain one test at subgrade. Perform subsequent tests every 12 inches of compacted depth and at top of backfill or when materials or procedures change. Perform a minimum of two (2) tests at finished grade.

e. Along exterior basement walls and retaining walls: In horizontal plane, test each backfill area with subsequent test for every 100 lineal feet of wall, a minimum of two test per exterior wall side. At every horizontal location, obtain one test at subgrade. Perform subsequent tests every 12 inches of compacted depth and at top of backfill or when materials or procedures change.

ADD Paragraphs 3.13 and 3.14 as follows:

3.13 DISPOSAL OF WASTE SOIL

A. Contractor shall dispose of waste material at an off-site location determined by the contractor.

3.14 TOLERANCES

A. Finished grade of graded areas shall meet the following requirements:

1. In paved areas including roadways, sidewalks, parking lots, etc., plus or minus 0.10 feet from the grade shown on the plans.

2. Building pads, plus or minus 0.05 feet from the grade shown on the plans.

3. In landscaped areas or similar areas, plus or minus two (2) inches.

4. Differential grades between walking surfaces shall not exceed 1/4-inch.

5. Landscape finish grade adjacent to concrete walks shall be minus 1-inch from walking surface elevation.

Section 306 – Trench Backfill

ADD Paragraph 2.5 as follows:

2.5 IDENTIFICATION TAPE AND LOCATING WIRE

C. Locating wire shall be No. 12 AWG insulated cooper locating wire with 1/64" PVC insulation.

D. Identification tape shall be 3-inches wide, 4 mil polyethylene vinyl. Tape text and color shall meet the following requirements

Pipe Contents	Text	Color
Potable Water	"CAUTION – WATER LINE BURIED BELOW"	Blue
Pressure Sewer	"CAUTION – SEWER LINE BURIED BELOW"	Green
Reclaimed Water	"CAUTION – RECLAIMED WATER LINE BURIED BELOW"	Purple
Pressure Irrigation	"CAUTION – IRRIGATION LINE BURIED BELOW"	Purple
Gas	"CAUTION – GAS LINE BURIED BELOW"	Yellow
Telephone	"CAUTION – PIPE LINE BURIED BELOW"	Yellow
Cable TV	"CAUTION – PIPE LINE BURIED BELOW"	Yellow
Electric	"CAUTION – ELECTRICAL LINE BURIED BELOW"	Red

ADD Paragraphs 3.7 and 3.8 as follows:

3.7 IDENTIFICATION TAPE AND LOCATING WIRE PLACEMENT

E. Unless indicated otherwise, attach locating wire to the crown of all buried pipelines using electrical tape, except gravity irrigation, sanitary sewer, or storm sewer mains having visible manholes or clean-out structures at all angle points. Provide 12” of slack wire above ground at each location of valve or wire box.

F. Unless indicated otherwise, identification tape shall be placed above all buried pipelines, 18” - 24” above the crown of the pipe, except gravity irrigation, sanitary sewer, or storm sewer mains having visible manholes or clean-out structures at all angle points.

G. Unless indicated otherwise, identification tape shall be placed above all buried pipelines that are installed with locating wire. Identification tape shall be placed 18” - 24” above the crown of the pipe.

3.8 QUALITY CONTROL

H. Material & Compaction Testing: All soils testing of samples submitted by the Contractor will be done by a testing laboratory mutually agreed upon by the Contractor and Owner and at the Contractor’s expense. If tests indicate work does not meet specific compaction requirements, remove work, replace, and retest at the Contractor’s expense.

1. Qualifications of testing company

a. 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.

b. 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.

2. Frequency of Compaction Tests

a. Test section shall be a test at 2-feet above top of pipe and every 1-foot lift thereafter and at the top of the trench backfill.

b. Two (2) test sections, at different locations for every trench less than 300 feet in length, but not less than once per day.

c. One (1) test section per every 300 feet of additional trench and at locations where materials or construction procedures change, but not less than once per day.

Section 307 – Street Cuts and Surface Repairs

DELETE Paragraphs 3.8.C, D, E and replace with the following:

C. Use Compacted base course depths as specified on the plans. When depths are not specified, use those shown on the Standard Drawing 303. Base material shall consist of Type 1 Aggregate in accordance with Section 802 – Crushed aggregate.

D. Compact base course to 95% of maximum density as determined by ASTM 1557.

E. Use asphalt concrete depths as specified on the plans. When depths are not specified, use those shown on Standard Drawing 303. Asphalt concrete shall conform to the requirements of Section 810 – Plant Mix Pavement.

DELETE Paragraph 4.1.A and replace the following: Miscellaneous Surface Repair Measurement units from LF to SY:

A. Miscellaneous Surface Restoration: By the square yard measured within the construction limits. Includes work required to restore area to original conditions or better.

1. Bid Schedule Payment Reference: 307.4.1.A.1

2. Bid Schedule Description: Miscellaneous Surface Restoration (Landscaping)…square yard (SY)

3. Bid Schedule Payment Reference: 307.4.1.A.7

4. Bid Schedule Description: Miscellaneous Surface Restoration (Natural Ground)…square yard (SY)

Section 401 – Water Pipe Fittings

ADD the following after Paragraph 1.3.BB:

CC. NSF/ANSI 372: Drinking Water System Components – Lead Content

REPLACE Paragraph 2.6.A with the following:

A. Couplings and Coupling Adapters: As manufactured by Romac Industries Inc., for the type and size of connection or approved substitution.

REPLACE paragraph 2.12.A with the following:

A. Applicable NSF Compliance: All products used to construct a public drinking water system and will be in contact with potable water must be certified by an accredited ANSI certification body to meet applicable ANSI/NSF standards (NSF/ANSI 61, Annex G or NSF/ANSI 61 and NSF/ ANSI 372). Affidavits of compliance may be required.

REPLACE Paragraph 3.4.F with the following:

F. For test pressures greater than 150 psi or soil bearing pressures less than 1,500 psi, increase thrust block bearing areas as directed by the Engineer.

REPLACE Paragraph 3.9.B.3.a.5 with the following:

5) Placement When Using Tablets: During construction, place 5g calcium hypochlorite tablets in each section of pipe and also place one tablet in each hydrant, hydrant branch and other appurtenance. Attach tablets so the inside of the pipe using an adhesive such as Permatex Clear RTV Silicone Adhesive Sealant or approved substitution. Adhesive must be NSF approved. Assure no adhesive is on the tablet except on the broad side attached to the surface of the pipe. Attach the tablets at the inside tip of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, mark their position on the section so it can be readily determined that the pipe is installed with the tablets at the top.

Section 404 – Water Service Lines and Meters

ADD the following after Paragraph 1.3.H:

I. NSF/ANSI 372: Drinking Water System Components – Lead Content

DELETE Paragraph 2.1.B.

REPLACE Paragraph 2.5.A with the following:

A. Applicable NSF Compliance: All products used to construct a public drinking water system and will be in contact with potable water must be certified by an accredited ANSI certification body to meet applicable ANSI/NSF standards (NSF/ANSI 61, Annex G or NSF/ANSI 61 and NSF/ANSI 372). Affidavits of compliance may be required.

Section 703 – Cast-in-Place Concrete

REPLACE Paragraph 1.1.A with the following:

A. Cast-in-place concrete for exterior concrete work including sidewalks, curbs and gutters, and driveway approaches. All other concrete work shall refer to Division 03 of the project Specifications.

REPLACE Paragraph 2.4.C with the following:

C. Use the following classes of concrete per the following Table:

Construction Type	Minimum Compressive Strength	Minimum Cement Content	Maximum Water / Cement Ratio	Air Entrainment Percentage	Maximum Slump
Curbs, Gutters	4,000 psi	560 LB/CY	0.44	6.5 ±1.5	2.5 ±1
Concrete Pavement	4,000 psi	560 LB/CY	0.44	6.5 ±1.5	4 ±1
Walking Surfaces – Sidewalks, Driveways	4,500 psi	564 LB/CY	0.44	6.5 ±1.5	4 ±1
Walking Surfaces with Reinforcement – Driveways	5,000 psi	611 LB/CY	0.40	6.5 ±1.5	4 ±1

REPLACE Paragraph 3.4.A, with the following:

Provide formed concrete surfaces to be left exposed with Sacked Finish, if not otherwise specified.

ADD the following after Paragraph 3.4.C:

D. Point & Patch: Patch defects, chip or rub off fins exceeding one-quarter inch (1/4') in height. Patch tie holes and defects and remove fins completely. When surface texture is impaired and form joints misaligned by more than one-eighth inch, grind and bushhammer. Slurry grout areas evidencing minor mortar leakage to match adjacent concrete.

E. Sacked Finish: Sacked finished to be applied unless specifically stated otherwise on the drawings. Remove forms and perform necessary patching as soon after placement as possible. Finish newly hardened concrete no later than the day following form removal. Wet surfaces and rub with carborundum brick or other abrasive until uniform color and texture are produced. No cement grout to be used other than paste drawn from concrete rubbing process.

Section 705 – Portland Cement Concrete Pavements

REPLACE Paragraph 2.5.A with the following

A. Sealer: Use Conspec Silane 40 or approved equal.

Section 706 – Other Concrete Construction

REPLACE Paragraph 2.4.A with the following:

A. All concrete sidewalk, vehicle ramps, and curb and gutter shall conform to Section 703, as modified in accordance with these special provisions.

ADD Paragraph 2.7, as follows:

2.7 PEDESTRIAN RAMPS

A. Detectable warning Surfaces shall be yellow in color.

REPLACE Paragraphs 706.3.8.A and 706.3.8.D with the following:

A. Driveways, Vehicle Approaches, and Sidewalk: Concrete flatwork shall not be troweled. Use screed, float, and broom. Light broom.

D. Inclined Vehicular Ramps: Concrete flatwork shall not be troweled. Use screed, float, and broom. Broomed perpendicular to slope.

Section 801 – Uncrushed Aggregates

ADD Paragraphs 2.2.I through 2.2.M as follows:

I. Uncrushed aggregate under roadways, sidewalks, and pathways shall be Aggregate Subbase (Pit Run) as defined below.

J. Aggregate Subbase (Pit Run): Uncrushed rock aggregate subbase material that can be compacted readily by watering and rolling to form a firm stable subbase. The material shall meet the following requirements:

Sieve Size	Percent Passing By Weight
4”	100
3”	90-100
No. 4	30-75
No. 200	0 – 15.0

a. The sand equivalent value shall be not less than 30, sand equivalent not required if less than 5% passing the No. 200 sieve.

b. The material shall have a Los Angeles Abrasion of 40% or less.

K. Imported Trench Backfill (8" Pit Run): Uncrushed rock aggregate material that can be compacted readily by watering and rolling to form a firm stable trench. The sand equivalent value shall be not less than 25, sand equivalent not required if less than 5% passing the No. 200 sieve, and the material shall meet the following requirements:

Sieve Size	Percent Passing By Weight
8"	100
No. 4	15 - 60
No. 200	0 - 12

L. Rip Rap: Riprap material shall be hard, durable, angular in shape and free from overburden and organic material. The breadth or thickness of any stone shall not be less than one-third of its length. The minimum unit weight of the stone shall be 165 pounds per cubic foot. Riprap material shall have less than 10 percent loss after five cycles in the sulfate soundness tests and shall conform to the following gradation:

Weight of Stones	Percent of Total Weight Less than the Stone Weight
200 lbs	100
130 lbs	80
90 lbs	50
25 lbs	10 max.

M. Landscape Rock: Provide samples and color selection submittal to the Owner for selection. Material shall be at least 1-1/2" minus rock conforming to the following gradation:

Sieve Size	Percent Passing by Weight
1-1/2"	100
1"	25 - 60
3/8"	0 - 4
No. 200	0 - 2

Section 802 – Crushed Aggregates

ADD Paragraph 2.2.H as follows:

H. Crushed aggregate under roadways, sidewalks, and pathways shall be Type 1, ¾ inch minus crushed aggregate. This aggregate may also be referred to as Aggregate Base or ¾" Road Mix.

ADD Section 2.6 as follows:

2.6 ADDITIONAL SUITABLE MATERIALS

A. Crushed Stone Backfill (Bedding Chips): Manufactured angular, crushed stone, crushed rock, or crushed slag with the following gradation requirements:

Sieve Size	Percent Passing By Weight
1"	100
3/4"	80 - 100
3/8"	20 - 70
No. 4	5 - 20
No. 200	0 - 3

B. Coarse Gravel (Drain Rock): Crushed rock or gravel which is free of shale, clay, friable materials, and or debris that conforms to the gradation below. Drain Rock shall have a minimum of 35% Air Voids as determined by ASTM C 29 Standard Test Method for Unit Weight and Voids in aggregate, Jigging Procedure.

Sieve Size	Percent Passing By Weight
3"	100
1"	25 - 60
3/8"	0 - 4
200	0 - 2

C. Gravel Surfacing: Meet the following requirements for gravel surfacing, including added binder or blending material:

Sieve Size	Percent Passing By Weight
3/4"	100
No. 4	40-80

Sieve Size	Percent Passing By Weight
No. 10	25-60
No. 200	8-20

d. Dust Ratio: the portion passing the No. 200 (0.075 mm) sieve cannot exceed two-thirds of the portion passing the No. 40 (0.425 mm) sieve.

e. For material passing the No. 40 (0.425 mm) sieve, the liquid limit must not exceed 35 and the plasticity index must not be below 6 or above 12.

f. A wear factor not exceeding 40% at 500 revolutions.

g. At least 35% by weight of the aggregate retained on the No. 4 (4.75 mm) sieve must have one fractured face.

D. See Section 2.2 for additional requirements for uncrushed aggregates.

Section 805 – Asphalt

REPLACE Paragraph 2.4.A with the following:

A. Anti-stripping additive shall be Kling beta 2700, ACRA 500 or equal. Anti-stripping additive shall be added to the asphalt at the refinery at a minimum rate of 0.5 percent by weight of asphalt.

Section 1001 – Construction Site Management

ADD the following items after 2.1.A

A. Contractor responsible for providing all sediment control items and maintaining throughout the project.

B. Contractor responsible for furnishing a Stormwater Pollution Prevention Plan (SWPPP) and erosion and sediment control drawings for review.

ADD the following to 4.1.A

This item shall include but not limited to all stormwater and sediment control measures needed to meet the stormwater management plan, City and State/Federal standards including witches hats, maintenance of controls, fiber waddles, mulching, creation of SWPPP and sediment control plans/drawings.

I. SPECIAL PROVISION BID ITEMS

SP 050-Connect to Existing Pressure Water Mains

This item consists of connecting newly constructed water main to the existing water mains at the locations specified on the drawings.

Materials and Construction: Per ISPWC Divisions 300 and 400.

Measurement and Payment: Measurement of this item shall be for each connection of the new water main to an existing water main. Payment for this item shall include all necessary labor, couplers, coordination with the City to isolate existing lines, and incidental materials. Payment for this item does not include the pipe, fittings and valves itself, which will be made under the appropriate bid item. Payment for this item will be made under the following pay item:

SP 050 Connect to Existing Water Main EA

SP 075-Controls Improvements

This item consists of updating the existing water system.

Materials and Construction: Per Division 26.

Measurement and Payment: Measurement of this item shall be on a lump sum basis. Payment for this item shall include all necessary labor, equipment, software coordination with the City and incidental materials. Payment for this item includes controls improvements as indicated in the project documents. Controls improvements shall be implemented at Additive Alternate sites, regardless of award of Additive Alternate. All Controls Improvements are paid for under the base bid. Payment for this item will be made under the following pay item:

SP 075 Controls Improvements LS

SP 100 –Existing Elevated Reservoir Improvements

This item consists of raising the existing elevated reservoir at the location specified on the drawings, foundation modifications, and new exterior coating. Item includes all materials, equipment and labor associated with raising the elevated reservoir, including any site civil work, demolition, connection to the City's water system, disinfection and restoration within the Site fence. Additionally, item includes the furnishing and provision of a security light, electrical conduit and power connection from the City's existing meter as shown on the Drawings.

Materials and Construction: Per Specification Sections 02 83 33.13 – Lead-Based Paint Removal, 08 31 00 – Access Doors, 09 97 12.24 – Steel Water Storage Tank Painting, Structure Raising-02 43 16 and Drawings.

Measurement and Payment: Measurement of this item shall be on a lump sum basis.

SP-100 Existing Elevated Reservoir Improvements, LS

SP 200 – New Cemetery Standpipe

This item consists of removing two existing above-ground water storage tanks and constructing a new standpipe at the location specified on the Drawings. Item includes all materials, equipment and labor associated with tank removal and standpipe installation, including any site civil work, demolition, connection to the City's water system, disinfection and restoration within the Site fence. Additionally, item includes the furnishing and provision of a security light and, electrical conduit and power connection from the City's existing meter as shown on the Drawings.

Materials and Construction: Per specification section 02 41 00 – Demolition; Division 03, 31 16 23 – Ground Level Glass-Fused-to Steel Water Tank; ISPWC Divisions 200, 300, 400, 700, 800, 2000; and Drawings.

Measurement and Payment: Measurement of this item shall be on a lump sum basis.

SP-200 New Cemetery Standpipe, LS

SP 300 – Bennett Well Improvements (Add Alternative Bid 3)

This item consists of removing and replacing all electrical equipment at the Bennett Well site as indicated on the Drawings within the fenced area, and connecting the new generator with City Hall. Bid item consists of removing and replacing generator, installing a mechanical HVAC system for the generator, and all restoration. Note that this item is NOT a part of the base bid, and does NOT include controls improvements (see SP 075).

Materials and Construction: Per Division 08, Division 26, and Drawings.

Measurement and Payment: Measurement of this item shall be on a lump sum.

SP-300 Bennett Well Improvements LS

SP 400 – Grove Well (Add Alternative Bid 4)

This bid item is lump sum for all improvements associated with the Grove Well Site, including structural, electrical, mechanical, pump replacement and related improvements. Note that this item is NOT a part of the base bid, and does NOT include controls improvements (see SP 075).

Materials and Construction: Per Specification Sections 02 41 00 - Demolition, Division 06, Division 07, Division 08, Division 09, Division 33, Division 40, and Drawings.

Measurement and Payment: Measurement of this item shall be on a lump sum basis.

SP-400 Grove Well, LS

SP 500 – Remove and Reset Fence

This item consists of removing and re-setting fence as indicated on the plans. Contractor to remove fence, protect it from damage and reinstall once earthwork and piping is completed. As a part of restoration, re-place the removed fence to its preconstruction position. Any damages to fence may result in replacement by Contractor at no cost to owner. Contractor will be required to install a temporary fence or reuse existing fence in a way that still secures the wastewater facility from the public.

Materials and Construction: Fencing, fencing foundation, concrete, fencing equipment.

Measurement and Payment: Measurement of this item shall be on a linear foot basis. Payment for this item will be made under the following pay item:

SP-500 Remove and Reset Fence LF

SP 600 – Unmarked Utility Crossings

This item consists of the additional work and labor for unmarked utility crossings not depicted on the plans.

Materials and Construction: Work to hand dig around unmarked utilities. Work needed to meet utility company requirements for crossing shall be incorporated in this price.

Measurement and Payment: Measurement of this item shall be paid on a per each basis for each unmarked utility not depicted on the plans.

SP-600 Unmarked Utility Crossing EA

SP 650 – Air Release Valve and Structure

This item consists of the additional work and labor, and materials for air release provisions as required by unanticipated field conditions.

Materials and Construction: As per ISPWC Section 402, and detail C-502/A2.

Measurement and Payment: Measurement of this item shall be paid on a per each basis. Payment will not be made for air release valves that could have been avoided with appropriate planning, by avoiding unnecessary high points.

SP-650 Air Release Valve and Structure EA

SP 700 – Monuments

This item consists of the work and labor for removing and resetting monuments that will be damaged, demolished or modified during construction of this project. The Contractor shall employ a professional land surveyor, duly and properly registered in the State of Idaho, to reference all public and private land survey monuments that will be disturbed by construction activities prior to construction. Reestablish such monuments as part of the survey work for this project before project completion. Section corner and quarter corner monuments reset after construction shall include corner perpetuations and filing with the county. Sixteenth corner monuments reset and having existing corner perpetuation filed with the county shall have new perpetuation records filed after the corner has been reset. Perform all monument work in accordance with Title 55, Chapter 16 of the Idaho State Code. Perform all corner, property, and roadway centerline reestablishment in accordance with standard surveying practices under the responsible charge of a professional land surveyor. The contactor is solely responsible for resetting the monuments correctly with a Professional Land Surveyor and in accordance with IDAPA 50-1303. This work consists of resetting monuments, cast iron frames, furnishing new monuments, frames and cover and installing to proper line and grade. Contractor to provide written verification from a licensed Surveyor for each reset monument.

Materials and Construction: Work will be in accordance with ISPWC Section 2020 Survey Monuments.

Measurement and Payment: Measurement of this item shall be paid on a per each basis.

SP-700 Monuments EA

SP 800 –1" Polyethylene (PE) Pressure Pipe for water service

This item consists of the work and labor for installing 1" PE pipe as indicated in ISPWC Section 404.2.2.A. Excavation, bedding, backfill, service pipe and fittings are included in this pay item.

SP-800 1" Polyethylene Pressure Pipe LF

SP 825 –Water Service Connection

This item consists of the work and labor for reconnecting water services to the meter and the main. Service tap and saddle, corporation stop, and any additional fittings required to reconnect existing services are included in this pay item.

SP-825 Water Service Connection EA

SP 850 –Meter Box

This item consists of the work and labor for installing the meter box and cover as indicated in ISPWC Section 404. Excavation/backfill, removal are included in this pay item.

SP-850 Meter Box EA

SP 875 –Meter Setter

This item consists of the work and labor for installing the meter setter as indicated in ISPWC Section 404.

SP-875 Meter Setter EA

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 00 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 11 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Work to be performed under this Contract shall consist of furnishing tools, equipment, materials, supplies, and manufactured articles, and furnishing all labor, transportation, and services, including fuel, power, water, and essential communications, and performing all work or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents. The Work shall be complete, and all work, materials, and services not expressly indicated or called for in the Contract Documents which may be necessary for the complete and proper construction of the Work in good faith shall be provided by the Contractor as though originally so indicated, at no increase in cost to the Owner. The Contractor shall provide all materials and equipment required for construction except for the materials and equipment provided by the Owner as described in Section 01 64 00-Owner Furnished Products

B. The Contractor is responsible to follow the provisions of these Contract Documents, including but not limited to: the following of Plans and Specifications; the timely, complete, and accurate submittal of shop drawings; the work of and correlation with his subcontractors and suppliers, timely performance of the Contract, and timely payment of suppliers and subcontractors. Nothing stated in the Contract Documents or Specifications shall be construed to relieve the Contractor of these basic responsibilities.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Overview: The Work of this Contract comprises the construction of the Water System Improvements Project for the City of Athol, Idaho specified and shown with all appurtenances.

B. Project Elements – The major project elements for the Water Systems Improvements construction project are listed below:

1. Civil Site Work

a. Earthwork excavation for new structures.

b. Dewatering as necessary of excavations to accommodate concrete placement and pipe placement.

c. Placement of all backfill including native and imported materials.

d. Yard piping including new water line, fire hydrants, drainage sewer and other utilities as shown on the drawings.

e. Overflow ponds

2. Distribution Improvements

    a. Removal of obstructions

    b. Installation of water main, to include hydrants, valves, connections, and fittings.

    c. Restoration of asphalt and miscellaneous surfaces

    d. Protection of existing utilities

3. Raise Existing Elevated Reservoir

    a. Raising existing Elevated Reservoir as indicated in Drawings.

    b. Foundation improvements.

    c. Furnish and install a security light.

4. Cemetery Standpipe

    a. Construct new standpipe as indicated in Drawings.

    b. Construct an overflow pond as shown in Drawings.

    c. Site piping and grading.

5. Grove Well

    a. All electrical work including lights, motor control center, control panels, all wiring and raceways, and conduit and wiring.

    b. Instrumentation including pump controls, flow meter, and mechanical piping.

    c. Structural Improvements on building

6. Bennet Well

    a. All electrical work including lights, motor control center, control panels, all wiring and raceways, and conduit and wiring.

    b. Remove existing generator and provide to City.

    c. Install new generator and automatic transfer switch

    d. Install mechanically operated HVAC in existing generator building

7. Additional work includes:

    a. SCADA system integration

8. The Work shall also include Additive Bid Items that are included in the Contract Award. These Additive Bid Items are described in Section 00 41 13 – Bid Form – Stipulated Price and in the Contract Documents.

1.3 CONTRACT METHOD

A. The Work hereunder will be constructed as a Unit Price project.

1.4 WORK BY OTHERS

A. The Contractor's attention is directed to the fact that work will be conducted at the site by other contractors during the performance of the Work under this Contract. The Contractor shall conduct its operations so as to cause a minimum of interference with the Work of such other contractors, and shall cooperate fully with such contractors to provide work under their respective contracts. At a minimum, the Work by the Contractor will include the following construction projects or activities at or adjacent to the project site:

1. Water System Operations and Maintenance Building.

2. On-site and off-site utility work.

B. Interference with work on Utilities: The Contractor shall cooperate fully with all utility forces of the Owner or forces of other public or private agencies engaged in the construction, relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the Work, and shall schedule the Work so as to minimize interference with said construction.

1.5 CONSTRUCTION PROGRESS SCHEDULE

A. The Work under the contract shall be scheduled and performed in such a manner as to result in the least possible disruption to the operation of the existing facilities. The Contractor shall not operate any existing valves, pumps, or motors. The Contractor shall submit to the Engineer a construction schedule covering the entire work before any work is commenced. The schedule shall be as described in Section 01 32 16 – Construction Progress Schedule, complete with estimated dates for start and finish of each item of work. The construction constraints are as described in Section 01 35 40 - Special Project Procedures. The construction sequences described therein are suggested methods to accomplish the work. The Contractor shall remain responsible for the successful completion of all work.

B. To minimize the period of disruption of facility operation, all new piping and/or facilities should be constructed and all preparations shall be made for fast connection to existing piping and facilities.

C. Submit preliminary construction progress schedules as required in the General Conditions within ten (10) days after the award of the contract. The progress schedule is to be in reproducible form and subject to the approval of the Engineer.

D. Commence work on or before a date to be specified in a written "Notice to Proceed" and complete all phases of the Work as specified in Section 00 52 13 – Agreement Form – Stipulated SumArticle 2.01.

E. The Contract time is computed on a calendar basis and is included in the agreement form. The Contractor shall take into consideration potential weather delays based on the climate and weather patterns at the project site. If Contractor requests an extension due to abnormal weather, Contractor shall provide evidence and documentation that poor weather condition occurrences during construction period exceeded typical poor weather condition occurrences at the project site. The Contractor acknowledges that construction during the winter at the project site will require cold weather construction methods.

1.6 PUBLIC WORKS CONTRACTOR'S LICENSE

A. Any Contractor, Subcontractor, or Specialty Contractor is required to have a current license as a Public Works Contractor in the State where the work is to be completed in order to submit a bid or proposal on this contract.

1.7 CODES AND STANDARDS

A. Where codes and standards are referred to, they are the current approved codes. It is the duty of the Contractor to obtain from its supplier any material on this work to submit evidence, if requested, that provided material is in compliance with the applicable codes and standards.

1.8 STATE AND LOCAL LAWS

A. Conform to all applicable State and local laws in carrying out obligations under the contract.

B. Meet the requirements and recommendations of the Manual of Accident Prevention in Construction; Associated General Contractors of America, Inc., and Occupational Safety and Health Act.

1.9 PREDETERMINED EQUIPMENT COSTS

A. The following methods of determination of construction equipment costs apply to all Change Orders and other adjustments of contract price except for Article 15, Suspension of Work and Termination, outlined in the General Conditions.

1. Allowable ownership and operating expense costs for construction equipment in sound workable conditions owned and furnished by the Contractor for work requiring adjustments in contract price shall be based on the applicable provisions of the U.S. Army Corps of Engineers North Pacific Division (NPD) "Equipment Ownership and Operating Expense Schedule." If, for any reason, the schedule referred to above is discontinued or becomes otherwise unavailable, the Owner and the Contractor shall agree upon another schedule or method of price adjustment which, in their opinion, will result in an equitable adjustment of contract price. For forwarding pricing, the issue of NPD Schedule in effect at the time of negotiations shall apply. For retrospective pricing, the issue of the NPD Schedule in effect as of the time work was performed shall apply.

2. For the purpose of determination of the hourly rates to be applied under this contract, working conditions shall be considered to be average unless otherwise determined by the Owner. Rate for equipment not in the schedule may be used for unlisted equipment of comparable horsepower and auxiliary features.

3. For rented equipment, the Owner will accept rates actually paid (substantiated by certified reproduced copies of invoices or bills), but in no event shall they exceed the rates contained in the current "Rental Rate Blue Book for Construction Equipment," published by Equipment Guide-Book Company, 3980 Fabian Way, Palo Alto, California 94303. When the "Blue Book" rates are applied, fuel, lubricants and operating expendables will be computed in accordance with NPD Schedule. Additional shifts or fractions thereof for rented equipment will be computed at 50 percent of the base rate in the "Blue Book" or invoices, as applicable. Rates for equipment under lease-purchase or sale-leaseback arrangements will be determined in accord with NPD Schedule. Rates for equipment rented from an organization under common control will be determined in accord with the NPD Schedule, and no markup will be permitted. A copy of the NPD Schedule will be provided to the successful bidder upon request.

1.10 PRODUCT SUBSTITUTIONS

A. Use equipment and materials specified by name in these Specifications or on Plans. Alternate equipment shown under Item 11in Section 00 41 13 – Bid Form – Stipulated Sum shall be listed at time of bid by the Contractor to receive consideration. Alternative equipment suppliers shall be reviewed after bid opening during the shop drawing review process as outlined in Section 01 33 00 – Submittal Procedures.

B. Request approval for substitutions by submitting written evidence and convincing the Engineer of equality of item and suitability for the service and/or construction conditions anticipated.

C. If alternative equipment or materials are approved, make required changes in structures, buildings, piping, systems, etc., necessary to accommodate alternate items without additional cost to the Owner except as specifically noted for Owner furnished materials.

1.11 PERMITS

A. The Contractor shall be responsible to obtain and pay for all construction and inspection permits required by the Idaho Transportation Department, State of Idaho, Lakes Highway District, Kootenai County, and the City of Athol, and shall include permit fees in Bid Schedule 1 for the base bid and in each line item for the additive bid items in Bid Schedule 2.

B. Building permit (includes structural) shall be obtained from the City.

C. Electrical and plumbing permits shall be obtained from the Idaho Division of Building Safety, and the State will charge a permit fee based on the cost of materials and labor for the plumbing work and the electrical work. State permits may be obtained online at dbs.idaho.gov. Contact Mr. Aaron Reynolds at (208) 685-9932 for additional information on the electrical permit requirements and fees, and Mr. Chris Critser at (208) 221-9636 for additional information on the plumbing permit requirements and fees.

1.12 WAGE RATES

A. The general prevailing rate of wages, as determined by the Secretary of Labor, is a requirement of this project.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 11 00

SECTION 01 14 13 - ACCESS TO SITE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall make its own investigation of the condition of available public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress to the site of the Work. It shall be the Contractor's responsibility to construct and maintain any haul roads required for its construction operations.

1.2 TEMPORARY CROSSINGS

A. General: Continuous, unobstructed, safe, and adequate pedestrian and vehicular access shall be provided to fire hydrants, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, and hospitals. Safe and adequate public transportation stops and pedestrian crossings at intervals not exceeding 300 feet shall be provided. The Contractor shall cooperate with parties involved in the delivery of mail and removal of trash and garbage so as to maintain existing schedules for such services. Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time.

B. Temporary Bridges: Wherever necessary, to maintain vehicular crossings, the Contractor shall provide suitable temporary bridges or steel plates over unfilled excavations, except in such cases as the Contractor shall secure the written consent of the responsible individuals or authorities to omit such temporary bridges or steel plates, which written consent shall be delivered to the Engineer prior to excavation. All such bridges or steel plates shall be maintained in service until access is provided across the backfilled excavation. Temporary bridges or steel plates for street and highway crossing shall conform to the requirements of the authority having jurisdiction in each case, and the Contractor shall adopt designs furnished by said authority for such bridges or steel plates, or shall submit designs to said authority for approval, as may be required.

C. Street Use: Nothing herein shall be construed to entitle the Contractor to the exclusive use of any public street, alleyway, or parking area during the performance of the Work hereunder, and it shall conduct its operations to not interfere unnecessarily with the authorized work of utility companies or other agencies in such streets, alleyways, or parking areas. No street shall be closed to the public without first obtaining permission of the Engineer and proper governmental authority. Where excavation is being performed in primary streets or highways, one lane in each direction shall be kept open to traffic at all times unless otherwise indicated. Toe boards shall be provided to retain excavated material if required by the Engineer or the agency having jurisdiction over the street or highway. Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times. Temporary provisions shall be made by the Contractor to assure the use of sidewalks and the proper functioning of all gutters, storm drain inlets, and other drainage facilities.

1.3 CONTRACTOR'S WORK AND STORAGE AREA

A. The Owner will designate and arrange for the Contractor's use, a portion of the property adjacent to the Work for its exclusive use during the term of the Contract as a storage and shop area for its construction operations on the Work. At completion of work, the Contractor shall return this area to its original condition, including grading and landscaping.

B. The Contractor shall make its own arrangements for any necessary off-Site storage or shop areas necessary for the proper execution of the Work.

C. The Contractor shall construct and use a separate storage area for hazardous materials used in constructing the Work as specified in Section 01 57 12 - Construction Site Discharge.

1. For the purpose of this paragraph, hazardous materials to be stored in the separate area are all products labeled with any of the following terms: Warning, Caution, Poisonous, Toxic, Flammable, Corrosive, Reactive, or Explosive. In addition, whether or not so labeled, the following materials shall be stored in the separate area: diesel fuel, gasoline, new and used motor oil, hydraulic fluid, cement, paints and paint thinners, two-part epoxy coatings, sealants, asphaltic products, glues, solvents, wood preservatives, sand blast materials, and spill absorbent.

2. Hazardous materials shall be stored in groupings according to the Material Safety Data Sheets.

3. The Contractor shall develop and submit to the Engineer a plan for storing and disposing of the materials above.

4. The Contractor shall obtain and submit to the Engineer a single EPA number for wastes generated at the Site.

5. The separate storage area shall meet all the requirements of all authorities having jurisdiction over the storage of hazardous materials.

6. The separate storage area shall be inspected by the local Fire Chief prior to construction of the area, upon completion of construction of the area, and upon cleanup and removal of the area.

7. All hazardous materials which are delivered in containers shall be stored in the original containers until use. Hazardous materials which are delivered in bulk shall be stored in containers which meet the requirements of authorities having jurisdiction.

1.4 PARKING

A. The Contractor shall:

1. Provide temporary parking areas for its employees and construction equipment.

2. The Contractor shall direct its employees to park in areas indicated.

3. Traffic and parking areas shall be maintained in a sound condition, free of excavated material, construction equipment, mud, and construction materials. The Contractor shall repair breaks, potholes, low areas which collect standing water, and other deficiencies.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 14 13

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 21 00 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Measurement and payment will be made as specified in this Section and in accordance with the provisions of Article 15 of the General Conditions.

1.2 SCHEDULE OF VALUES

A. The Contractor shall prepare and submit a detailed Schedule of Values to the Engineer within 30 days from the date of Notice to Proceed. The detailed Schedule of Values shall be based on the values listed in the Bid Schedule. Because the ultimate requirement is to develop a detailed Schedule of Values, sufficient detailed breakdown shall be provided to meet this requirement. The Engineer shall be the sole judge of acceptable numbers, details and description of values established. If, in the opinion of the Engineer, a greater number of Schedule of Values items than proposed by the Contractor are necessary, the Contractor shall add the additional items so identified by the Engineer.

B. The minimum detail of breakdown of the major work components is indicated.

1. Mobilization and demobilization 2% of contract price - no breakdown required.

2. Bonds and insurance.

3. Construction schedule.

4. Civil site work shall be broken down into individual piping, drainage structures, site concrete, paving, excavation cut and fill, removal of existing pipe, clearing and grubbing, demolition, and any other items determined to be necessary for the establishment of pay items.

5. Concrete structures shall be broken down into slabs on grade, walls/columns, suspended slabs, etc. and backfill.

6. Buildings shall be broken down into walls, roofs, decks, insulation, doors/windows/louvers and any other items determined to be necessary for establishment of pay items.

7. Mechanical work shall be broken down to identify individual piping systems, equipment installation by equipment name and number, and equipment testing and checkout.

8. The electrical work shall be broken down yard facilities and structures. Yard facilities shall be broken down by duct bank designation and substations. Structures electrical work shall be broken down into conduit and raceway installation, cable and wire installation, electrical equipment installation, terminations and lighting.

9. Instrumentation and Control Work.

10. All other work not specifically included in the above items shall be broken down as necessary for establishment of pay items.

C. The Contractor and Engineer shall meet and jointly review the detailed Schedule of Values within 35 days from the date of Notice to Proceed. The value allocations and extent of detail shall be reviewed to determine any necessary adjustments to the values and to determine if sufficient detail has been proposed. Any adjustments deemed necessary to the value allocation or level of detail shall be made by the Contractor and a revised detailed Schedule of Values shall be submitted within 40 days from the date of Notice to Proceed.

1.3 CHANGES TO SCHEDULE OF VALUES

A. Changes to the schedule of values shall be made to reflect Owner approved change orders.

B. In the event that the Contractor and Engineer agree to make adjustments to the original Schedule of Values because of inequities discovered in the original accepted detailed Schedule of Values, increases and equal decreases to values.

1.4 TECHNICAL MANUAL SUBMITTAL

A. Up to two percent of the Contract Price will be retained from any monies due the Contactor, if at the 75 percent construction completion point, all technical manuals have not been submitted as required by Section 01 78 23 – Operation and Maintenance Data.

1.5 CONTINGENCY ALLOWANCE

A. This is a contingency item to be paid on a time and materials charge account basis to reimburse the Contractor for work not identified or implied in the contract documents. This bid item is intended to address unanticipated items such as unspecified exploratory excavations, unmarked utilities, unforeseeable subsurface conditions, and conditions that are clearly different than those indicated in the contract documents.

B. The Engineer will provide a Work Change Directive document on the terms for completing the additional work. Within five days after the request from the Engineer, the Contractor shall submit to the Engineer a complete price breakdown of labor, equipment, and materials to complete the additional requested work not included in the contract documents.

C. All work is at the directive of the Engineer. Any work completed without the written authorization of the City of Athol and the Engineer will be denied payment.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 21 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 25 13 – PRODUCT SUBSTITUTIONS PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This document describes the requirements for submission of product information and procedures for consideration of substitutions by the Owner, including products proposed to be used by Contractor under "or equal" or "acceptable alternate" provisions.

B. Where equipment, materials or process have been specifically named, it is the intention of the Engineer to use these items. If a Contractor desires to have an alternate considered, they are to provide the following information. It will be the responsibility of the Contractor to convince the Engineer that the alternate materials are equal and will perform the intended function at or above that of the specified equipment. The burden of proof is on the Contractor to convince the Engineer that the product is equal for the purpose of a particular function.

C. Substitution or Alternative Product Options: The alternative materials shall be submitted to the Engineer no less than 10 business days before the bid opening. The Engineer shall evaluate the materials, and if the Engineer approves the substitution, an addendum shall be issued allowing the equipment alternatives.

1.2 DEFINITIONS

A. The word “Products,” as used herein, is defined to include purchased items form incorporation into the Work, regardless of whether specifically purchased for the project or taken from Contractor’s stock of previously purchased products. The word “Materials,” is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. The word “Equipment” is defined as products with operation parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, and other like items). Definitions in this paragraph are not intended to negate the meaning of other terms used in the Contract Documents, including “specialties”, “system”, “structure”, “finishes”, “accessories”, “furnishings”, “special construction”, and similar items, which are self-explanatory and have recognized meanings in the construction industry.

B. Neither “Products” nor “Materials” nor “Equipment” includes machinery and equipment used for preparation, fabrication, conveying and erection of the Goods.

1.3 CONTRACTOR’S OPTIONS

A. For products specified only by reference standards, select any product meeting standards, by any manufacturer.

B. For products specified by naming several products or manufacturers, select any product and manufacturer named.

C. For products specified by naming one or more products, but indicating the option of selecting equivalent products by stating "or equal" or "acceptable alternate" after specified product, Contractor must submit request, as required for substitution, for any product not specifically named.

1. "Or-Equal" Items: if in the Engineer's sole judgment 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 the Engineer as an "or-equal" item, in which case review and approval of the proposed item may in the Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purpose of the paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. It is at least equal in quality, durability, appearance, strength and design characteristics.

b. It will reliably perform at least equally well the function imposed by the design concept of the complete project as a functioning whole;

c. The equipment is compatible and consistent with make and model of the Owner's existing equipment.

d. There is no increase in cost to the Owner for the equipment and for construction modifications to accommodate alternate equipment, and

e. It will conform to the detailed requirements of the item named in the Contract Documents.

D. For products specified by name, brand, model, etc., the Contractor shall provide equipment/material as specified with no substitution. Contractor shall still provide submittal information in accordance with Section 01 33 00 – Submittal Procedures for the Engineer to review and determine under their sole discretion that the product is acceptable.

1.4 SUBSTITUTIONS

A. If in the Engineer's sole judgment an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, it will be considered a proposed substitute item and subject to the review process.

B. If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall first make written application to the Engineer for review of a proposed substitute item of material or equipment. The application shall certify that the proposed substitute will perform adequately the function and achieve the results called for by the general design, be similar in substance to the specified and be suited to the same use that is specified.

C. The procedure for review by the Engineer will include the following:

1. If the Contractor wishes to provide a substitution item, the Contractor shall make written application to the Engineer.

2. Unless otherwise provided by law or authorized in writing by the Engineer, the request shall be submitted within a 15-day period prior to submission of Bid.

3. Wherever a proposed substitution item has not been submitted within said 15-day period, or wherever the submission of a proposed substitution material or equipment has been judged to be unacceptable by the Engineer, the Contractor shall provide the material or equipment indicated in the Contract Documents.

4. The Engineer will evaluate proposed substitution within a reasonable period of time.

5. As applicable, no shop drawing submittals shall be made for a substitution item nor shall any substitution item be ordered, installed, or utilized without the Engineer's prior written acceptance of the Contractor's request.

6. The Engineer will record the time required by the Engineer in evaluating substitutions proposed by the Contractor and in making changes by the Contractor in Contract Documents occasioned thereby.

D. Contractor shall submit sufficient information as provided below to allow the Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and therefore an acceptable substitute therefore. Requests for review of proposed substitute items of materials or equipment will not be accepted by the Engineer from anyone other than the Contractor. Include the following minimum information in the application:

1. The Contractor shall certify that the proposed substitution will perform adequately the functions and achieve the results called for by the general design, and be similar and of equal substance to that indicated, and be suited to the same use as the specified.

2. For products:

   a. Product identification, including manufacturer's name and address.

   b. Manufacturer's literature:

      (1) Product description

      (2) Performance and test data

      (3) Reference standards

3. Samples.

4. Name and address of similar projects on which product was used and date of installation.

5. All variations of the proposed substitute item for the specified shall be identified in the application and available engineering, sales, maintenance, repair and replacement service shall be indicated.

6. The application shall state the extent, if any, to which the use of the proposed substitute will prejudice Contractor's achievement of delivery on time, whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provision of any other direct contract with the Owner for the Work on the project) to adapt the design to the proposed substitute item and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.

7. Relation to separate contracts.

8. The application shall also 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 sellers affected by any resulting change, all of which will be considered by the Engineer in evaluating the proposed substitute item.

E. In making request for substitution, Contractor shall:

1. Investigate proposed product or method and determine that it is equal or superior in all respects to that specified.

2. Provide the same guarantee for substitution as for product or method specified.

3. Coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects.

4. Waive all claims for additional costs related to substitution which consequently become apparent.

5. Ensure cost data is complete and includes all related costs under this contract, but excludes:

a. Costs under separate contracts

b. Engineer's redesign

F. Substitutions will not be considered if:

1. They are indicated or implied on shop drawings or project data submittals without formal request submitted in accord with Paragraph 1.05.

2. Acceptance will require substantial revision of work.

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

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 25 13

SECTION 01 31 19 - PROJECT MEETINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall attend all Project meetings. The Contractor's representative shall include Supervisor or Superintendent and shall have the required authority to commit the Contractor to solutions agreed upon. Other Contractor and subcontractor representatives may attend Project meetings as desired.

B. The Contractor shall provide all pertinent work-related reports or documents for each meeting as requested by the Owner.

C. The Engineer will record minutes of all meetings and will furnish one (1) copy to the Contractor. Recipients of copies may make and distribute such other copies as they wish.

D. The Contractor shall advise the Engineer of any inaccuracies, discrepancies, objections, or missing items in the minutes within five (5) calendar days of receipt of the minutes.

1.2 PRECONSTRUCTION CONFERENCE

A. A preconstruction conference will be convened to designate responsible personnel, discuss scheduling, shop drawing procedures, pay applications processing, project supervision, coordination, progress reports, payrolls, labor provisions, and to establish a working understanding among the parties as to the Work. The Contractor will be responsible to have all subcontractors and major suppliers represented at the preconstruction meeting.

B. The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The complete agenda will be furnished to the Contractor prior to the meeting date. However, the Contractor should be prepared to discuss all of the items listed below.

1. Status of Contractor's insurance and bonds.

2. Issuance of Notice to Proceed

3. Contractor's tentative schedules.

4. Transmittal, review, and distribution of Contractor's submittals.

5. Processing applications for payment.

6. Maintaining record documents.

7. Critical work sequencing.

8. Field decisions and Change Orders.

9. Use of Site, office and storage areas, security, housekeeping, and Owner's needs.

10. Major equipment deliveries and priorities.

11. Contractor's assignments for safety and first aid.

12. Daily Report Form.

13. Submittal Transmittal Form which the Engineer will furnish.

C. Unless previously submitted to the Engineer, the Contractor shall bring to the conference one copy each of the following:

1. A preliminary schedule of Shop Drawings, Samples, and proposed Substitute or Equal submittals listed in the Bid.

2. A list of all permits and licenses the Contractor shall obtain indicating the agency required to grant the permit, the expected date of submittal for the permit, and required date for receipt of the permit.

3. A preliminary schedule of values in accordance with the bid schedule.

4. A 60-day plan of operation in accordance with Section 01 32 16 – Construction Progress Schedule.

5. Procurement schedule of major equipment and materials and items requiring long-lead time.

D. The Engineer will preside at the preconstruction conference and will arrange for keeping and distributing the minutes to all persons in attendance.

E. The Contractor and its subcontractors should plan on the conference taking no more than 1 full working day.

1.3 PROGRESS MEETINGS

A. The Engineer will arrange and chair weekly progress meetings. These meetings will be held at the project site and held throughout the course of construction. The Contractor is to ensure that an authorized representative, having authority to act for and on behalf of the Contractor and having full knowledge of the Work and the contract schedule attend the meetings.

B. Representatives of the Contractor's suppliers and subcontractors, and parties providing services for the same, may attend the meeting if the Contractor elects to invite them to assist the Contractor's representatives at the meetings.

C. Relay agenda items to the Engineer at least 24 hours prior to meeting.

D. Suggested Agenda

1. Review of Work progress

2. Field observations, problems, and conflicts

3. Problems that impede construction schedules

4. Review of off-site fabrication and delivery schedules

5. Corrective measure and procedures to regain projected schedules

6. Revisions to construction schedules

7. Plan progress schedules during succeeding work period

8. Coordination of schedules

9. Review submittal schedules, field orders, change orders, RFIs, and pay applications; expedite as required

10. Maintenance of quality standards

11. Review proposed changes for effect on construction schedules and on completion dates

12. Other business

1.4 OTHER MEETINGS

A. Other meetings will be held from time to time as may be requested by the Owner or Contractor. Time and place of meeting shall be as mutually agreed upon. Those required to be in attendance at meetings shall be as requested.

B. Other meetings shall also include meetings with regulatory agencies. When requested, the Contractor shall attend meetings held or required by governmental regulatory agencies having jurisdiction of the Work.

C. Other meetings also include Post-Construction Conference. The Post-Construction Conference will be held prior to initial acceptance of the Work to discuss and resolve all unsettled matters.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 31 19

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 32 16 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Scheduling of the Work shall be performed by the Contractor in accordance with the requirements of this Section. The purpose of the Construction Schedule is to allow the Contractor to prepare an orderly plan to aid in the timely completion of the project.

B. Development of the schedule and project status reporting requirements of the Contract shall employ computerized Critical Path Method (CPM) scheduling.

C. The approved Construction Schedule shall be used to plan and execute the Work, to measure the progress of the Work, and to aid in evaluating time extensions.

D. Failure to maintain the Construction Schedule in an approved status may result in the Owner withholding a monetary penalty against the responsible Contractor(s) until the schedule is approved as set forth in 3.4 of this Section.

PART 2 - PRODUCTS

2.1 CONSTRUCTION SCHEDULE

A. Prepare a detailed construction schedule in graphic form showing duration and proposed dates of starting and completing each major division of the Work. The schedule is to be consistent with the time and order of the Work requirements of the Specifications, and is to be the basis of the Contractor’s operations. Prepare the schedule utilizing a Gantt chart (bar type) or similar method that connects related activities.

B. Sufficient detail shall be included for the identification of subdivisions of the major components listed below. The major components should be broken in into activities such as excavation, foundation subgrade preparation, foundation concrete, completion of all structural concrete, CMU, roof, pump/equipment, mechanical and plumbing installation, electrical power and controls, coatings, and other activities as required.

1. Site Work
2. Yard Piping
3. Site Grading
4. New Standpipe
5. Elevated Reservoir
6. Water Main
7. Controls

8. Well House Improvements

C. Submit a horizontal bar chart with separate line for each Section of the Work, identifying first work day of each week.

D. 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. Clearly indicate critical path and activities/items on the critical path.

E. Indicate estimated percentage of completion for each item of Work at each submission.

F. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

PART 3 - EXECUTION

3.1 INITIAL SCHEDULE SUBMITTAL

A. The Contractor shall submit two short-term schedule documents at the Pre-construction Conference which shall serve as the Contractor's Plan of Operation for the initial 60-day period of the Contract Time, and to identify the manner in which the Contractor intends to complete all the Work within the Contract Time.

B. The bar chart shall show the accomplishment of the Contractor's early activities (mobilization, permits, submittals necessary for early material and equipment procurement, and long lead, CPM submittals, initial site work and other submittals and activities required in the first 60 days).

C. Following the Contractor’s receipt of the Engineer’s review comments, the Contractor shall correct the schedule to identify missing activities and relationships relevant to the Scope of Work. No time extensions will be granted to complete activities not initially included in the Contractor’s Construction Schedule.

D. To the extent that there are any conflicts between the approved Construction Schedule and the requirements of the Contract Documents, the Contract Documents shall govern.

3.2 FINAL CONSTRUCTION SCHEDULE SUBMISSION

A. The Final Construction Schedule shall be submitted for approval within 60 calendar days after Notice to Proceed is issued. It shall provide a reasonable level of detail and a reasonable sequence of activities which represent the Work through the entire project.

B. The Construction Schedule shall show the sequence and interdependence of activities required for complete performance of the Work, beginning with the Contractor’s receipt of the Notice to Proceed and concluding with the date of Final Completion of the Contract. The Project Schedule shall show all activities in workdays, with allowance for holidays and the effects of normal weather conditions on outside work.

C. The Construction Schedule shall comply with all limits imposed by the Scope of Work, with all contractually specified intermediate milestones and completion dates, and with all constraints, restraints, or sequences included in the Contract.

D. Procurement Activities: Prepare the schedule in chronological order of submittals. Show Specification Section of the submittal, name of Contractor and generic description of work covered. Include activities to cover the complete procurement process to include but not limited to: submittal, review, approval, resubmittal, procurement, fabrication, delivery, permits, and similar pre-construction work.

E. Manpower:

1. All activities shall have an estimate of the average number of workers per day that are expected to be used during the execution of the activity.

2. Identification of any manpower, material or equipment restrictions, as well as any activity requiring unusual shift work, such as two (2) shifts per day, six (6) day work week, specified overtime, or work at times other than regular days or hours, shall clearly be identified in the Project Schedule.

3. Critical or near Critical Paths resulting from the use of manpower or equipment restraints shall be kept to a minimum. (Near Critical Paths are defined as paths having 10 workdays or less of total float.)

F. Responsibility: All activities shall be identified in the Construction Schedule by the party responsible to perform the Work. Responsibility includes, but is not limited to, the Contracting Firm, the Subcontracting Firm, the Contractor Workforce, or Agency performing a given task. Activities shall not belong to more than one responsible party.

G. Work Areas:

1. Arrange the schedule to show each major area of construction for each major category or unit of work.

2. All activities shall be identified in the Construction Schedule by the Work area in which the activity occurs. Activities shall not be allowed to cover more than one work area.

H. Modification or Claim Number: Any activity that is added or changed by a change order or used to justify any claimed time, shall be identified by change order code that changed the activity. Activities shall not belong to more than one change order.

I. Milestones: The Construction Schedule shall start no earlier than the date that the Notice to Proceed (NTP) was issued. Milestone dates are defined in calendar days following the date set forth in the Notice to Proceed and are required to be met by all Contractors. Time is of the essence for the completion of Milestones and for the Contract Completion date.

3.3 PERIODIC SCHEDULE UPDATES

A. Submit revised schedule with each Application for Payment, identifying changes since previous version.

B. Provide recommendations for adjusting the Construction Schedule to meet milestone completion and Contract completion dates (include why the schedule needs adjusting, i.e., change order, weather, contractor resources, etc.).

C. The Contractor shall prosecute the Work in accordance with the approved Construction Schedule. Out of sequence construction, defined as a change from the Construction Schedule in the Contractor's actual operation, requires prior approval from the Engineer.

D. Upon the approval of a change order or the issuance of a unilateral change order by the Owner the agreed-upon change order activities, activity durations, logic and impacts shall be reflected in the next schedule submittal by the Contractor.

E. If a revised CPM Construction Schedule accepted by the Engineer requires Contractor to employ additional manpower, equipment, hours of work or work shifts, or to accelerate procurement of materials or equipment, or any combination thereof, as schedule recovery measures to meet Contract milestones, Contractor shall implement such schedule recovery measures for Contractor caused delays without additional charge to the Owner.

3.4 PAYMENT FOR CPM SCHEDULES

A. The Contractor's attention is directed to the condition that 2% of the total Contract Price will be deducted from any money due the Contractor as progress payments until the Original CPM Schedule Submittal listed above has been completed as specified. The aforementioned amount will be retained by the Owner as agreed, estimated value of completing the original schedule. Any such retention of money for failure to complete all such mobilization items as a lump-sum item shall be in addition to the retention of any payments due to the Contractor as specified in the General Conditions of the Contract.

B. Approval of subsequent monthly pay requests may be delayed unless accompanied by a copy of the monthly update to the CPM schedule as described above. Extensive delays in submission of the monthly update may constitute sufficient basis for the Engineer to recommend withholding of some or all of any payment.

END OF SECTION 01 32 16

SECTION 01 33 00 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Wherever submittals are required hereunder, all such submittals by the Contractor shall be submitted to the Engineer as delineated in this Section.

B. At the Pre-Construction Conference, the Contractor shall submit the following items to the Engineer for review:

1. A preliminary construction Schedule.

2. A preliminary schedule of Shop Drawings, Samples, and proposed Substitutes ("Or-Equal") submittals listed in the Bid.

1.2 ENGINEER'S REVIEW PERIOD

A. All submittals are subject to a 14-day review period by the Engineer. If an expedited review is requested by the Contractor, the submittal shall identify the requested expedited review. The Engineer will attempt to accommodate the expedited review.

1.3 SUBMITTAL PROCEDURES

A. Verify that the material or equipment described in each submittal conforms to all requirements of the Specifications and drawings. Where the detailed Specifications require specific submittal data, submit all data at the same time. The submittals are to be accompanied by the transmittal form attached at the end of this Section. The Engineer will return for resubmittal any information not accompanied by the specified transmittal form, properly completed.

B. Indiscriminate submittal of only manufacturer's literature is unacceptable and will be rejected.

C. The submittals shall be numbered as XXXXXX-YY-z., where XXXXXX is the Specification Section number, YY is the sequential number of the submittal, and Z is used for re-submittal labeled a through z. For example, the first submittal of an item from Section 32 13 13 – Concrete for Exterior Improvements would be numbered "32 13 13-01"; the first re-submittal of the submittal would be numbered "32 13 13-01-A".

D. A separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Transmittal of a submittal of various items using a single transmittal form will be rejected. A multiple page submittal shall be collated into sets, and each set shall be stapled or bound, as appropriate, prior to transmittal to the Engineer.

E. Identify Project, Contractor, subcontractor or supplier, pertinent Drawing sheet and detail number(s), and Specifications Section number, as appropriate.

F. All Contractor shop drawings submittals shall be carefully reviewed by an authorized representative of the Contractor, prior to submission to the Engineer. Each submittal shall be dated, signed, and certified by the Contractor, as being correct and in strict conformance with the Contract Documents. In the case of shop drawings, each sheet shall be so dated, signed, and certified. No consideration for review by the Engineer of any Contractor submittals will be made for any items which have not been so certified by the Contractor. All non-certified submittals will be returned to the Contractor without action taken by the Engineer, and any delays caused thereby shall be the total responsibility of the Contractor.

G. Do not mark the submittals in red. Ensure that any marks are duplicated on all copies submitted. Outline the marks on reproducible transparencies in a rectangular box.

H. Coordinate submission of related items.

I. Identify variations from Contract Documents and product or system limitation which may be detrimental to successful performance of the completed Work.

J. Provide space for Contractor and Engineer Review stamps.

K. Submit electronic submittals to:
Zachary Wallin
601 Sherman Ave, #1
Coeur d'Alene, ID 83814
zwallin@kellerassociates.com

L. Electronic submittals:

1. The Engineer will return comments only.

2. Contractor is responsible for distributing copies of the submittal and the Engineer's comments to concerned parties.

3. The Engineer may require hard copies in lieu of an electronic submittal if, in the opinion of the Engineer, the electronic submittal is difficult to read.

M. Revise and resubmit submittals as required, identify all changes made since previous submittals.

N. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.4 DEVIATIONS FROM CONTRACT

A. If the Contractor proposes to provide material or equipment which does not conform to all of the Specifications and Drawings, the transmittal form accompanying the submittal copies shall indicate under "comments" the deviations.

1.5 SHOP DRAWINGS

A. The term "Shop Drawings" as used herein shall be understood to include detail design calculations, shop drawings, fabrication, and installation drawings, erection drawings, list,

graphs, catalog sheets, data sheets, and similar items. Whenever the Contractor is required to submit design calculations as part of a submittal, such calculations shall bear the signature and seal of an engineer registered in the appropriate branch and in the state wherein the project is to be built, unless otherwise directed.

B. Except as may otherwise be indicated herein, the Engineer will return submittal to the Contractor with comments. The Contractor shall make a complete and acceptable submittal to the Engineer by the second submission of a submittal item.

C. If submittal is returned to the Contractor marked "NO EXCEPTIONS TAKEN," formal revision and resubmission of said submittal will not be required.

D. If submittal is returned to the Contractor marked "MAKE CORRECTIONS NOTED," formal revision and resubmission of said submittal will not be required.

E. If submittal is returned to the Contractor marked "AMEND-RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of said revised submittal to the Engineer.

F. If submittal is returned to the Contractor marked "REJECTED-RESUBMIT," the Contractor shall revise said submittal and shall resubmit the required number of copies of, said revised submittal to the Engineer.

G. Fabrication of an item shall be commenced only after the Engineer has reviewed the pertinent submittals and returned copies to the Contractor marked either "NO EXCEPTIONS TAKEN" or “MAKE CORRECTIONS NOTED". Corrections indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents and shall not be taken as the basis for changes to the contract requirements.

1.6 ORGANIZATION

A. A single submittal transmittal form shall be used for each technical Specification Section or item or class of material or equipment for which a submittal is required. A single submittal covering multiple Sections will not be acceptable, unless the primary Specification references other Sections for components.

B. On the transmittal form, index the components of the submittal and insert tabs in the submittal to match the components. Relate the submittal components to Specification paragraph and subparagraph, drawing number, detail number, schedule title, room number, or building names, as applicable.

C. Unless indicated otherwise, terminology and equipment names and numbers used in submittals shall match those used in the Contract Documents.

1.7 EFFECT OF ACCEPTANCE OF CONTRACTOR INFORMATION

A. Acceptance by the Engineer of any drawings, method of work, or any information regarding materials or equipment the Contractor proposes to provide shall not relieve the Contractor of his responsibility for any errors therein and shall not be regarded as an assumption of risk or liability by the Engineer or Owner, or by any officer or employees

thereof, and the Contractor shall have no claim under the contract on account of the failure or partial failure or inefficiency of any plan or method of work or material or equipment so accepted. Such acceptance shall be considered to mean merely that the Engineer has no objection to the Contractor using, upon his own full responsibility, the plan or method of work proposed, or providing the materials or equipment proposed.

B. Approval of shop drawings by the Engineer is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the Plans and Specifications. The Contractor is responsible for dimensions which shall be confirmed and correlated at the job site, fabrication process and techniques of construction, coordination of his work with that of all other trades and the satisfactory performance of his work.

1.8 PRODUCT DATA AND SAMPLES

A. Where required in the Specifications and as determined by the Engineer, test specimens or samples of materials, appliances and fittings to be used or offered for use in connection with the Work shall be submitted to the Engineer at the Contractor's expense. Specimen or sample submittals shall be made with information as to their sources, with all cartage charges prepaid, and in such quantities and sizes as may be required for proper examination and tests to establish the quality or equality thereof, as applicable.

B. All samples and test specimens are to be submitted in ample time to enable the Engineer to make any tests or examinations necessary, without delay to the Work. The Contractor will be held responsible for any loss of time due to the neglect or failure to deliver the required samples to the Engineer as specified.

C. Samples are also to be taken during the course of the Work, as required by the Engineer.

D. Laboratory tests and examinations that the Owner elects to make will be made at no cost to the Contractor, except that, if a sample of any material or equipment proposed for use by the Contractor fails to meet the Specifications, the cost of testing subsequent samples will be borne by the Contractor.

E. All tests required by the Specifications to be performed by an independent laboratory are to be made, and the samples therefore furnished shall be at the sole expense of the Contractor.

F. Material used in the Work is to conform to the submitted samples and test certificates as approved by the Engineer.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 33 00

STANDARD SUBMITTAL FORM

Transmittal of Shop Drawing or Submittal

CONTRACTOR: <CONTRACTOR NAME>

Tracking No. XXXXXX

Item covered by this submittal

Refer to the following attachment(s) for a detailed description of the item.

Applicable Specification Section(s)

☐ First Submittal OR ☐ Resubmittal No. _____

☐ This item is as specified OR ☐ This item is a substitution/or equal

☐ Supplier/Subcontractor certifies:

- ☐ Conforms to contract
- ☐ Minor deviations as specifically noted
- ☐ Major deviations as specifically noted

Review Priority: ☐ 1 ☐ 2 ☐ 3

Due Date: XX-XX-XX (Engineer's standard review period is 14 days)

Notes to Engineer:

Date Received by Contractor: _____ Date Returned to Subcontractor/Supplier _____

Contractor Comments:

Deviations Specifically Noted

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 35 53 – SECURITY PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall implement security procedures to ensure existing facilities and new construction are protected from vandalism, theft, and unauthorized entry. The Contractor shall:

1. Initiate security program in coordination with the Owner's existing security system during mobilization.

2. Maintain program throughout construction period until Substantial Completion.

1.2 ENTRY CONTROL

A. The Contractor shall:

1. Restrict entry of persons and vehicles into construction areas.

2. Allow entry to construction area only to authorized persons with proper identification.

3. Keep all the Contractor employees out of existing facilities that are not being modified under the Work.

4. Coordinate with the Owner entry control to existing facilities that are not being modified under the Work.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 35 53

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 42 13 - ABBREVIATIONS AND ACRONYMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Wherever in these Specifications references are made to the standards, specifications, or other published data of the various international, national, regional, or local organizations, such organizations may be referred to by their acronym or abbreviation only. As a guide to the user of these Specifications, the following acronyms or abbreviations which may appear in these Specifications shall have the meanings indicated herein.

1.2 ABBREVIATIONS

1.3 ACRONYMS

AA	Aluminum Association
AAMA	Architectural Aluminum Manufacturer's Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association, Inc.
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AI	The Asphalt Institute
AlA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association

ANS	American Nuclear Society
ANSI	American National Standards Institute, Inc.
APA	American Plywood Association (or) American Parquet Association, Inc.
API	American Petroleum Institute
APWA	American Public Works Association
ARI	Air-Conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASAE	American Society of Agricultural Engineers
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASLE	American Society of Lubricating Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASQC	American Society for Quality Control
ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWCI	American Wire Cloth Institute
AWPA	American Wood Preservers Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BBC	Basic Building Code, Building Officials and Code Administrators
BHMA	Builders Hardware Manufacturer's Association
CBM	Certified Ballast Manufacturers
CDA	Copper Development Association
CEMA	Conveyors Equipment Manufacturer's Association

CGA	Compressed Gas Association
CLFMI	Chain Link Fence Manufacturer's Institute
CLPCA	California Lathing and Plastering Contractors Association
CMA	Concrete Masonry Association
CRSI	Concrete Reinforcing Steel Institute
DCDMA	Diamond Core Drill Manufacturer's Association
DEQ	Department of Environmental Quality
DHI	Door and Hardware Institute
DIPRA	Ductile Iron Pipe Research Association
DOE	Department of Ecology
DWR	Department of Water Resources
EIA	Electronic Industries Association
ETL	Electrical Test Laboratories
EPA	Environmental Protection Agency
FCI	Fluid Controls Institute
FM	Factory Mutual System
FPL	Forest Products Laboratory
HI	Hydronics Institute (or) Hydraulics Institute
HPMA	Hardwood Plywood Manufacturers Association
IAPMO	International Association of Plumbing and Mechanical Officials
IBC	International Building Code
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IFC	International Fire Code
IME	Institute of Makers of Explosives

IP	Institute of Petroleum (London)
IPC	Institute of Printed Circuits
IPCEA	Insulated Power Cable Engineers Association
ISA	Instrument Society of America
ISDSI	Insulated Steel Door Systems Institute
ISEA	Industrial Safety Equipment Association
ISO	International Organization for Standardization
ISPWC	Idaho Standards for Public Works Construction
ITE	Institute of Traffic Engineers
MBMA	Metal Building Manufacturer's Association
MIL	Military Standards (DoD)
MPTA	Mechanical Power Transmission Association
MSS	Manufacturers Standardization Society
MTI	Marine Testing Institute
NAAMM	National Association of Architectural Metal Manufacturer's
NACE	National Association of Corrosion Engineers
NAGDM	National Association of Garage Door Manufacturers
NB	National Board of Boiler and Pressure Vessel Inspectors (alternate NBBPVI)
NBS	National Bureau of Standards (Now NIST)
NCCLS	National Committee for Clinical Laboratory Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association (or) National Fluid Power Association (or) National Forest Products Association
NISO	National Information Standards Organization
NLGI	National Lubricating Grease Institute
NMA	National Microfilm Association

NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association
NWWDA	National Wood Window and Door Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PPI	Plastics Pipe Institute
RCRA	Resource Conservation and Recovery Act
RIS	Redwood Inspection Service
RMA	Rubber Manufacturers Association
RVIA	Recreational Vehicle Industry Association
RWMA	Resistance Welder Manufacturer's Association
SAE	Society of Automotive Engineers
SAMA	Scientific Apparatus Makers Association
SDI	Steel Door Institute
SMA	Screen Manufacturers Association
SMACCNA	Sheet Metal and Air Conditioning Contractors National Association
SPI	Society of the Plastics Industry, Inc.
SPIB	Southern Pine Inspection Bureau
SPR	Simplified Practice Recommendation
SSA	Swedish Standards Association
SSBC	Southern Standard Building Code, Southern Building Code Congress
SSPC	Steel Structures Painting Council
SSPWC	Standard Specifications for Public Works Construction
TAPPI	Technical Association of the Pulp and Paper Industry
TFI	The Fertilizer Institute
TIA	Telecommunications Industries Association

UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WCRSI	Western Concrete Reinforcing Steel Institute
WEF	Water Environment Federation
WIC	Woodwork Institute of California
WRI	Wire Reinforcement Institute, Inc.
WWPA	Western Wood Products Association

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 42 13

SECTION 01 42 19 - REFERENCE STANDARDS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Titles of Sections and Paragraphs: Captions accompanying Specification Sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.

B. Applicable Publications: Whenever Specification references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids shall apply. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of, or omission from, said standards or requirements.

C. Specialists' Assignments: In certain instances, specification text requires specific work be assigned to specialists or expert entities who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. In addition, these requirements are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all work specified herein shall conform to or exceed the requirements of applicable codes and the applicable requirements of the following documents:

1. References herein to "Building Code" shall mean current International Building Code (IBC).

2. References to "Mechanical Code" or "Uniform Mechanical Code," "Plumbing Code" or "Uniform Plumbing Code," "Fire Code" or "Uniform Fire Code," shall mean International Mechanical Code, Uniform Plumbing Code and International Fire Code of the International Conference of the Building Officials (ICBO).

3. "Electric Code" or "National Electric Code (NEC)" shall mean the National Electric Code of the National Fire Protection Association (NFPA).

4. The latest edition of the codes as approved by the Municipal Code and used by the local agency as of the date that the Work is advertised for bids, as adopted by the

agency having jurisdiction, shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

B. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Owner for clarification and directions prior to ordering or providing any materials or furnishing labor. The Contractor shall bid for the most stringent requirements.

C. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein.

D. References herein to "OSHA Regulations for Construction" shall mean Title 29, Part 1926, Construction Safety and Health Regulations, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

E. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

F. Applicable Standard Specifications: References in the Contract Documents to "Standard Specifications" shall mean the Idaho Standards for Public Works Construction, 2017 Edition

1.3 REGULATIONS RELATED TO HAZARDOUS MATERIALS

A. The Contractor shall be responsible that all the Work included in the Contract Documents, regardless if shown or not, shall comply with all EPA, OSHA, RCRA, NFPA, and any other Federal, State, and Local Regulations governing the storage and conveyance of - hazardous materials, including petroleum products.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 42 19

SECTION 01 45 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Specific quality control requirements for the Work are indicated throughout the Contract Documents. The requirements of the Section are primarily related to performance of the Work beyond furnishing of manufactured products. The term "Quality Control" includes inspection, sampling and testing, and associated requirements.

B. The Work shall be inspected and tested according to the requirements stated in Article 14 of the General Conditions and as amended by the Supplementary Conditions.

1.2 SUBMITTALS

A. Submit testing results in accordance with Section 01 33 00 – Submittal Procedures.

B. For Engineer and Owner approval, the Contractor shall submit testing laboratory's qualifications and certifications prior to entering into a contractual agreement to perform quality control testing and inspection work.

C. Reports of testing will be submitted to the Engineer indicating observations and results in test and indicating compliance or non-compliance with Contract Documents. It is the responsibility of the Contractor to ensure these submittals are provided in a timely manner to reduce cost impact of potential removal of defective work.

1.3 SAMPLING AND TESTING

A. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current ASTM standards, as applicable to the class and nature of the article or materials considered; however, the Owner reserves the right to use any generally-accepted system of inspection which, in the opinion of the Engineer will ensure the Owner that the quality of the workmanship is in full accord with the Specifications.

B. Any waiver of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial work, shall not be construed as a waiver of any technical or qualitative requirements of the Specifications.

C. Notwithstanding the existence of such waiver, the Engineer shall reserve the right to make independent investigations and tests as specified in Subparagraph 1.3.D, following; and, upon failure of any portion of the Work to meet any of the qualitative requirements of the Specifications, shall be reasonable cause for the Engineer to require the removal or correction and reconstruction of any such work.

D. In addition to any other inspection or quality assurance provisions that may be specified, the Engineer shall have the right to independently select, test, and analyze, at the expense of the Owner, additional test specimens of any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the Contractor to determine compliance with the applicable Specifications for the materials so tested or analyzed; provided, that wherever any portion of the Work is discovered, as a result of such independent testing or investigation by the Engineer, which fails to meet the requirements of the Specifications, all cost of such independent inspection and investigation, and all costs of removal, corrections, and reconstruction or repair of any such work shall be borne by the Contractor.

1.4 TESTING SERVICES

A. The Contractor shall hire an independent testing lab to perform quality control tests as specified in each Specification. All tests shall be paid for by the Contractor.

Item	Reference for testing requirements
Earthwork	ISPWC Section 200
Trench Backfill	ISPWC Section 300
Asphalt Pavement	ISPWC Section 400
Cast-in-Place Concrete	See Section 03 30 00 – Cast-in-Place-Concrete
Grout	See Section 03 30 00 – Cast-in-Place-Concrete and Section 04 22 00 – Concrete Unit Masonry, and 03 60 00 – Grouting as applicable
Structural Steel	See Section 05 12 00 – Structural Steel Framing

B. Testing company shall meet the following qualifications:

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.

C. The Contractor shall notify the Engineer 24 hour prior to the expected time for operations requiring inspection and laboratory test services. Failure of the Contractor to notify the Engineer at least 24 hours in advance of any such inspections shall be reasonable cause for the Engineer to order a sufficient delay in the Contractor's schedule to allow time for such inspections and any remedial or corrective work required, and all costs of such delays, including its effect upon other portions of the Work, shall be borne by the Contractor.

D. Samples and test specimens required under these Specifications shall be furnished and prepared for testing in ample time for the completion of the necessary tests and analysis before said articles or materials are to be used. The Contractor shall furnish and prepare all required test specimens at his own expense.

E. Should any tests fail the specified requirements, the Work shall be redone and retested at the Contractor's expense.

1.5 REGULATORY REQUIREMENTS

A. General

1. Comply with all Federal, State, and local Codes as referenced herein. Such regulations apply to activities including, but not limited to, sitework and zoning, building practices and quality, on and offsite disposal, safety, sanitation, nuisance, and environmental quality.

2. Contractor designed structural systems are subject to the same overall inspection requirements as all other work.

B. Special Inspection

1. Special Inspection is in addition to, but not replacing, other inspections and quality control requirements herein.

2. Contractor will contract with and pay for the services of an independent Special Inspection Agency. The Contractor shall coordinate with the designated Special Inspector to schedule the timing of site visits to perform the inspections in a timely manner.

3. A schedule of Special Inspections is attached to this Section as a supplement.

C. Structural Observation

1. Inspect framework, shoring, pipe supports, and other Contractor-designed systems for adequacy.

2. The Engineer will provide structural observation in addition to the inspection performed by the Special Inspection Agency.

1.6 RIGHT OF REJECTION

A. The Engineer may reject portions of the Work as provided in Article 14 of the General Conditions.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 INSTALLATION

A. Inspection: The Contractor shall inspect materials or equipment upon their arrival on the job site and immediately prior to installation, and reject damaged and defective items.

B. Measurements: The Contractor shall verify measurements and dimensions of the Work as an integral step of starting each installation.

C. Manufacturer's Instructions: Where installation includes manufactured products, the Contractor shall comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in Contract Documents.

3.2 SITE INVESTIGATION AND CONTROL

A. Contractor shall verify all dimensions in the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the Work due to his failure to comply with this requirement.

B. Contractor shall inspect related and appurtenant work and shall report in writing to the Engineer any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair or replacement caused by unsuitable conditions shall be performed by the Contractor at his sole cost and expense.

END OF SECTION 01 45 00

SCHEDULE OF SPECIAL INSPECTIONS (PLAN)			
PROJECT	**CITY OF ATHOL WATER SYSTEM IMPROVEMENTS**		
2015 IBC REFRENCE AND MATERIAL *I* ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**
1704.2.5 Inspection of Fabricators		Y	
Verify fabrication/quality control procedures	In-plant review (3)	Y	Periodic
1705.1.1 Special Cases			
Work unusual in nature, including but not limited to alternative materials and systems, unusual design applications, materials and systems with special manufacturer's requirements	Submittal review, shop (3) and/or field inspection	Y	Post Installed Anchors: As required by submitted ICC ESR Report or if specifically called out on plans.
1705.2 Steel Construction		Y	
1. Material verification of cold-formed steel deck:		Y	
a. Identification markings to conform to ASTM standards specified in the approved construction documents		Y	Periodic
b. Manufacturer’s certified test reports		Y	Periodic
2. Inspection of welding:	Field inspection	Y	
a. Cold-formed steel deck:	Field inspection	Y	
1) Floor and roof deck welds	Field inspection	Y	Periodic
b. Reinforcing steel:	Field inspection	Y	
1) Verification of weldability of reinforcing steel other than ASTM A 706	Field inspection	Y	Periodic
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement	Field inspection	Y	Continuous
3) Shear reinforcement	Field inspection	Y	Continuous
4) Other reinforcing steel	Field inspection	Y	Periodic

SCHEDULE OF SPECIAL INSPECTIONS (PLAN)			
PROJECT	**CITY OF ATHOL WATER SYSTEM IMPROVEMENTS**		
2015 IBC REFRENCE AND MATERIAL *I* ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**
1705.3 Concrete Construction		Y	
1. Inspection of reinforcing steel installation (see 1705.2.2 for welding)	Shop (3) and field inspection	Y	Periodic
2. Inspection of prestressing steel installation	Shop (3) and field inspection	Y	Periodic
3. Inspection of anchors cast in concrete where allowable loads have been increased per Section 1908.5 or where strength design is used	Shop (3) and field inspection	N	Periodic
4. Inspection of anchors and reinforcing steel post-installed in hardened concrete: Per research reports including verification of anchor type, anchor dimensions, hole dimensions, hole cleaning procedures, anchor spacing, edge distances, concrete minimum thickness, anchor embedment and tightening torque	Field inspection	Y	Periodic or as required by the research report issued by an approved source
5. Verify use of approved design mix	Shop (3) and field inspection	Y	
6. Fresh concrete sampling, perform slump and air content tests and determine temperature of concrete	Shop (3) and field inspection	Y	
7. Inspection of concrete and shotcrete placement for proper application techniques	Shop (3) and field inspection	Y	
8. Inspection for maintenance of specified curing temperature and techniques	Shop (3) and field inspection	Y	
9. Inspection of pre-stressed concrete:	Shop (3) and field inspection	N	
1705.4 Masonry Construction		Y	
(A) Level A, B and C Quality Assurance:		Y	
1. Verify compliance with approved submittals	Field inspection	Y	Periodic
(B) Level B Quality Assurance:		Y	
1. Verification of fm and f_{AAC} prior to construction	Testing by unit strength method or prism test method	Y	Periodic

SCHEDULE OF SPECIAL INSPECTIONS (PLAN)			
PROJECT	**CITY OF ATHOL WATER SYSTEM IMPROVEMENTS**		
2015 IBC REFRENCE AND MATERIAL *I* ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**
(D) Levels B and C Quality Assurance:		Y	
1. Verification of Slump Flow and Visual Stability Index (VSI) of self-consolidating grout as delivered to the project	Field testing	Y	Continuous
2. Verify compliance with approved submittals	Field inspection	Y	Periodic
3. Verify proportions of site-mixed mortar, grout and prestressing grout for bonded tendons	Field inspection	Y	Periodic
4. Verify grade, type, and size of reinforcement and anchor bolts, and prestressing tendons and anchorages	Field inspection	Y	Periodic
5. Verify construction of mortar joints	Field inspection	Y	Periodic
6. Verify placement of reinforcement, connectors, and prestressing tendons and anchorages	Field inspection	Y	Level B – Periodic
		N	Level C – Continuous
7. Verify grout space prior to grouting	Field inspection	Y	Level B – Periodic
		N	Level C – Continuous
8. Verify placement of grout and prestressing grout for bonded tendons	Field inspection	N	Continuous
9. Verify size and location of structural masonry elements	Field inspection	Y	Periodic
10. Verify type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.	Field inspection	Y	Level B – Periodic
		N	Level C – Continuous
11. Verify welding of reinforcement (see 1705.2.2)	Field inspection	N	Continuous
12. Verify preparation, construction, and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F)	Field inspection	Y	Periodic
13. Verify application and measurement of prestressing force	Field inspection	N	Continuous

SCHEDULE OF SPECIAL INSPECTIONS (PLAN)			
PROJECT	**CITY OF ATHOL WATER SYSTEM IMPROVEMENTS**		
2015 IBC REFRENCE AND MATERIAL *I* ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**
14. Verify placement of AAC masonry units and construction of thin-bed mortar joints (first 5000 SF of AAC masonry)	Field inspection	N	Continuous
15. Verify placement of MC masonry units and construction of thin-bed mortar joints (after the first 5000 SF of MC masonry)	Field inspection	N	Level B – Periodic
		N	Level C – Continuous
16. Verify properties of thin-bed mortar for MC masonry (first 5000 SF of Ap,C masonry)	Field inspection	N	Continuous
17. Verify properties of thin-bed mortar for AAC masonry (after the first 5000 SF of AAC masonry)	Field inspection	N	Level B – Periodic
		N	Level C – Continuous
18. Prepare grout and mortar specimens	Field testing	N	Level B – Periodic
		N	Level C – Continuous
19. Observe preparation of prisms	Field inspection	N	Level B – Periodic
		N	Level C – Continuous
1705.6 Soils		Y	
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	Field inspection	Y	Periodic
2. Verify excavations are extended to proper depth and have reached proper material.	Field inspection	Y	Periodic
3. Perform classification and testing of controlled fill materials.	Field inspection	Y	Periodic
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of controlled fill	Field inspection	Y	Continuous
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly	Field inspection	Y	Periodic

SCHEDULE OF SPECIAL INSPECTIONS (PLAN)			
PROJECT	**CITY OF ATHOL WATER SYSTEM IMPROVEMENTS**		
2015 IBC REFRENCE AND MATERIAL *I* ACTIVITY	**SERVICE**	**Y/N**	**EXTENT**

Notes:

1. *Any conflict* of *interest must be disclosed to the Building Official prior to commencing work. The qualifications* of *the Special Inspector(s) and/or testing agencies may be subject to the approval* of *the Building Official and/or the Design Professional.*
2. *The list* of *Special Inspectors may be submitted* as a *separate document, if noted* so *above.*
3. *Special Inspections* as *required by Section 1704.2.5 are not required where the fabricator is approved in accordance with IBC Section 1704.2.5.2*
4. *Observe on* a *random basis, operations need not be delayed pending these inspections. Perform these tasks for each welded joint, bolted connection, or steel element.*
5. *NOT* of *welds completed in an approved fabricator's shop may be performed by that fabricator when approved by the AHJ. Refer to AISC 360, N7.*

END OF SECTION 01 45 33

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall be responsible to provide all equipment including that required for office, sanitation, signage, lighting, etc., as per requirements in Section 00 72 00 – General Conditions.

1.2 SAFETY

A. The Contractor shall comply with "Safety and Protection" requirements as described in Section 00 72 00 – General Conditions.

B. Appropriate first aid facilities and supplies shall be kept and maintained by the Contractor at the site of the Work. All persons within the construction area shall be required to wear protective helmets and eye protection. In addition, all employees of the Contractor and his subcontractors shall be provided with, and required to use, personal protective and lifesaving equipment as set forth in "Subpart E" of the OSHA Safety and Health Standards for Construction (29CFR 1926) including all of its amendments.

C. During the performance of the Work, the Contractor shall erect and maintain temporary railings and barriers and shall take all other necessary precautions and place proper guards for the prevention of accidents and he shall erect and maintain suitable and sufficient lights and other signals.

1.3 TEMPORARY UTILITIES

A. Types: The types of utility services required for general temporary use at the Site include the following:

1. Water service (potable for certain uses, including fire protection)

2. Storm sewer

3. Sanitary sewer

4. Electric power service

5. Telephone service

6. Gas service

B. Scheduled Uses: The Contractor shall, in conjunction with establishment of job progress schedule, establish a schedule for implementation and termination of service for each temporary utility at the earliest feasible time, and when acceptable to the Owner and the Engineer, change over from use of temporary utility service to permanent service.

1.4 TEMPORARY FACILITIES

A. The Contractor shall obtain all necessary permits, arrange for connection of utilities, and pay all required fees and utility costs associated with the work site during the construction activities.

B. Suitable areas for on-site materials storage shall be maintained by the Contractor as specified in Section 01 14 13 – Access to Site. Locations of storage areas shall be subject to Owner's approval, but shall remain the responsibility of the Contractor. Location shall not interfere with drainage, traffic, or private property.

C. The Contractor shall set up and maintain in a neat and orderly manner all temporary construction facilities. Locations shall be subject to Owner's approval, but shall remain the responsibility of the Contractor.

1.5 CULTURAL RESOURCES

A. The Contractor's attention is directed to the National Historic Preservation Act of 1966 (16 U.S.C. 470) and 36 CFR 800 which provides for the preservation of potential historical architectural, archaeological, or cultural resources (hereinafter called cultural resources.).

B. The Contractor shall conform to the applicable requirements of the National Historic Preservation Act of 1966 as it relates to the preservation of cultural resources.

C. In the event potential cultural resources are discovered during subsurface excavations at the site of construction, the following procedures shall be instituted:

1. The Engineer will issue a Field Order directing the Contractor to cease all construction operations at the location of such potential cultural resources find.

2. Such Field Order shall be effective until such time as a qualified archaeologist can be called to assess the value of these potential cultural resources and make recommendations to the Engineer.

D. If the archaeologist determines that the potential find is a bona fide cultural resource, at the direction of the Idaho State Historical Society, the Contractor shall suspend work at the location of the find under the provisions for changes contained in Section 00 72 00 – General Conditions.

1.6 DUST ABATEMENT

A. The Contractor shall prevent its operation from producing dust in amounts damaging to property, cultivated vegetation, or domestic animals, or causing a nuisance to persons living in or occupying buildings in the vicinity. The Contractor shall be responsible for any damage resulting from dust originating from its operations. The dust abatement measures shall be continued until the Contractor is relieved of further responsibility by the Engineer.

1.7 RUBBISH CONTROL

A. During the progress of the Work, the Contractor shall keep the Site and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the Site, and shall establish regular intervals of collection and disposal of such materials and waste. The Contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Disposal of all rubbish and surplus materials shall be off the Site in accordance with local codes and ordinances governing locations and methods of disposal, and in conformance with all applicable safety laws, and to the particular requirements of Part 1926 of the OSHA Safety and Health Standards for Construction.

1.8 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. In addition, see the requirements set forth in 01 57 23 – Construction Site Discharge.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The Contractor shall provide either new or used materials and equipment, which are in substantially undamaged condition and without significant deterioration and which are recognized in the construction industry, by compliance with appropriate standards, as being suitable for intended use in each case. Where a portion of temporary utility is provided by utility company, the Contractor shall provide the remaining portion with matching and compatible materials and equipment and shall comply with recommendations of utility company.

PART 3 - EXECUTION

3.1 INSTALLATION OF TEMPORARY UTILITY SERVICES

A. Wherever feasible, the Contractor shall engage the utility company to install temporary service to project, or as a minimum, to make connection to existing utility service; locate services where they will not interfere with total project construction Work, including installation of permanent utility services; and maintain temporary services as installed for required period of use; and relocate, modify or extend as necessary from time to time during that period as required to accommodate total project construction work.

B. Temporary connections for electricity shall be subject to approval of the Engineer and the power company representative, and shall be removed in like manner at the Contractor's expense prior to final acceptance of the Work.

C. Separation of Circuits: Unless otherwise permitted by the Engineer, circuits used for power purposes shall be separate from lighting circuits.

D. Construction Wiring: Wiring for temporary electric light and power shall be properly installed and maintained and shall be securely fastened in place. Electrical facilities shall conform to the requirements of Subpart K of the OSHA Safety and Health Standards for Construction.

3.2 INSTALLATION OF POWER DISTRIBUTION SYSTEM

A. Power: The Contractor shall provide power required for its operations under the Contract, and shall provide and maintain all temporary power lines required to perform the Work in a safe and satisfactory manner.

B. Temporary Power Distribution: The Contractor shall provide a weatherproof, grounded, temporary power distribution system sufficient for performance of entire Work of project, including temporary electrical heating where indicated, operation of test equipment and test operation of building equipment and systems which cannot be delayed until permanent power connections are operable, temporary operation of other temporary facilities, including permanent equipment and systems which must be placed in operation prior to use of permanent power connections (pumps, HVAC equipment, elevators, and similar equipment), and power for temporary operation of existing facilities (if any) at the Site during change-over to new permanent power system.

1. Provide circuits of adequate size and proper power characteristics for each use;

2. Run circuit wiring generally overhead, and rise vertically in locations where It will be least exposed to possible damage from construction operations and will result in minimal interference with performance of the Work;

3. Provide rigid steel conduit or equivalent raceways for wiring which must be exposed on grade, floors, decks, or other exposures to damage or abuse.

3.3 WATER SUPPLY

A. The Contractor shall coordinate with the Utility he is obtaining water service connection from. The Contractor shall provide all facilities necessary to convey the water from the source to the points of use in accordance with the requirements of the Contract Documents; this includes back flow prevention in accordance with the Utilities requirements.

B. The Contractor shall provide and operate all pumping facilities, pipelines, valves, hydrants, storage tanks, and all other equipment necessary for the adequate development and operation of the water supply system. Water used for domestic purposes shall be free of contamination and shall conform to the requirements of the State and local authorities for potable water. The Contractor shall be solely responsible for the adequate functioning of its water supply system and shall be solely liable for any claims arising from the use of same, including discharge or waste of water there from.

C. The Contractor shall not make connection to or draw water from any fire hydrant or pipeline without first obtaining permission of the Owner. For each such connection made, the Contractor shall first attach to the fire hydrant or pipeline a valve, meter, and backflow prevention device acceptable to the Owner.

3.4 STORM WATER

A. All storm water runoff and control of soil erosion shall be managed as outlined in Specification 01 57 23 – Construction Site Discharge

3.5 INSTALLATION OF SANITARY FACILITIES

A. Fixed or portable chemical toilets shall be provided wherever needed for the use of Contractor's employees. Toilets at construction job sites shall conform to the requirements of Subpart C Section 1926.51 of the OSHA Standards for Construction.

B. The Contractor shall establish a regular daily 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 a manner satisfactory to the Engineer and in accordance with all laws and regulations pertaining thereto.

C. The Contractor shall coordinate with the Owner for obtaining sewer connection and shall pay all permit and sewer usage charges. The sewer capacity charges will be paid by the Owner.

3.6 INSTALLATION OF COMMUNICATIONS

A. Telephone Services: The Contractor shall provide and maintain at all times during the progress of the Work not less than one telephone in good working order at its own field construction office at or near the Site. Each such telephone shall be connected to an established exchange for toll service and with all other telephones utilized by the Contractor.

B. Telephone Use: The Contractor shall permit the Engineer, the Owner, or their authorized representatives or employees free and unlimited use of said telephone facilities for all calls that do not involve published toll charges. Calls originated by the Engineer, the Owner, their authorized representatives or employees which involve toll or message unit charges shall be billed to the Owner by the Contractor at the rates charged by the telephone company.

3.7 OPERATIONS AND TERMINATIONS

A. Prior to placing temporary utility services into use, the Contractor shall inspect and test each service and arrange for governing authorities' required inspection and tests, and obtain required certifications and permits for use thereof.

B. The Contractor shall maintain distinct markers for underground lines, and protect from damage during excavating operations.

C. When need for a temporary utility service or a substantial portion thereof has ended, or when its service has been replaced by use of permanent services, or not later than time of substantial completion, the Contractor shall promptly remove installation unless requested by the Engineer to retain it for a longer period. The Contractor shall complete and restore Work which may have been delayed or affected by installation and use of temporary utility, including repairs to construction and grades and restoration and cleaning of exposed surfaces.

D. Before final acceptance of the Work on the project, all temporary connections and piping installed by the Contractor shall be entirely removed, and all affected improvements shall be restored to original condition or better, to the satisfaction of the Engineer and to the Owner.

END OF SECTION 01 50 00

SECTION 01 57 12 - CONSTRUCTION SITE DISCHARGE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Construction activities that disturb one acre or more are regulated under the National Pollutant Discharge Elimination System (NPDES) Regulations for Storm Water Discharges. The U.S. Environmental Protection Agency (EPA) has created a Construction General Permit (CGP) which outlines a set of provisions construction operators must follow to comply with the requirements of the NPDES storm water regulations.

B. The NPDES through the CGP governs the construction activities to prevent and control soil erosion, transport, sedimentation, and further water and air pollution that may degrade receiving waters including rivers, streams, lakes, reservoirs, groundwater and wetlands. The control measures contained herein shall be installed and maintained through the construction contract and coordinated with any permanent or temporary pollution control feature specified elsewhere on the plans and in the Specifications to assure effective and continuous water pollution control throughout the construction and post construction periods. The controls may include silt fences, straw wattles, rock berms, diversion dikes, interceptor swales, sodding, mulching, soil retention blankets, or other structural or non-structural stormwater pollution controls. Any and all erosion control structures and stabilization practices will be inspected, maintained by the Contractor on a weekly basis, and after any storm event of 0.25 inches or greater. The Contractor will all keep a detailed record of inspections, maintenance and discharge events.

C. The Owner reserves the right to have required temporary erosion sedimentation and water pollution prevention and control work performed by others should the Contractor fail to perform required temporary erosion, sedimentation, and water pollution prevention and control work in a timely fashion or should the Contractor fail to prevent and control soil erosion, sedimentation, and water pollution which may degrade receiving water. All costs, including engineering, for the Work required shall be borne by the Contractor.

1.2 REFERENCES

A. The U.S. Environmental Protection Agency (EPA):

1. Construction General Permit web address: www.epa.gov/npdes/pubs/cgp2003_entirepermit.pdf

2. EPA Construction General Permit Overview Website: https://www.epa.gov/npdes/epas-2017-construction-general-permit-cgp-and-related-documents Catalog of Stormwater Best Management Practices for Idaho Cities and Counties: http://www.deq.idaho.gov/media/494058-entire.pdf

B. Other guidance documents:

1. Customizable SWPPP template for construction site operators in unauthorized states including Idaho. This SWPPP template is in Microsoft Word format: http://www.epa.gov/npdes/pubs/sw_swppp_template_unauthstates.doc

2. Sample Inspection Report Template - A helpful tool to aid in completing construction site inspections. This sample inspection report is in Microsoft Word format: http://www.epa.gov/npdes/pubs/sw_swppp_inspection_form.doc

1.3 SUBMITTALS

A. Stormwater Pollution Prevention Plan (SWPPP): Prior to submitting a Notice of Intent the Contractor shall create and submit the SWPPP that details how the Contractor proposes to comply with CGP. The Contractor's SWPPP will be subject to review by the Engineer prior to commencement of Work.

B. Notice of Intent (NOI): Prior to commencement of any work, the Contractor shall complete a NOI with the EPA. The NOI must be submitted to the EPA at least 14 calendar days prior to commencing earthwork. An executed NOI from EPA shall be submitted to the Engineer prior to commencing work.

C. Notice of Termination (NOT): Upon completion of all work, the Contractor shall submit a complete NOT with the EPA. The NOT shall be submitted to the Engineer.

1.4 MEASUREMENT AND PAYMENT

A. Unless otherwise provided in the contract or bid proposal as separate pay items, no separate payment shall be made for preparation of CGP documents and implementation. Such work shall be considered as incidental work in the contract.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. The Owner and Contractor shall be co-permittees of the General Construction Permit (CGP) and, as such, both are responsible for the implementation of the SWPPP. If the Contractor fails to prevent pollutants from leaving the construction site, the Owner shall have the right to take corrective measures and withhold monies from the Contractor for such cost incurred by the Owner for corrective actions.

1. Prior to the Owner withholding costs for corrective actions. The Owner or Engineer will notify the Contractor of pollutants leaving the site. The Contractor shall have 8 hours to take corrective actions.

2. If the Contractor fails to take corrective actions, within 8 hours of notification, to prevent the pollutants from leaving the site, the Owner may take corrective actions and all costs incurred by the Owner for the corrective actions shall be withheld from payments owed to the Contractor.

B. A copy of the SWPPP, NOI and the NPDES Stormwater General Construction Permit shall be kept on site at all times.

C. Copies of the required site inspection reports shall be made as an appendix to the SWPPP.

D. All documents shall be maintained and available for public review anytime during the project including up to three years after substantial completion.

3.2 MAINTENANCE & INSPECTION PROCEDURES

A. Any and all erosion control structures and stabilization practices will be inspected by the Contractor on a weekly basis at a minimum and after any storm event of 0.25 inches or greater. During the winter when the ground is frozen and runoff is unlikely to occur, such inspections shall be conducted at least every two weeks.

1. The SWPPP shall be modified as necessary to include additional or modified Best Management Practices (BMPs) designed to correct problems identified. Revision to the SWPPP shall be made within 7 calendar days following any identified correction. Copies of the revised SWPPP shall be provided to the Owner and Engineer.

2. All areas that undergo temporary and final stabilization with seeding or sodding shall be inspected; areas that have lack of growth and bare spots shall be reseeded by the Contractor to ensure healthy growth.

3. All erosion control structures and stabilization practices shall be maintained in good working condition throughout the duration of the construction project.

4. Repair of the damage to any structural erosion control structure shall be completed by the Contractor within 24 hours of discovery of the damage.

5. In locations where silt fences or wattles are used around catch basins, trapped sediment shall be removed by the Contractor when one-third of the height of the silt fence or wattle is covered by sediment.

6. Hard surfaces shall be swept at the end of each day’s work.

B. If a detention/retention ponds are employed, the depth of the detention/retention ponds shall be measured monthly by the Contractor and the depth shall be provided to the Owner within one day of measuring. The Contractor shall remove sediment buildup in the pond if the buildup begins to interfere with the proper operation of the pond. The

detention/retention ponds shall be excavated to design profile depths and slopes at the end of the project, if sediment buildup has significantly altered the pond profile.

1. Excavated material from any detention/retention ponds or swales shall not be used as structural fill and shall be disposed of as spoil material, in a location selected by the Contractor and approved by the Engineer. Once placed, the excavated material shall be stabilized using one of the suggested BMPs listed in IDEQ's Catalog of Stormwater BMPs.

3.3 CLEAN UP AND REMOVAL OF BMPS

A. After final stabilization, remove all temporary BMPs and dispose of off-site at no cost to the Owner.

B. After removal of temporary BMPs, sweep all sediment accumulated on project hard surfaces, including asphalt, sidewalks, and adjacent roadways.

END OF SECTION 01 57 12

SECTION 01 71 13 - MOBILIZATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Mobilization consists of preparatory work and operations including, but not limited to those necessary for the movement of personnel, movement of equipment, temporary construction facilities, supplies and incidentals to the project site. Included is the establishment of all necessary offices, buildings, signs, utilities, acquisition of permits, preconstruction submittals, and all other work which must be performed and costs incurred prior to beginning work on the various items of the contract.

B. Mobilization shall include the following principal items:

1. Moving onto the site all Contractor's plant and equipment required for first month operations.

2. Providing all necessary temporary on-site utilities per Section 01 50 00 – Temporary Facilities and Controls.

3. Arranging for and erection of the Contractor's work and storage yard in accordance with Section 01 14 13 – Access to Site.

4. Constructing and implementing security features and requirements complying with Section 01 35 53 – Security Procedures.

5. Installing proper stormwater pollution prevention measures as specified in the Stormwater Pollution Prevention Plan developed in accordance with Section 01572 – Construction Site Discharge.

6. Obtaining all required permits and property insurance.

7. Having all OSHA required notices and establishment of safety programs.

8. Having the Contractor's superintendent at the job site full-time.

9. Installing the Project Sign in accordance with Section 01 58 13 – Temporary Project Signage.

10. Submitting pre-construction submittals in accordance with Specification Section 01 33 00 -Submittal Procedures.

1.2 SITE AREA

A. The limits of the project site are as indicated on the Drawings.

B. The Contractor shall provide and maintain all signing, barricades, fencing, drainage facilities, and other items as required to protect public and private property from damage caused by mobilization operations.

1.3 ACCESS

A. Refer to Section 01 14 13 – Access to Site.

B. If construction access is required in addition to that shown on the Drawings, the Contractor shall secure the Owner's approval of all additional project entrances prior to construction. The Contractor shall also obtain written approval from impacted land owner(s) if other than project owner.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 PAYMENT FOR MOBILIZATION

A. Allowable amounts for partial payment of mobilization are as follows:

1. First monthly progress estimate: Up to 60% of the Mobilization contract price in the agreed-upon Schedule of Values, or 6% of the total Contract Amount, whichever is less.

2. The balance of the Mobilization contract price in the agreed-upon Schedule of Values shall be paid after Substantial Completion.

3. The Contractor's attention is directed to the condition that 2 percent of the total Contract Price will be deducted from any money due the Contractor as progress payments until all mobilization items listed above have been completed as specified. The aforementioned amount will be retained by the Owner as the agreed estimated value of completing all of the mobilization items listed. Any such retention of money for failure to complete all such mobilization items as a lump-sum item shall be in addition to the retention of any payments due to the Contractor as specified in Article 14 of Section 00 72 00 – General Conditions of the Contract.

END OF SECTION 01 71 13

SECTION 01 71 23.16 - CONSTRUCTION SURVEYING

PART 1 - GENERAL

1.1 SCOPE

A. The Contractor shall provide construction surveying for the project.

B. The Contractor shall hire a professional land surveyor to reset any disturbed survey monuments in accordance with Idaho Code.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. The electronic AutoCAD base maps used to create the drawings are available to the Contractor. In the event of a discrepancy between the stamped paper drawings and the electronic files, the stamped paper drawings shall govern. The Contractor shall immediately notify the Engineer of any discrepancies prior to proceeding. The Contractor shall indemnify and hold harmless the Owner and Engineer from all liability, claims, damages, losses and expenses, including attorneys' fees arising out of or resulting from the Contractor's use or interpretation of electronic files.

3.2 CONSTRUCTION STAKING

A. The Contractor shall provide location and grade construction surveying as required to locate the Work.

3.3 MONUMENTATION

A. The Contractor shall employ a professional land surveyor, duly and properly registered in the State of Idaho, to reference all public and private land survey monuments that will be disturbed by construction activities prior to construction. Reestablish such monuments as part of the survey work for this project before project completion in accordance with Idaho Code. Section corner and quarter corner monuments reset after construction shall include corner perpetuations and filing with the county. Sixteenth corner monuments reset and having existing corner perpetuation filed with the county shall have new perpetuation records filed after the corner has been reset. Perform all monument work in accordance with Title 55, Chapter 16 of the Idaho State Code. Perform all corner, property, and roadway centerline reestablishment in accordance with standard surveying practices under the responsible charge of a professional land surveyor.

END OF SECTION 01 71 23.16

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 01 71 33 - PROTECTION OF ADJACENT CONSTRUCTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements indicated on the drawings and to see that such utilities or other improvements are adequately protected from damage due to all construction operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be directed by the Owner.

1.2 RIGHTS-OF-WAY

A. The Contractor shall not do any work that would affect any oil, gas, sewer, or water pipeline; any telephone, telegraph, or electric transmission line; any fence; or any other structure; nor shall the Contractor enter upon the rights-of-way involved until notified that the Owner has secured authority from the property owner.

1.3 EXISTING UTILITIES AND IMPROVEMENTS

A. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities, including underground utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements specified herein, and in accordance with the requirements of the Contract Documents.

B. The Contractor shall determine the exact locations and depths of all underground utilities indicated on the drawings.

C. The right is reserved to the Owner and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the Work of this contract.

D. Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained, and all utility lines that are constructed during excavation operations, shall be protected from damage during excavation and back-filling and, if damaged, shall be immediately repaired by the Contractor at his expense.

E. In the event that the Contractor damages any existing utility lines that are not shown on the drawings or the locations of which are not made known to the Contractor prior to excavation, the Contractor shall refer to procedures of paragraph 4.04 of General Conditions.

F. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Owner a sufficient time in advance for the necessary measures to be taken to prevent interruption of the service.

G. All repairs to a damaged improvement shall be inspected and approved by an authorized representative of the improvement owner before being concealed by backfill or other work.

H. Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown on the drawings, the Contractor shall, at his own expense, remove and without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the Engineer and the owner of the facility. In all cases of such temporary removal or relocations, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipelines; all buried electric power, communications, or television cables; all traffic signal and street lighting facilities; and all roadway and state highway rights-of-way, the Contractor shall notify the respective authorities representing the owners or agencies responsible for such facilities not less than 3 days nor more that 7 days prior to excavation so that a representative of said owners or agencies can be present during such work if they so desire.

END OF SECTION 01 71 33

SECTION 01 74 30 - SITE PRESSURE PIPE TESTING AND DISINFECTION

Part 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall test all potable water pipelines, utility water, pressure sewer pipe and appurtenant piping, fittings, valves, and meters.

B. The Contractor shall be responsible for obtaining permits for discharging excess testing and disinfection water and dichlorination of such water if required to satisfy permit limits.

1.2 SUBMITTALS

A. The Contractor shall furnish the following information:

1. A testing plan and schedule, including method for conveyance, control, disposal, de-chlorination, and disinfection shall be submitted in writing for approval.

2. Name of certified bacteriological testing laboratory.

3. Provide to the Project Engineer a record of test duration calculations for each segment tested.

Part 2 - PRODUCTS

2.1 MATERIALS

A. All test equipment, chemicals for chlorination, temporary valves, bulkheads, and other water control equipment, and choice of disinfectant shall be as determined by the Contractor.

B. Chlorine for disinfection may be in one of the following forms:

1. Sodium hypochlorite liquid containing approximately 5 to 15% available chlorine, per ANSI/AWWA B 300.

2. Calcium hypochlorite, granular or in 5g tablets containing approximately 65% available chlorine by weight, per ANSI/AWWA B 301.

3. Liquid chlorine: Only with written authorization of the Engineer, in accordance with the requirements of ANSI/AWWA B301 - Liquid Chlorine and only by trained personnel using appropriate safety practices.

C. Dechlorinate water prior to discharge. Dechlorination agents may be sodium bisulfite, calcium bisulfite, sodium sulfite, or sodium thiosulfate.

Part 3 - EXECUTION

3.1 GENERAL

A. Water for section testing pipelines will be furnished by the Owner; however, the Contractor shall convey the water from the owner-designated source to the points of use.

B. All pressure pipelines shall be pressure tested; those for potable water shall be disinfected. All chlorinating and testing operations shall be performed in the presence of the Engineer.

C. Disposal of flushing water and water containing chlorine shall be by methods acceptable to the Idaho Department of Environmental Quality.

D. Disinfection operations shall be scheduled as late as possible during the Contract Time to maximize the degree of sterility of the facilities at the time the Work is accepted by the Owner. Bacteriological testing shall be performed by a certified testing laboratory and paid by the Contractor.

3.2 HYDROSTATIC TESTING OF PIPELINES

A. Prior to hydrostatic testing, pipelines shall be flushed or blown out as appropriate. Flushing pipe velocity shall be 2.5 ft/second minimum.

B. The Contractor shall test pipelines either in sections or as a unit. No section of the pipeline shall be tested until the trench has been properly backfilled and all field-placed concrete or mortar has attained an age of 7 days, or until adequately cured. The test shall be made by closing valves when available or by placing temporary bulkheads in the pipe and filling the line slowly with water. The Contractor shall be responsible for ascertaining that all test bulkheads are suitably restrained to resist the thrust of the test pressure without damage to or movement of the adjacent pipe. Unharnessed sleeve-type couplings, expansion joints, or other sliding joints shall be restrained or suitably anchored prior to the test to avoid movement and damage to piping and equipment. Remove or protect any pipeline-mounted devices that may be damaged by the test pressure. The Contractor shall provide sufficient temporary tapping’s in the pipelines to allow for all entrapped air to exit. After completion of the tests, such taps shall be permanently plugged. Open all air relief valves during filling.

C. The pipeline shall be filled at a rate which will not cause any surges or exceed the rate at which the air can be released through the release valves at a reasonable velocity. All the air within the pipeline shall be allowed to escape. The differential pressure across the orifices in the air release valves shall not be allowed to exceed 5 psi at any time during filling.

D. Verify that, in a minimum two-hour test, the pipe does not leak in excess of the allowable leakage as defined by the following formula in which L is the allowable leakage in gallons per hour.

E. $L = \frac{ND(P)^{1/2}}{7,400}$

Where: L = Allowable Leakage (gallons/hours)

N = Number of Joints in Tested Line - including fittings (number)

D = Nominal Pipe Diameter (inches)

P = Tested Pressure (psi, gauge)

F. For pipe working pressures less than or equal to 100 psi, sustain a test pressure of 150 psi. For pipe working pressures greater than 100 psi, sustain a test pressure at least 1.5 times the working pressure or as determined by the Engineer.

G. Pressure test pipe per ASTM F 2164-02 Field Leaking Testing of Polyethylene (PE) Pressure Piping Systems using Hydrostatic Pressure.

3.3 DISINFECTING PIPELINES – TABLET OR GRANULE METHOD

A. Solution Strength: 25 mg/L minimum.

B. Use: Only if the pipes and appurtenances are kept clean and dry during construction. Do not use on solvent welded plastic or screwed joint steel pipe.

C. Placement When Using Granules: During construction, place calcium hypochlorite granules at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-foot intervals.

D. Granular Quantity:

Ounces of Granules	
Pipe Diameter (inches)	Amount (ounces)
4	0.5
6	1.0
8	2.0
10	3.2
12	4.0
16	8.0
18	10.2
20	12.5
24	18.0

E. Placement When Using Tablets: During construction, place 5g calcium hypochlorite tablets in each section of pipe as noted in Table 2, and also place one tablet in each hydrant, hydrant branch and other appurtenances. Attach tablets to the inside of the pipe using an adhesive such as Permatex No. 2 or approved substitution. Assure no adhesive is on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets at the inside top of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, mark their position on the section so it can be readily determined that the pipe is installed with the tablets at the top.

Number of Tablets [1]	
Pipe Diameter (inches)	No. of 5g Tablets [2]
4	1
6	1
8	2
10	3
12	4
16	6
18	7
20	9
24	13

[1] Adjust for pipe length other than 18 feet.

[2] Based on 3.25g available chlorine per tablet.

F. Filling Procedure: When granule or tablet installation has been completed, fill the main with clean water at a velocity not exceeding 1 fps. Take precautions to assure that air pockets are eliminated. Leave this water in the pipe for at least 24 hours. If the water temperature is less than 41°F, leave the water in the pipe for at least 48 hours. Position valve so that the chlorine solution in the main being treated will not flow into water mains in active service.

3.4 DISINFECTING PIPELINES – CONTINUOUS FEED METHOD

A. Solution Strength: Dose at 25 mg/L for 4 hours

B. Residual: 10 mg/L at 24 hours.

C. Dosing Methods:

1. Liquid Chlorine: Solution feed vacuum-operated chlorinator in combination with a booster pump. Direct feed is not allowed.

2. Hypochlorite Solution: Chemical feed pump designed for feeding chlorine solutions.

3. Calcium Hypochlorite Granules: Refer to previous section.

D. Filling Procedure: Use approved source to flow clean water at a constant, measured rate into the newly laid water main. Fill at a point not more than 10 feet downstream from the beginning of the new main. Measure concentration at regular intervals to ensure a 25 mg/L dose. Position valves so that the chlorine solution in the main being treated does not flow into water mains in active service. Do not stop chlorine application until the entire main is filled with chlorinated water. Retain the chlorinated water in the main for at least 4 hours, operating all valves and hydrants in the section treated. At the end of the 24-hour period, verify the treated water in all portions of the main has a residual of 10 mg/L free chlorine.

3.5 DISINFECTING PIPELINES – SLUG METHOD

A. Solution Strength: 100 mg/L.

B. Dosing Methods: Per the Engineer's direction

C. Filling Procedure: Use approved source to flow clean water at a constant, measured rate into the newly laid water main. Fill at a point not more than 10 feet downstream from the beginning of the new main. Measure concentration at regular intervals to ensure 100 mg/L dose. Apply the chlorine continuously and for the time required to develop a solid column or "slug" of chlorinated water that will, expose all interior surfaces to a 100 mg/L for at least 3 hours. Measure the chlorine residual in the slug as it moves through the main. If at any time it drops below 50 mg/L, stop flow and relocate chlorination equipment at the head of the slug, and as flow is resumed, add chlorine to restore the free chlorine in the slug to not less than 100 mg/L. As the chlorinated water flows past fittings and valves, operate valves and hydrants to disinfect appurtenances and pipe branches.

3.6 DISINFECTING PIPELINES – FINAL FLUSHING

A. After the retention period, flush the chlorinated water from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that in the system, or is acceptable for domestic use.

B. Dispose of flushing water to a location approved by the Engineer.

3.7 DISINFECTING PIPELINES – BACTERIOLOGICAL TESTS

A. After final flushing and before the water main is placed in service, test samples collected from the main(s) for coliform bacteria. Take 2 samples from each location at least 24 hours apart.

B. If the initial disinfection fails to produce approved bacteriological samples, reflush and resample the main. If check samples show bacterial contamination, re-chlorinate the main until approved results are obtained.

3.8 DISINFECTING PIPELINES – SWABBING

A. If connections are not disinfected along with the newly installed main, swab or spray the interior of all pipe and fittings used in making the connections with a 1% hypochlorite solution before installation.

END OF SECTION 01 74 30

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Comply with requirements stated in conditions of the contract and in Specifications for administrative procedures in closing out the Work.

B. Furnish lien waivers, bond extensions, and other required data.

C. Satisfy conditions of the contract, fiscal provisions, legal submittals and additional administrative requirements.

1.2 SUBSTANTIAL COMPLETION

A. When substantially complete, the Contractor shall submit to the Owner:

1. A written notice that the Work, or designated portion thereof, is substantially complete.

2. A list of items to be completed or corrected.

B. Within a reasonable time after receipt of such notice, the Engineer will perform an inspection to determine the status of completion. If the Work is not deemed substantially complete, the following will occur:

1. The Owner will promptly notify the Contractor in writing, giving the reasons therefore.

2. The Contractor shall remedy the deficiencies in the Work, and send a second written notice of Substantial Completion to the Owner.

3. The Owner will request the Engineer to re-inspect the Work.

4. Once the Work is deemed substantially complete and after review and approval, the Engineer will execute and deliver to the Owner and the Contractor, the Certificate of Substantial Completion with a final list of items to be completed or corrected prior to release of final payment.

1.3 PROJECT RECORD DOCUMENTS

A. Maintain at Project site, available to the Owner and Engineer, one copy of the Contract Documents, shop drawings and other submittals, in good order.

1. Mark and record field changes and detailed information contained in submittals and change orders.

2. Record actual depths, horizontal and vertical location of underground pipes, duct banks and other buried utilities. Reference dimensions to permanent surface features.

3. Identify specific details of pipe connections, location of existing buried features located during excavation, and the final locations of piping, equipment, electrical conduits, manholes, and pull boxes.

4. Identify location of spare conduits including beginning, ending, and routing through pull boxes and manholes. Record spare conductors, including number and size, within spare conduits, and filled conduits.

5. Provide schedules, lists, layout drawings, and wiring diagrams.

6. Make annotations with erasable colored pencil conforming to the following color code:

   a. Additions - Red

   b. Deletions - Green

   c. Comments - Blue

   d. Dimensions - Graphite

7. Make all annotations on one set of drawings.

B. Maintain documents separate from those used for construction.

1. Label documents “RECORD DRAWINGS.”

C. Keep documents current.

1. Record required information at the time the material and equipment is installed and before permanently concealing.

2. During progress meetings, record documents will be reviewed to ascertain that changes have been recorded.

D. Submit record documents for review. Submittal shall be in accordance with Section 01 33 00 – Submittal Procedures.

1.4 FINAL SUBMITTALS

A. The Contractor, prior to requesting final payment, shall obtain and submit the following items to the Engineer for transmittal to the Owner:

1. Written guarantees, where required.

2. Technical Manuals and instructions.

3. New permanent cylinders and key blanks for all locks.

4. Maintenance stock items; spare parts; special tools.

5. Completed record drawings.

6. Bonds for roofing, maintenance, etc., as required.

7. Certificates of inspection and acceptance by local governing agencies having jurisdiction.

8. Releases from all parties who are entitled to claims against the subject project, property, or improvement pursuant to the provisions of law.

9. Letter from bonding company stating that bonds will be extended for one year after substantial completion.

B. The Owner will prepare a final Change Order, reflecting approved adjustments to the contract sum which were not previously made by Change Orders.

1.5 FINAL CLEANUP

A. The Contractor shall promptly remove from the vicinity of the completed Work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the Work by the Owner will be withheld until the Contractor has satisfactorily performed the final cleanup of the Site.

1.6 MAINTENANCE AND GUARANTEE

A. The Contractor shall comply with the maintenance and guarantee requirements contained in the General Conditions.

B. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the right to do the Work and the Contractor and its surety shall be liable to the Owner for the cost thereof.

1.7 FINAL PAY ESTIMATE

A. Submit final pay estimate and supporting data to the Owner.

B. Final estimates shall reflect all adjustments to the contract sum:

1. The original contract sum

2. Additions and deductions resulting from:

a. Previous Change Orders

b. Allowances

c. Unit prices

d. Deductions for uncorrected work

e. Penalties and bonuses

f. Deductions for liquidated damages

3. Total contract sum, as adjusted

4. Previous payments

5. Sum remaining due

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall submit technical operation and maintenance information for each item of mechanical and electrical equipment in an organized manner in the Owner's Manual. It shall be written so that it can be used and understood by the Owner's operation and maintenance staff. The Owner's Manual information shall also be submitted in electronic format using a USB flash drive.

B. All manuals supplied to the Owner by suppliers of owner-furnished equipment, shall be inserted into the Owner's Manual by the Contractor. The Contractor shall be responsible for providing all other information.

1.2 OWNER'S MANUAL

A. The Owner's Manual shall include the following for each item of mechanical and electrical equipment (as applicable):

1. Equipment Summary: A summary table shall include the equipment name and equipment number, the manufacturer's model number, serial number, and other nameplate information specific to the equipment provided.

2. Operational Procedures: Manufacturer-recommended procedures on the following shall be included:

    a. Installation

    b. Adjustment

    c. Startup

    d. Location of controls, special tools, equipment required, or related instrumentation needed for operation

    e. Operation procedures

    f. Load changes, Calibration, Shutdown

3. Troubleshooting, Disassembly, Reassembly

    a. Realignment

    b. Testing to determine performance efficiency

c. Tabulation of proper settings for all pressure relief valves, low and high pressure switches, and other protection devices

d. List of all electrical relay settings including alarm and contact settings

4. Preventive Maintenance Procedures:

a. Procedures: Preventive maintenance procedures shall include all manufacturer-recommended procedures to be performed on a periodic basis, both by removing and replacing the equipment or component, and by leaving the equipment in place.

b. Schedules: Recommended frequency of preventive maintenance procedures shall be included. Lubrication schedules, including lubricant SAE grade, type, and temperature ranges, shall be covered.

5. Parts List and Drawings:

a. Parts List: A complete parts list shall be furnished, including a generic description and manufacturer's identification number for each part. Addresses and telephone numbers of the nearest supplier and parts warehouse shall be included.

b. Drawings: Cross-sectional or exploded view drawings shall accompany the part list.

6. Wiring Diagrams: Include complete internal and connection wiring diagrams for electrical equipment items.

7. Shop Drawings: Include approved shop or fabrication drawings, complete with dimensions. Include performance curves for pumps furnished.

8. Safety: This part describes the safety precautions to be taken when operating and maintaining the equipment or working near it.

9. Documentation: All equipment warranties, affidavits, and certifications required by the Technical Specifications shall be placed in this part.

10. Spare Parts: This part shall contain spare parts information for all mechanical, electrical, and instrumentation equipment. The spare parts list shall include the current list price of each spare part. The spare parts list shall be limited to those spare parts which each manufacturer recommends be maintained by the Owner in inventory at the plant site. Each manufacturer or supplier shall indicate the name, address, and telephone number of its nearest outlet of spare parts to facilitate the Owner in ordering. The Contractor shall cross-reference all spare parts lists to the equipment numbers designated in the Contract Documents.

B. If manufacturer's standard brochures and manuals are used to describe operating and maintenance procedures, modify such brochures and manuals **to reflect only the model or series of equipment used on this project and features provided**. Cross out neatly or remove extraneous material, or otherwise annotate or eliminate.

1.3 TRANSMITTAL PROCEDURE

A. Provide three (3) original paper copies and one (1) electronic copy in PDF format of all operating and maintenance information. For ease of identification, label each manufacturer's brochure and manual with the equipment name. Organize the information in 3-ring binders and use an indexing feature within the PDF submission, in numerical order, per Specification Section number. Include in the manuals a table of contents and tab sheets to permit easy location of desired information. Each binder shall include a cover sheet and spine label giving the project name, the Engineer's project number, DEQ loan number, Contractor name and contact information, applicable subcontractor name and contact information, and supplier name and contact information.

B. The Contractor shall submit to the Engineer three identical Owner's Manuals a minimum of 90 calendar days prior to the scheduled startup of the equipment.

C. The Engineer will review the Owner's Manuals within 30 days following their receipt by the Engineer. The Contractor shall then make any corrections and changes noted and compile all the corrected Owner's Manuals for final submittal to the Engineer.

1.4 PAYMENT

A. Acceptable operating and maintenance information for the project must be delivered to the Engineer prior to the project being 75 percent complete or at least two weeks prior to startup of any equipment. Progress payments for work in excess of 80 percent completion or 2 weeks prior to startup will not be made until the specified acceptable operating and maintenance information has been delivered to the Engineer.

1.5 FIELD CHANGES

A. Following the acceptable installation and operation of an equipment item, the item's instructions and procedures are to be modified and supplemented to reflect any field changes or information requiring field data.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION NOT USED

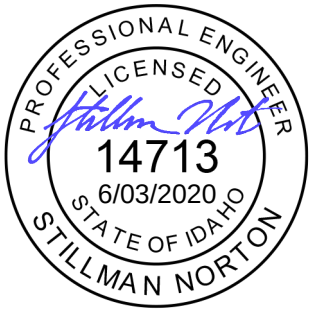
END OF SECTION 01 78 23

THIS PAGE LEFT BLANK INTENTIONALLY

Contract Documents & Specifications

CITY OF ATHOL
WATER SYSTEM IMPROVEMENTS

Volume 2 of 2
Division 02 – Division 40



Funded by DEQ, IDOC, and USDA-RD
DEQ SRF Loan Project Number DW 1906
AIS & Wage Requirements Apply

JUNE 2020

PROJECT NO. 216064-001

PREPARED BY:

KELLER ASSOCIATES

601 Sherman Ave., Suite 1
Coeur d'Alene, ID 83814
(208) 758-8601

PREPARED FOR:

CITY OF ATHOL
IDAHO

30355 N. 3rd Street
Athol, ID 83801
(208) 683-2101

THIS PAGE LEFT BLANK INTENTIONALLY

TABLE OF CONTENTS

BIDDING REQUIREMENTS, CONTRACT FORMS, AND CONDITIONS OF THE CONTRACT

BIDDING DOCUMENTS

00 11 16 Invitation for Bid
00 21 13 Instruction to Bidders
00 41 13 Bid Form
00 43 13 Bid Bond

CONTRACT FORMS

00 51 00 Notice of Intent to Recommend Award
00 52 13 Agreement between Owner and Contractor
00 55 00 Notice to Proceed
00 61 13.13 Performance Bond
00 61 13.16 Payment Bond
00 62 76 Application for Payment
00 65 16 Certificate of Substantial Completion
00 74 00 Agreement Supplements
00 94 39 Field Orders
00 94 49 Work Change Directives
00 94 63 Change Orders

CONDITIONS OF THE CONTRACT

00 62 76.10 Idaho State Tax Requirements
00 72 13 General Conditions
00 73 00 Supplementary Conditions

TECHNICAL SPECIFICATIONS

DIVISION 01 – GENERAL REQUIREMENTS

01 00 00 Special Provisions
01 11 00 Summary of Work
01 14 13 Access to Site
01 21 00 Measurement and Payment
01 25 13 Product Substitution Procedures
01 31 19 Project Meetings
01 32 16 Construction Progress Schedule
01 33 00 Submittal Procedures
01 35 53 Security Procedures
01 42 13 Abbreviations and Acronyms
01 42 19 Reference Standards
01 45 00 Quality Control
01 45 33 Special Inspection, Observation and Testing
01 50 00 Temporary Facilities and Controls
01 57 12 Construction Site Discharge
01 71 13 Mobilization
07 71 23.16 Construction Surveying
01 71 33 Protection of Adjacent Construction
01 74 30 Site Pressure Pipe Testing and Disinfection

DIVISION 01 – GENERAL REQUIREMENTS (CONTINUED)

01 77 00 Closeout Procedures
01 78 23 Operation and Maintenance Data

DIVISION 02 – EXISITING CONDITIONS

02 41 00 Demolition
02 43 16 Structure Raising
02 83 33.13 Lead-Based Paint Removal

DIVISION 03 – CONCRETE

03 11 00 Concrete Forming
03 20 00 Concrete Reinforcing
03 30 00 Cast-In-Place Concrete
03 60 00 Grouting

DIVISION 05 – METALS

05 12 00 Structural Steel Framing
05 50 00 Metal Fabrications

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry
06 17 53 Shop-Fabricated Wood Trusses

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 11 13 Bituminous Dampproofing
07 20 00 Thermal Protection
07 25 00 Weather Barriers
07 40 00 Roofing and Siding Panels
07 60 00 Flashing and Sheet Metal
07 71 00 Roof Specialties
07 92 00 Joint Sealants

DIVISION 08 – OPENINGS

08 11 13 Hollow Metal Doors and Frames
08 31 00 Access Doors
08 71 00 Door Hardware
08 91 00 Louvers

DIVISION 09 – FINISHES

09 29 00 Gypsum Board
09 90 00 Painting and Coating
09 97 13.24 Steel Water Storage Tank Painting

DIVISION 26 – ELECTRICAL

26 05 00 Electrical, General
26 05 19 Low-Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Supporting Devices
26 05 33 Raceways for Electrical Systems
26 05 33.16 Cabinets and Boxes for Electrical Systems

DIVISION 26 – ELECTRICAL (CONTINUED)

26 21 00 Service Entrance
26 22 00 Low Voltage Transformers
26 24 16 Panelboards
26 27 26 Wiring Devices
26 28 00 Overcurrent Protective Devices
26 32 13 Engine Generators
26 36 00 Transfer Switches
26 51 19 LED Interior Lighting
26 56 19 Exterior Lighting

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 31 11 Building Intrusion Detection

DIVISION 33 – UTILITIES

33 11 36 Submersible Centrifugal Well Pumps
33 16 23 Ground Level Steel Water Storage Tanks

DIVISION 40 – PROCESS INTERCONNECTIONS

40 05 00 Piping, General
40 05 07 Hangers and Supports for Process Piping
40 05 19 Ductile Iron Pipe and Fittings
40 05 51 Valves, General
40 05 57 Actuators for Process Valves and Gates
40 05 61 Gate Valves
40 05 64 Butterfly Valves
40 05 97 Piping Identification
40 63 43.A IO Schedules
40 67 00 Control Panels
40 67 00.A Panel List
40 70 00 Instrumentation and Control, General
40 70 00.A Device List
40 70 13 In-Line Liquid Flow Measuring Systems
40 73 00 Pressure Measuring and Detection Systems
40 79 23 Testing, Calibration, and Commissioning

APPENDICES

APPENDIX A – GEOTECHNICAL REPORT (SUPPLEMENTAL INFORMATION)

APPENDIX B – PERMIT INFORMATION

DRAWINGS (BOUND SEPARATELY)

THIS PAGE LEFT BLANK INTENTIONALLY

TECHNICAL SPECIFICATIONS

(Continued)

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 02 41 00 – DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTIONS

A. The Work under this Section includes providing selective demolition of part of the existing facility shown on the drawing and as specified herein.

B. The Work under this Section also includes EPA reporting, testing (unless previously provided to the Contractor), and disposal of structures containing asbestos. The EPA required reporting is required regardless if asbestos is encountered or not.

C. Prior to performing any demolition work, the area to be demolished shall be measured and agreed upon by the Engineer and Contractor. If demolition occurs prior to this measurement and agreement with the Engineer, the Engineer will measure only the area that, in the opinion of the Engineer, should have been the limits of demolition. Repairs to areas outside of these demolition limits, as determined by the Engineer, shall be replaced or reconstructed at no cost to the Owner.

1.2 CONDITION OF STRUCTURES

A. The Owner assumes no responsibility for actual conditions of items or structures to be demolished. Conditions existing at time of commencement of contract will be the responsibility of the Contractor.

1.3 PROTECTION OF FACILITIES

A. Protect from damage existing finish work that is to remain in place that becomes exposed during demolition operations.

B. Protect adjacent areas with suitable coverings when necessary to prevent surface damage, including protecting existing concrete and asphalt surfaces from concrete staining.

C. Remove protections at completion of work.

1.4 ENVIRONMENTAL CONTROLS

A. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

1.5 ASBESTOS REQUIREMENTS

A. Completing the National Emission Standards for Hazardous Air Pollutants (NESHAP) sampling, testing, submitting the EPA notification and any other required submittals as incidental to the Work.

B. The project includes structures with a potential for asbestos containing material (materials other than metal, glass, or PVC plastic). Comply with the following regulations:

1. (NESHAP Regulations 40 CFR 61

2. Toxic Substances Control Act – Asbestos 40 CFR 763

3. Asbestos Hazard Emergency Response Act (AHERA)

4. Relevant OSHA Standards

C. If asbestos is discovered in the course of the demolition work that exceeds the threshold amounts as defined in NESHAP 40 CFR 61.145, comply with the requirements for asbestos containing materials in all of the above listed regulations and standards.

1.6 PERMITS

A. Obtain any permits for building, electrical, or plumbing demolition that may be required for the Work at no additional costs.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing conditions of surrounding area that could be misconstrued as damage resulting from selective demolition work.

3.2 ASBESTOS SAMPLING, TESTING, HANDLING, SHIPPING, AND DISPOSAL

A. Prior to any demolition or renovation, have a National Emissions Standards for Hazardous Air Pollution (NESHAP), Asbestos Hazard Emergency Response Act (AHERA) or Environmental Protection Agency (EPA) certified inspector inspect and collect appropriate samples to determine the presence of Asbestos Containing Material (ACM) in the structure.

B. Have the collected samples analyzed at a certified asbestos analytical laboratory.

C. Generate and submit a copy of the inspection report to the Engineer.

D. If ACM is found and is below the threshold quantities as defined in NESHAP 40 CFR 61.145 Standard for Demolition and Renovation, or if ACM is not present on structures being renovated, complete the EPA Notification requirements below.

E. If ACM is found and was not previously identified in the Contract and is above the threshold quantity as defined in NESHAP 40 CFR 61.145 Standard for Demolition and Renovation, stop Work on the affected structure and notify the Owner and Engineer. Do not proceed with Work on the affected structure until a Change has been issued by the Owner.

3.3 EPA NOTIFICATION REQUIREMENTS

A. Regardless if ACM is found or not, complete a Notification of Demolition/Renovation in writing and submit to the EPA at least 10 days prior to the start of demolition/renovation operations, as outlined in NESHAP 40 CFR 61.145. Use of the following form is recommended.

1. http://www.epa.gov/region10/pdf/asbestos/demolition-renovation-notification-form_fillable.pdf

B. Submit a copy of the notification to the Engineer for concurrence prior to the EPA submittal. Allow 10 working days for Engineer concurrence. Upon concurrence, submit notification to the EPA Region 10 office. At the following address:

Asbestos NESHAP Coordinator
U.S. Environmental Protection Agency
Region 10 Office of Compliance and Enforcement (OCE-101)
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

3.4 PREPARATION

A. Provide shoring, bracing, or support to prevent movement, settlement, or collapse of adjacent facilities to remain.

B. Cease operations immediately if safety of structure or existing facility appears to be endangered. Take precautions to support structure/facilities until determination is made for continuing operations.

3.5 DEMOLITION

A. Demolish concrete flatwork only in areas shown on the drawings to be removed. However, the exact location may be adjusted in the field if required to avoid existing obstacles.

1. The line to be cut shall be marked on the surface along a string-line or straight edge with a marker that will not wash away from the action of the saw's cooling water. All cutting lines shall be marked along straight line prior to cutting.

2. Furnish and operate a power drive, self-propelled wheel mounted pavement sawing machine. The saw blade shall be either a wet cutting or dry cutting type. The depth of the saw shall be controlled by graduated positions set on the machine.

3. Concrete and asphalt slabs shall be cut by saw cutting the slab to full slab depth with one pass of the saw following exactly along the marked cutting line.

B. Where large power driven saws cannot be operated close enough to the end of the slab to completely cut it (i.e. at an abutting wall or foundation) use power driven impact tools and grinders to remove the slab and form a smooth neat joint.

C. Where slab thicknesses exceed the maximum depth of the cutting machine, cut a line as deep as possible with the machine and use power driven impact tolls and grinders to remove the slab and form a smooth neat joint.

D. Remove all foundations shown to be removed. Do not bury unless authorized by the Engineer at the time of demolition.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove debris, rubble and other materials resulting from demolition work. Haul all materials from demolition to a disposal site obtained by the Contractor.

3.7 CLEANUP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and demolished materials from site.

3.8 REPAIR

A. Repair demolition performed in excess of that required. Return structures and surfaces to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02 41 00

SECTION 02 43 16 – STRUCTURE RAISING

PART 1 - GENERAL

1.1 DESCRIPTIONS

A. Furnish design, fabrication and construction required to raise the 250,000 gallon elevated leg supported steel water tank as shown on the drawings and as specified in this Section.

B. Furnish all labor, materials, and equipment required for the design, fabrication and installation of seismic retrofit system for the elevated tank shown on the drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Fabricator's and Installer's Qualifications: Firms regularly engaged in design, fabrication and construction of raised steel water storage tanks and have been preforming such work for not less than 5 years.

B. Design and Construction Standards: The design, fabrication and erection of the storage tank shall be in accordance with the requirements of AWWA D100. Design shall be done by an engineer licensed in Idaho.

C. Design of seismic retrofit system for the elevated tank shall be done by a registered professional engineer in the state where the project is located.

D. Qualification of Welders: Comply with Paragraph 3.03

E. American Welding society (AMS) D1.1 and D1.3.

1.3 SUBMITTALS

A. Contractor shall provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Shop Drawings

1. Erection Drawings

a. Plans and/or elevations locating and defining material furnished by fabricator.

b. Sections and details showing connections, members and their relation to structure.

c. Field installed and component location drawings.

d. Erection sequences and handling requirements.

2. Production Drawings:

a. Elevation view of each member.

b. Sections and details to indicate quantities materials of fabrication.

c. Lifting and erection provisions.

d. Dimensions and finishes.

C. Submittals Before Fabrication: Shop and erection drawings along with structural design calculations shall be submitted for approval before proceeding with any fabrication. The drawings shall be complete with details of all steel items and with details of the assembling of all items required for the complete installation. Standard welding symbols as recommended by the American Welding Society shall be used. Details of all joints referenced on drawings shall also be submitted for approval.

D. Test Reports: Copies of the following test reports shall be furnished:

1. Copies of the manufacturer's mill test reports for steel material.

2. Mill and shop inspections by a commercial inspection agency.

E. At the conclusion of the Work, a written report prepared by the Contractor certifying that the Work was constructed in accordance with AWWA D100.

Provide the following information:

1. Description of the structural design loading conditions used for the design of entire tank including the foundation.

2. Description of the structural design method and codes used in establishing the allowable stresses and safety factors applied in the design.

3. A statement verifying that the structural design has been checked by experienced engineers specializing in hydraulic structures.

4. A statement verifying that the shop drawings have been checked by experienced engineers specializing in hydraulic structures to determine that they agree with the design calculations in member sizes, dimensions, and fabricating process as prescribed by the applicable AWWA standards.

1.4 SCOPE OF WORK

A. Provide field personnel to examine, analyze and measure the existing tank so all conditions relative to the tank raising is known by the Contractor before beginning work. The Contractor is responsible for determining all site conditions related to dimensions, access, overhead restrictions, weight limits and existing tank conditions. The tank is approximately seventy (70) feet from ground to the bottom of the tank and is supported on six steel pipe legs.

B. Design leg extensions, cross bracing and connections to the existing structure associated with the increase in leg height of fifty (50) feet raising the bottom of the tank to one hundred twenty (120) feet above the existing ground.

C. Design modifications to the existing tank legs and cross bracing to comply with the current seismic and wind loading requirements of AWWA D100.

D. Remove the existing cross bracing if removal is required by the design of the new cross bracing.

E. Design Criteria:

1. Loadings for design:

a. Design calculations of products shall be performed by a registered professional engineer registered in the state of the project and experienced in seismic retrofit design.

b. Design the seismic retro fit system using AWWA D100 Welded Carbon Steel Tanks for Water Storage and ASCE 41, Seismic Evaluation and Retrofit of Existing Buildings.

c. Design structure seismic retrofit for an earthquake with a 5 percent probability of exceedance in 50 years or a return period of 975 years.

F. Design, fabricate and install new or modified connections of the new leg extensions to the existing concrete footings.

G. Coordinate the new leg extension and footing connection with the underpinning of the foundations.

H. Design, fabricate and install the center column and water pipe extensions at the center of the tank. The center pier contains a 10 inch water inlet pipe.

I. Design, fabricate and install 10 inch overflow water pipe extensions at the leg of the tank.

J. Design, fabricate and install an extension of the ladder to extend the ladder to the ground with a lockable security door at the bottom.

K. Repaint the exterior of the tank including the tank, support legs, bracing, center column and accessories.

1.5 SITE CONDITIONS

A. A Geotechnical Investigation was prepared for the site. The follow are reported in the Geotechnical Report.

Seismic Risk Category	III
Site Class	C
F_a	1.2
F_v	1.683
S_s	0.364
S_1	0.117
I_E	1.50
Basic Wind Speed	90 mph
I_w	1.15

PART 2 - PRODUCTS

2.1 GENERAL

A. The elevated water tank modifications shall be a designed, shop fabricated, field assembled, field connected to the existing steel tank and concrete foundations.

2.2 MATERIALS

A. Material used in fabrication of the tank modifications shall be new and shall conform to the following requirements:

1. Plates
ASTM A283 (Grade A, B, C) low and intermediate strength carbon steel.

2. Structural Shapes - Nontubular
ASTM A36 Standard Structural Shapes

3. Structural Shapes - Tubular
ASTM A501 Hot Formed Structural Tubing
ASTM A139 (Grade B) Welded Steel Pipe
ASTM A53 (Type E, Grade B) Seamless Steel Pipe

4. Bolts - ASTM A307 (Grade B) Low Carbon Steel Threaded Fasteners

5. Rods - ASTM A36 Structural Steel Bar Stock

2.3 TANK ACCESSORIES

A. The following accessories shall be furnished, fabricated and installed as part of the tank.

1. An inlet-outlet pipe connection as shown on the drawing.

2. A drain pipe outlet with sump as shown on the drawing.

3. An outside ladder with SAF-T CLIMB and ANTI-CLIMB mechanism at the bottom.

2.4 TANK DESIGN FEATURES

A. Column base plates and cap plates shall be seal welded to columns.

B. All ladders shall conform to the safety requirements as required by Federal or State regulations.

C. The elevated tank shall be designed to withstand earthquake loads that are applicable to the site of construction in accordance with AWWA D100.

D. The minimum thickness for any part of the structure shall be 1/4-inch.

E. All column members shall be tubular (i.e., pipe) members.

2.5 WATER PIPE

A. Pipe used for the tank piping shall be ASTM A53 Grade B seamless Pipe with a wall thickness of 3/8 inches. Pipe shall be epoxy lined. Fittings for steel pipe shall be standard weight forged steel seamless fittings conforming to ASTM A234, fittings shall be epoxy lined.

PART 3 - EXECUTION

3.1 SHOP FABRICATION

A. Steel used in the construction of the tank shall be shop fabricated by only experienced workmen. Steel edges to be welded shall be prepared by shearing, machining or by mechanically controlled oxygen cutting. All shop fabrication shall be done in conformity with the approved shop drawings.

3.2 FABRICATION AND ASSEMBLY

A. Conform to the requirement of AWWA D100.

B. Finished tank variation from plumb: 0.5 inches per any 10 feet of height.

C. Finished total height variation from plumb: 3 inches

3.3 WELDING

A. Welder and Welding Operator Performance Qualification: Each welder and welding operator assigned to work on this contract shall be qualified by performance tests using equipment, positions, procedures, and a base metal and electrode or bare filler wire from the same Specification, Classification, or Group Number that will be encountered on his assignment. Welders or welding operators who make acceptable procedure qualification test welds will be considered performance qualified for the welding procedure used.

1. Certification: Prior to assigning any welder or welding operator to work under this contract, the Contractor shall provide the Engineer with the names of the welders and welding operators to be employed on the work together with certification that each individual is performance qualified as specified herein. The certification shall state the type of welding and positions for which he is qualified, the code and procedure under which he is qualified, date qualified, and the firm and individual certifying the qualification tests. The certification shall be kept on file and two copies shall be furnished to the Engineer. The certification shall be kept current for the duration of the contract.

2. Renewal of Qualification: Requalification of a welder or welding operator shall be required under any of the following conditions:

   a. When a welder or welding operator has not used the specific process, i.e., metal arc, gas, submerged arc, etc., to weld either ferrous or nonferrous materials for a period of three months or more, except when employed on some other welding process the period may be extended to six months.

   b. There is specific reason to question his ability to make welds that meet the requirements of these Specifications.

   c. The welder or welding operator was qualified by an employer other than those firms performing work under this contract and a qualification test has not been taken within the proceeding 12 months. Renewal of qualification under this condition need be made in only a single test joint, plate, or pipe on any thickness, position, or material to reestablish the welder's or welding operator's qualification for any thickness, position, or material for which he was previously qualified.

B. Surface Preparation and welding conform to the requirements of AWWA D100.

3.4 INSPECTION AND TESTING OF WELDS

A. Visual Inspection (General): Welds shall be inspected visually and if there is any reason to believe that a weld is defective, the weld shall be examined by radiographic methods to determine conformance to paragraph: STANDARDS OF ACCEPTANCE. When inspection and testing indicates defects in the weld joint, the welds shall be repaired by a qualified welder in accordance with paragraph: CORRECTIONS AND REPAIRS.

1. The following methods shall be used for visual inspection and testing of weld joints:

   a. Prior to welding, for compliance with requirements for joint preparation, placement of backing rings or consumable inserts, alignment and fit-up, and cleanliness.

   b. During welding, for conformance with the qualified welding procedure.

   c. After welding, for cracks, contour and finish, bead reinforcement, undercutting, overlap, and size of fillet welds.

B. Radiographic Inspection: Radiographic inspection shall be done by an independent testing laboratory experienced in radiographic testing. The radiographic testing shall be obtained and paid for by the Contractor.

1. All welds proven defective by the radiographic tests shall be repaired by the Contractor. Repaired welds shall be retested by the Owner's radiographic testing laboratory and the cost of retesting shall be paid for by the Contractor.

2. Weld joints with weld ripples or surface irregularities that might mask or be confused with the radiographic image of any objectionable defect shall be removed by grinding or other suitable mechanical means. The weld surface shall be merged smoothly with the base metal surface.

C. Standards of Acceptance: The following requirements shall be met:

1. Cracks: No cracks will be acceptable regardless of length or location.

2. Porosity, Fusion, and Inclusion: Weld joints in steel shall meet the requirements of AWWA D100.

3. Fillet-Weld Size: The minimum fillet-weld size shall be as indicated on the drawings. The maximum length of a fillet-weld leg shall be 1-1/4 times the minimum specified fillet leg length.

D. Corrections and Repairs: Defects shall be repaired in accordance with approved procedures. Defects discovered between passes shall be repaired before additional weld material is deposited. Wherever a defect is removed and repair by welding is not required, the affected area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners. After a defect is thought to have been removed, and prior to rewelding, the area shall be examined by suitable methods to insure that the defect has been eliminated. After repairs have been made, the repaired area shall be reexamined by the same methods that were originally required for the area. Any indication of a defect shall be regarded as a defect unless reevaluation by nondestructive methods and/or by surface conditioning shows that no unacceptable defect is present.

1. Defect Removal: Defective or unsound weld joints shall be corrected by removing and replacing the entire weld joint, or for the following defects, corrections shall be made as follows:

2. Excessive Weld Porosity, Inclusions, Lack of Fusion, Incomplete Penetrating: Remove defective portions and reweld.

3. Cracks in Weld or Base Metal: Remove crack throughout its length, including sound weld metal for a distance of twice the thickness of the base metal or 2 inches, whichever is less, beyond each end of the crack, followed by the required rewelding.

4. Poor Fit-Up: Improperly fitted parts shall be cut apart and rewelded.

5. Methods of Defect Removal: The removal of weld metal or portions of the base metal shall be done preferably be chipping, grinding, sawing, machining, or other mechanical means. Defects also may be removed by thermal cutting techniques, if appropriate, such as oxygen cutting, oxygen gouging, or air carbon-arc gouging. If thermal cutting techniques are used, the cut surfaces shall be cleaned and smoothed by mechanical means. When removing defective weld areas every effort shall be made to remove the heat-affected base metal adjacent to the area of removal.

6. Rewelding: Repair welds shall be made using an electrode or filler wire preferably smaller than that used in making the original weld. Rewelding shall be done using qualified welding procedures. The surfaces shall be cleaned thoroughly before rewelding. Repair welds shall meet all of the requirements of this Specification. Defective repair welds shall be grounds for rejection of the entire piece or member.

3.5 DISINFECTION

A. When the construction activities required to raise the elevated tank have been completed, the Contractor shall disinfect the tank in accordance with AWWA C652.

END OF SECTION 02 43 16

02 83 33.13 LEAD BASED PAINT REMOVAL AND DISPOSAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Work shall consist of the containment, collection, temporary storage, transportation and disposal of waste from paint removal from the elevated reservoir. Waste requiring containment and control includes, but is not limited to, old paint, spent abrasives, corrosion products, mill scale, dirt, dust, grease, oil, salts, and water used for cleaning the surface of existing coatings prior to painting.

B. The scope of the paint removal activities associated with repaint the existing elevated water tank.

1.2 CONDITION OF STRUCTURES

A. The Owner assumes no responsibility for actual conditions of items or the structure where work is shown. Conditions existing at time of commencement of contract will be the responsibility of the Contractor.

1.3 GENERAL

A. The existing coatings may contain toxic metals. This Specification provides the requirements for containment and for the protection of the public, and the environment from exposure to harmful levels of toxic metals that may be present in the paint being removed or repaired. The Contractor shall take reasonable and appropriate precautions to protect the public from the inhalation or ingestion of dust or debris from the operations, and is responsible for the clean-up of all spills of waste at no additional cost to the Owner.

B. The Contractor shall comply with the requirements of this Specification and all applicable Federal, State, and Local laws, codes, and regulations, including, but not limited to the regulations of the United States Environmental Protection Agency (USEPA), Occupational Safety and Health Administration (OSHA).

C. The Contractor shall comply with all applicable regulations even if the regulation is not specifically referenced herein. If a Federal, State, or Local regulation is more restrictive than the requirements of this Specification, the more restrictive requirements shall prevail.

1.4 SUBMITTALS

A. The Contractor shall submit the following before accomplishing the Work. The submittals shall be provided within 10 days of execution of the contract. The Work cannot proceed until the submittals are accepted. Details for each of the plans are presented within the body of this Specification.

1. Containment Plans. The containment plans shall include drawings, equipment specifications with air flow and ventilation when negative pressure on the interior. The plans shall include copies of the manufacturer’s specifications for the

containment materials and equipment that will be used to accomplish containment and ventilation as applicable.

2. Environmental Monitoring Plan. The Environmental Monitoring Plan shall address the visual inspections and clean up of the soil and water that the Contractor will perform, including final project inspection and cleanup. The plan shall address the daily visible emissions observations that will be performed and the corrective action that will be implemented in the event emissions or releases occur. The plan shall include: A site sketch shall be included, indicating sensitive receptors, monitor locations, and distances and directions from work area. Equipment specification sheet for monitors being used. Include a procedure for operation of monitors per 40 CFR 50, Appendix B. The name, contact information (person's name and number), and certification of the laboratory performing the filter analysis. Laboratory shall be accredited by one of the following: 1) the American Industrial Hygiene Association (AIHA) for lead (metals) analysis, 2) Environmental Lead Laboratory Accreditation Program (ELLAP) for metals analysis, 3) or 3) the EPA National Lead Laboratory Accreditation Program (NLLAP) for lead analysis. The laboratory shall provide evidence of certification, a sample laboratory chain-of-custody form, and sample laboratory report that provides the information required by this Specification. The laboratory shall do the analysis per 40 CFR 50, Appendix G.

3. Waste Management Plan. The Waste Management Plan shall address all aspects of waste handling, storage, testing, hauling and disposal. Include the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. Submit the name and qualifications of the laboratory proposed for Toxicity Characteristic Leaching Procedure (TCLP) analysis. If the use of abrasive additives is proposed, provide the name of the additive, the premixed ratio of additive to abrasive being provided by the supplier, and indicating IEPA acceptance of the material. Note that the use of any steel or iron based material, such as but not limited to grit, shot, fines, or filings as an abrasive additive is prohibited.

4. Contingency Plan. The Contractor shall prepare a contingency plan for emergencies including fire, accident, failure of power, failure of dust collection system, failure of supplied air system or any other event that may require modification of standard operating procedures during lead removal. The plan shall include specific procedures to ensure safe egress and proper medical attention in the event of an emergency.

B. When the Engineer accepts the submittals, the Contractor will receive written notification. The Contractor shall not begin any work until acceptance of the submittals. Acceptance does not imply approval of any particular method or sequence for conducting the Work, or for addressing health and safety concerns. Acceptance of the plans does not relieve the Contractor from the responsibility to conduct the Work according to the requirements of Federal, State, or Local regulations, this Specification, or to adequately protect the health and safety of all workers involved in the project and any members of the public who may be affected by the project. The Contractor remains solely responsible for the adequacy and completeness of the programs and work practices, and adherence to them.

C. Quality Control (QC) Inspections. The Contractor shall perform QC inspections of all environmental control and waste handling aspects of the project to verify compliance with these Specification requirements and the accepted submittals. Contractor QC inspections shall include, but not be limited to the following:

D. As applicable, proper installation and continued performance of the containment system(s) in accordance with the approved drawings.

E. Visual inspections of emissions into the air and verification that the cause(s) for any unacceptable emissions is corrected.

F. Set up, calibration, operation, and maintenance of the ambient air monitoring equipment, including proper shipment of cassettes/filters to the laboratory for analysis. Included is verification that the Engineer receives the results within the time frames specified and that appropriate steps are taken to correct work practices or containment in the event of unacceptable results.

G. Visual inspections of spills or deposits of contaminated materials into the water or onto the ground, pavement, soil, or slope protection. Included is verification that proper cleanup is undertaken and that the cause(s) of unacceptable releases is corrected.

H. Proper implementation of the waste management plan including laboratory analysis and providing the results to the Engineer within the time frames specified herein.

I. Proper implementation of the contingency plans for emergencies. The personnel providing the QC inspections shall poses current SSPC-C3 certification or equal, including the annual training necessary to maintain that certification (SSPC-C5 or equal)

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 PAINT REMOVAL METHODS

A. Abrasive blasting: the use of either air pressure or a centrifugal wheel and abrasive particles to remove surface coatings or to prepare a surface for paint application.

B. Wet abrasive blasting: abrasive blasting with the addition of water to the air abrasive stream.

C. Power tool: an electric or pneumatic rotary peening tool, needle gun or other tool that breaks and removes a coating, or an electric or pneumatic tool that abrades the coating and is equipped with a high efficiency particulate air (HEPA) filter vacuum.

D. Vacuum blasting: dry abrasive blasting with either a blast nozzle that is surrounded by a chamber evacuated with negative air pressure, and that is held against the coated surface.

3.2 CONTAINMENT REQUIREMENTS

A. The Contractor shall install and maintain containment systems for the purpose of controlling emissions of dust and debris according to the requirements of this Specification. Working platforms (if used) and containment materials that are used shall be firm and stable and platforms shall be designed to support the workers, inspectors, spent surface preparation media (e.g., abrasives), and equipment during all phases of surface preparation and painting. Platforms, cables, and other supporting structures shall be designed according to OSHA regulations. If the containment needs to be attached to the structure, the containment shall be attached by bolting, clamping, or similar means. Welding or drilling into the structure is prohibited.

B. The containment system for removal of paint shall maintain the work area free of visible emissions of dust and debris with no debris permitted outside of the regulated area at any time. All debris within the regulated area and within the containment shall be collected at the end of the last shift each day, and properly stored in sealed containers. Cleaning shall be accomplished by HEPA vacuuming unless it is conducted within a containment that is designed with a ventilation system capable of collecting the airborne dust and debris created by sweeping and blowing with compressed air. The ventilation system shall be in operation during the cleaning.

C. The containment systems shall meet the following requirements:

1. Dry Abrasive Blast Cleaning - Full Containment with Negative Pressure (SSPC Class 1A) Airflow inside containment shall be designed to provide visibility and reduce worker exposures to toxic metals according to OSHA regulations. The blast enclosure shall have an airlock or resealable door entryway to allow entrance and exit from the enclosure without allowing the escape of blasting residue. If recyclable metallic abrasives are used, the Contractor shall operate the equipment in a manner that minimizes waste generation. Steps shall also be taken to minimize dust generation during the transfer of all abrasive/paint debris (expendable or recyclable abrasives) for recycling or disposal. The equipment shall be enclosed if visible dust and debris are being emitted and/or the regulated area or high volume monitor lead levels are not in compliance. Areas beneath containment connection points that were shielded from abrasive blast cleaning shall be prepared by vacuum blast cleaning or vacuum-shrouded power tool cleaning after the containment is removed.

2. Vacuum Blast Cleaning within Containment (SSPC-Class 4A) Vacuum blasting equipment shall be fully automatic and capable of cleaning and recycling the abrasive. The system shall be designed to deliver cleaned, recycled blasting abrasives and provide a closed system containment during blasting. The removed coating, mill scale, and corrosion shall be separated from the abrasive, and stored for disposal. The Contractor shall attach containment materials around and under the work area (as needed) to catch and contain abrasive and waste materials in the event of an accidental escape from the vacuum shroud.

3. Vacuum-Shrouded Power Tool Cleaning within Containment (SSPC-Class 3P) The Contractor shall utilize power tools equipped with vacuums and High Efficiency Particulate Air (HEPA) filters.

4. Power Tool Cleaning without Vacuum, within Containment (SSPC-Class 2P) The Contractor shall securely install containment around the work area to capture and collect all debris that is generated.

5. Water Washing, Water Jetting or Wet Abrasive Blast Cleaning within Containment (SSPC Class 2W-3W) Water washing for the purpose of removing chalk, dirt, grease and other surface debris, and water jetting or wet abrasive blast cleaning for the purpose of removing paint and surface debris shall be conducted within a containment designed, installed, and maintained in order to capture and contain all water and waste materials. When water is used for surface cleaning, the collected water shall be filtered to separate the particulate from the water. Recycling of the water is preferred in order to reduce the volume of waste that is generated. The water after filtration shall be collected and disposed of according to the waste handling portions of this Specification. When a slurry is created by injecting water into the abrasive blast stream, the slurry need not be filtered to separate water from the particulate.

3.3 CONTAINMENT

A. The basic components that make up a containment systems are defined below. The use of these components may vary depending on the containment strategy submitted by the Contractor and approved by the Engineer.

1. Containment Materials - Rigid containment materials consist of solid panels of plywood, aluminum, rigid metal, plastic, fiberglass, composites, or similar materials. Flexible materials consist of screens, tarps, drapes, plastic sheeting, or similar materials.

2. Permeability of Containment Materials - The containment materials are identified as air impenetrable if they are impervious to dust or wind such as provided by rigid panels, coated solid tarps, or plastic sheeting. Air penetrable materials are those that are formed or woven to allow air flow. Water impermeable materials are those that are capable of containing and controlling water when wet methods of preparation are used. Water permeable materials allow the water to pass through. Chemical resistant materials are those resistant to chemical and solvent stripping solutions. Use fire retardant materials in all cases.

3. Support Structure - Rigid support structures consist of scaffolding and framing to which the containment materials. Use fire retardant materials in all cases.

4. Containment Joints - Fully sealed joints require that mating surfaces between the containment materials and to the structure being prepared are completely sealed.

5. Entryway - An airlock entryway involves a minimum of one stage that is full sealed to the containment and which is maintained under negative pressure using the ventilation system of the containment. Resealable door entryways involve the use of flexible or rigid doors capable of being repeatedly opened and resealed. Sealing methods include the use of zippers, Velcro, clamps, or similar fasteners. Overlapping door tarpaulin entryways consist of two or three overlapping door tarpaulins.

6. Mechanical Ventilation - The requirement for mechanical ventilation is to ensure that adequate air movement is achieved to reduce worker exposure to toxic metals to as low as feasible according to OSHA regulations (e.g., 29 CFR 1926.62), and to enhance visibility. Design the system with proper exhaust ports or plenums, adequately sized ductwork, adequately sized discharge fans and air cleaning devices (dust collectors) and properly sized and distributed make-up air points to achieve a uniform air flow inside containment for visibility. The design target for airflow shall be a minimum of 100 ft. per minute cross-draft or 60 ft. per minute downdraft. Increase these minimum airflow requirements if necessary to address worker lead exposures.

7. Negative Pressure - Achieve a minimum of 0.05 in. water column (W.C.) relative to ambient conditions.

8. Exhaust Ventilation -Provide exhaust filtration of the exhaust air, to achieve a filtration efficiency of 99.9 percent at 0.02 mils (0.5 microns).

3.4 MONITORING

A. The Contractor shall prepare an Environmental Monitoring Plan. The purpose of the plan is to address the observations and equipment monitoring undertaken by the Contractor to confirm that project dust and debris are not escaping the containment into the surrounding air, soil, and water.

1. Soil and Water. Containment systems shall be maintained to prevent the escape of paint chips, abrasives, and other debris into the water, and onto the ground, soil and pavements. If there are inadvertent spills or releases, the Contractor shall immediately shut down the emissions-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

2. Visible Emissions. The Contractor shall conduct observations of visible emissions and releases on an ongoing daily basis when dust-producing activities are underway, such as paint removal, clean up, waste handling, and containment dismantling or relocation. If visible emissions in excess of SSPC Guide 6, Level 1 or releases are observed, the Contractor shall immediately shut down the emission-producing operations, clean up the debris, and change work practices, modify the containment, or take other appropriate corrective action as needed to prevent similar releases from occurring in the future.

3. Ambient Air Monitoring. The Contractor shall perform ambient air monitoring according to the following:

4. Equipment Provided by Contractor. The Contractor shall provide up to 4 monitors at the work site and all necessary calibration and support equipment, filters, flow chart recorders and overnight envelopes for shipping the filters to the laboratory. Each monitor shall be tagged with the calibration date.

B. Monitoring shall be performed for the duration of dust-producing operations (e.g., paint removal, waste handling, containment clean-up and movement, etc.) or a minimum of 8 hours each day (when work is performed). The monitoring schedule shall be as follows:

1. For dry abrasive blast cleaning monitoring shall be conducted full time during all days of dust-producing operations (e.g., paint removal, waste handling, containment movement, etc.).

2. For wet abrasive blast cleaning, water jetting, or power tool cleaning, monitoring shall be conducted for the first 5 days of dust producing operations. If the results after 5 days are acceptable, monitoring may be discontinued. If the results are unacceptable, corrective action shall be initiated to correct the cause of the emissions, and monitoring shall continue for an additional 5 days. If the results are still unacceptable, the Engineer may direct that the monitoring continue full time.

3.5 DISPOSAL OF WASTE MATERIALS:

A. The Contractor is responsible for all aspects of waste collection, testing and identification, handling, storage, transportation, and disposal according to these specifications and all applicable Federal, State, and Local regulations. The Contractor shall provide a Waste Management Plan that addresses all aspects of waste handling, storage, and testing, and provides the names, addresses, and a contact person for the proposed licensed waste haulers and disposal facilities. All surface preparation/paint residues shall be collected daily and deposited in all-weather containers supplied by the Contractor as temporary storage. The storage area shall be secure to prevent unauthorized entry or tampering with the containers. Acceptable measures include storage within a fully enclosed (e.g., fenced in) and locked area, within a temporary building, or implementing other reasonable means to reduce the possibility of vandalism or exposure of the waste to the public or the environment (e.g., securing the lids or covers of waste containers and roll-off boxes). Waste shall not be stored outside of the containers. Waste shall be collected and transferred to bulk containers taking extra precautions as necessary to prevent the suspension of residues in air or contamination of surrounding surfaces. Precautions may include the transfer of the material within a tarpaulin enclosure. Acceptable containers include covered roll-off boxes and 55-gallon drums. The Contractor shall ensure that no breaks and no deterioration of these containers occur. The containers shall be kept closed and sealed from moisture except during the addition of waste. The Contractor shall have each waste stream sampled for each project and tested by TCLP and according to EPA and disposal company requirements. If approved abrasive additives are used that render the waste non-hazardous as determined by TCLP testing, the waste shall be classified as a non-hazardous special waste, transported to a disposal facility.

B. When paint is removed without the use of abrasive additives, the paint, together with the surface preparation media (e.g. abrasive) shall be handled as a hazardous waste, regardless of the TCLP results. The waste shall be transported by a licensed hazardous waste transporter, treated by a treatment facility to a non-hazardous special waste and disposed at a disposal facility.

C. The Contractor shall make arrangements to have other hazardous waste, which he/she generates, such as used paint solvent, transported to the Contractor's facility at the end of each day that this waste is generated. These hazardous wastes shall be manifested using

the Contractor's own generator number to a treatment or disposal facility from the Contractor's facility. The Contractor shall not combine solvents or other wastes with cleaning residue wastes. All waste streams shall be stored in separate containers. The Contractor is responsible for the payment of any fines and undertaking any clean up activities mandated by State or federal environmental agencies for improper waste handling, storage, transportation, or disposal. Contractor personnel shall be trained in the proper handling of hazardous waste, and the necessary notification and clean up requirements in the event of a spill.

3.6 CLEANUP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment, and waste materials from site.

3.7 REPAIR

A. Repair any damage performed in excess of that required and any areas that are damaged by the Contractor’s operation as a result of the demolition work. Return reservoir and surrounding area to a condition equal to that existing prior to commencement of construction.

END OF SECTION 02 83 33.13

SECTION 03 11 00 – CONCRETE FORMING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required for forming cast-in-place concrete, including necessary shoring, bracing, and anchorage.

B. Construct openings in formwork as required for other related work.

C. Provide and install all form accessories such as snap ties, bracing, etc.

D. Stripping of forms from finished concrete.

1.2 QUALITY ASSURANCE

A. Designer's Qualifications: Professional engineer, licensed in State where Work is to be done and having experience in concrete formwork. The Contractor is responsible for the design and adequacy of formwork and shoring.

B. Submit concrete form designs for review for all forming where the height of the concrete work exceeds four feet. Submit shoring designs for all concrete work where shoring is required.

1. Design and provide forms for pressure resulting from placement of concrete and construction loads while maintaining the specified tolerances.

2. Forming shall have sufficient strength to support loads, lateral pressure, and allowable stresses outlined in ACI 347 and for design considerations including wind load, temporary construction load and construction equipment loads.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Smooth Forms: Pre-manufactured forms or job fabricated forms using plyform faced with material which will produce smooth, hard, uniform texture on concrete.

1. Arrange facing materials orderly and symmetrical, keeping number of seams to a practical minimum.

2. Do not use material with raised grain, patches, or other defects which will impair texture of concrete surfaces.

B. Forming accessories:

1. Do not use nonfabricated wire.

2. Use form ties constructed so that ends or end fasteners can be removed without causing appreciable spalling of concrete faces.

3. After ends or end fasteners of form ties have been removed, embedded portion of ties to terminate not less than two diameters from formed faces of concrete, but in no case less than 3/4 inch.

4. When formed face of concrete is not to be permanently exposed to view, form ties may be cut off flush with formed surfaces.

5. Use ties with 3/4 inch diameter cones and a 1-1/2 inch break back on both ends for water retaining structures. Ties are to be furnished with a water seal or stop.

6. Snap ties, if used, shall not be broken until the concrete has reached the design concrete strength. Snap ties, designed so that the ends must be broken off before the forms can be removed, shall not be used. The use of tie wires as form ties will not be permitted. Fully threaded stub bolts may be used in lieu of smooth ties with waterstops.

7. Taper ties with plastic or rubber plugs of an approved and proven design may also be used. The plugs must be driven into the hole with a steel rod, placed in a cylindrical recess made for the plug. At no time shall plugs be driven on the flat area outside the cylindrical recess. Plugs shall be A-58 Sure Plug as manufactured by Dayton Superior.

8. Form ties which remain in the corewall of water-retaining structures shall have waterstops and a one-inch minimum breakback or cone depth.

C. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

D. Fillets for Chamfered Corners: Wood or plastic strips attached to the inside of forms.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify lines, levels, and measurements before proceeding with formwork. Ensure dimensions agree with the Drawings.

3.2 CONSTRUCTION

A. Make forms sufficiently tight to prevent loss of cement paste.

B. Place chamfer strips in corners of forms to produce beveled edges on permanently exposed surfaces.

1. Interior corners on such surfaces and edges of formed joints will not require beveling.

C. To maintain specified finish tolerances, chamfer formwork to compensate for anticipated deflections.

D. Provide positive means of adjustment using wedges or jacks, or shores and struts, and take up all settlement during concrete placing operation.

E. Securely brace forms against lateral deflection.

F. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not be apparent in exposed concrete surfaces.

G. At construction joints, overlap forms over hardened concrete at least 6 inches. Hold forms against hardened concrete to prevent offsets or loss of mortar at construction joint and to maintain true surface.

H. Provide runways for moving equipment with struts or legs, supported directly on formwork or structural member without resting on reinforcing steel.

I. Anchor formwork to shores or other supporting surfaces or members so that upward or lateral movement of any part of formwork system is prevented during concrete placement.

J. Position expansion joint material and other embedded items accurately and support against displacement.

K. The wall form design shall be such that wall sections can be poured full height without creating horizontal cold joints and without causing snapping of form ties which shall be of sufficient strength and number to prevent spreading of the forms during placement of concrete and which shall permit ready removal of the forms without spalling or damaging the concrete.

3.3 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for Work embedded in or passing through concrete.

B. Coordinate Work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

C. Install accessories in accordance with manufacturer's instructions, level and plumb with templates where necessary. Ensure items are not disturbed during concrete placement.

3.4 FORM FINISHES

A. Use smooth forms for natural plywood, grout cleaned, smooth rubbed, scrubbed, or sand floated finishes.

1. Fabricate true-to-line in order that surfaces produced will require little dressing to arrive at true surfaces.

2. Where an as-cast finish is required, no dressing shall be permitted in the finishing operation.

B. Install form panels in orderly arrangement with joints planned in approved relation to building elements.

3.5 FORM COATING

A. Unless otherwise specified or approved, treat surfaces of forms.

B. Cover surfaces of forms with form coating to aid in removal of forms with minimal damage to concrete.

3.6 REMOVAL OF FORMS

A. Formwork for columns, walls, sides of beams, and other parts not supporting weight of concrete may be removed as soon as concrete has hardened sufficiently to resist damage from removal.

B. Where no re-shoring is planned, leave forms and shoring used to support weight of concrete in beams, slabs, and other concrete members in place until concrete has attained its specified strength as determined by test cylinders.

C. Where reshoring is planned, supporting formwork may be removed when concrete has reached 70 percent of specified strength as determined by test cylinders, provided reshoring is installed immediately.

D. When shores and other vertical supports are so arranged that non-load carrying, form-facing material may be removed without loosening or disturbing shores and supports, facing material may be removed at an earlier age as permitted. Forms may not be removed prior to 24 hours after placement of concrete.

3.7 RESHORING

A. Design, engineering, and construction of reshoring is the responsibility of the Contractor.

B. While reshoring is under way, allow no live load on new construction.

C. During reshoring do not subject concrete in beam, slab, column, or any other structural member to combined dead and construction loads in excess of loads permitted by the Engineer for developed concrete strength at time of reshoring.

D. Place reshores as soon as practicable after stripping operations are complete, but in no case later than end of working day on which stripping occurs.

E. Tighten reshores to carry required loads without over stressing.

F. Leave reshores in place until tests representative of concrete being supported have reached specified strength.

G. For floors supporting shores under newly placed concrete, level original supporting shore in place or reshore.

3.8 REUSE OF FORMS

A. Do not reuse forms if there is any evidence of surface wear or defect which would impair quality of surface.

B. Thoroughly clean and properly coat forms before reuse.

END OF SECTION 03 11 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and place reinforcing steel and reinforcing steel accessories in accordance with the drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Fabrication tolerances:

1.	Sheared length	± 1 inch
2.	Overall for stirrups, ties, and spirals	± 1/2 inch
3.	All other bends	± 1 inch

B. Placement tolerance:

1.	Spacing	1/4 inch
2.	Clear distance	+ 1/4 inch
3.	Lengthwise location	2 inches

C. Submit shop fabrication drawings of reinforcement prior to placing concrete.

D. Comply with the requirements of ACI 315.

E. Submit mill test certificates of supplied concrete reinforcing, indicating physical and chemical analysis.

F. Submit certifications for welders employed on the project, verifying AWS qualification within the last 12 months.

1.3 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Indicate sizes, spacings, locations, and quantities of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting, and spacing devices.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Furnish steel reinforcing bars of the type and grade as shown on the contract drawings conforming to the following steel reinforcing bars specifications. If bar type and grade are not shown on the drawings, furnish bars conforming to paragraph B below.

B. Reinforcing Steel Bars: ASTM A615, Grade 60 billet-steel deformed bars, uncoated as shown on the plans.

C. Welded Steel Wire Fabric: ASTM A1064 plain type; in flat sheets or coiled rolls uncoated finish as shown on the plans.

D. Low Alloy Reinforcing Steel Bars: ASTM A706, Grade 60 low alloy steel deformed bars, uncoated as shown on the plans.

E. Smooth dowel bars for construction joints: ASTM A29, Grade 60.

1. Where indicated, provide metal dowel cap at one end of dowel to permit longitudinal movement of dowel within concrete section.

2. Provide for movement which equals joint width plus one-half inch.

F. Corrosion Resistant Steel Bars: ASTM A615 Grade 75 and ASTM A1035-16b, Low Carbon Chromium Steel Reinforcing Bars.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gauge annealed type.

B. Chairs, Bolster, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete.

2.3 FABRICATION

A. Fabricate reinforcement in accordance with ACI 315.

B. Locate reinforcing splices only where shown on the drawings. Indicate location of splices on shop drawings.

C. Weld reinforcing bars only where shown on the drawings. Furnish ASTM A706 reinforcing steel only where welding is required. Weld reinforcing bars in accordance with AWS D1.4.

PART 3 - EXECUTION

3.1 PLACING

A. All reinforcement to be free of loose mill scale, loose or thick rust, dirt, paint, oil or grease and have a clean surface.

B. Place all reinforcement in the exact position shown on the plans and approved shop drawings and secure in position during the placing and compacting of concrete. Wire bars together with No. 16 gauge wire with ties at all intersections except where spacing is less than 12 inches in each direction, in which case tie alternate intersections.

C. Maintain the distance from the forms and between layers of reinforcement by means of prefabricated chairs, precast mortar blocks, ties, hangers, or other approved devices. Placing and fastening of reinforcement in each section of the Work must be approved by the Engineer before any concrete is deposited in the section.

D. Do not tack weld reinforcing bars.

E. Overlap sheets of metal mesh 1 square plus 6 inches to maintain a uniform strength, and securely fasten at the ends and edges, and support to maintain clearances.

F. Support reinforcing steel for formed floor slabs on metal chairs or slab bolsters. Size chairs or bolsters to position the steel in the exact location shown on the plans. Space chairs for supporting the top steel and bolsters for supporting the bottom steel not more than 5 feet on centers in each direction. Plastic coat the portion of the metal support in contact with the forms to prevent rust. Tie down deck steel to beams or forms at regular intervals of not more than 5 feet on centers along the beams to prevent movement of the steel during placing of the concrete.

3.2 SPLICING

A. Furnish all reinforcement in the full lengths indicated on the plans unless otherwise permitted. Splicing of bars, except where shown on the plans, not permitted without written approval from the Engineer. Stagger splices as far as possible.

B. Do not use lap splices on No. 14 and 18 bars.

C. Weld reinforcing steel only if detailed on the drawings

D. Do not bend reinforcement after embedding in hardened concrete.

E. Do not extend bars continuously through any expansion joint except expansion dowels.

END OF SECTION 03 20 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish all labor, materials, and equipment required for the construction of cast-in-place concrete as shown on the drawings and as specified herein.

1.2 DEFINITIONS

A. Cold Weather: When ambient temperature is below 40 degrees Fahrenheit or is approaching 40 degrees Fahrenheit and falling.

B. Contractor's Licensed Design Engineer: Individual representing Contractor who is licensed to practice engineering as defined by statutory requirements of professional licensing laws in state or jurisdiction in which Project is to be constructed.

C. Defective Area: Surface defects that include honeycomb, rock pockets, indentations, and surface voids greater than 3/16 inch deep, surface voids greater than 3/4 inch in diameter, cracks in liquid containment structures and below grade habitable spaces that are 0.005 inch wide and wider, and cracks in other structures that are 0.010 inch wide and wider, spalls, chips, embedded debris, sand streaks, mortar leakage from form joints, deviations in formed surface that exceed specified tolerances and include but are not limited to fins, form pop-outs, and other projections. At exposed concrete, defective areas also include texture irregularities, stains, and other color variations that cannot be removed by cleaning.

D. Exposed Concrete: Concrete surface that can be seen inside or outside of structure regardless of whether concrete is above water, dry at all times, or can be seen when structure is drained.

E. Hot Weather: As defined in ACI 305.1.

F. Hydraulic Structure: Liquid containment structure.

G. New Concrete: Less than 60 days old.

H. Slurry Mixture: Mixture of sand, 3/8 inch maximum nominal aggregate size, cement, and water for wall construction joints with waterstop.

1.3 JOB CONDITIONS

A. In hot and cold weather, comply with the requirements of ACI 305 and 306.

B. Do not place concrete on frozen ground.

C. Unless adequate protection is provided, do not place concrete during rain, sleet, or snow.

D. Do not allow rain water to increase mixing water or damage surface finish.

1.4 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Submit mix design to be used for each class of concrete.

C. Submit location of materials source, admixtures to be used, and other related data.

D. Submit test reports showing suitability of aggregates used in concrete mixes.

E. Detailed plan for curing and protection of concrete: Detailed plan for curing and protection of concrete placed and cured in cold weather. Plan shall include, but not be limited to, the following:

1. Procedures for protecting sub grade from frost and accumulation of ice or snow on reinforcement, other metallic embeds, and forms prior to placement.

2. Procedures for measuring and recording temperatures of reinforcement and other embedded items prior to concrete placement.

3. Methods for temperature protection during placement.

4. Types of covering, insulation, housing, or heating to be provided.

5. Curing methods to be used during and following protection period.

6. Use of strength accelerating admixtures.

7. Methods for verification of in-place strength.

8. Procedures for measuring and recording concrete temperatures.

9. Procedures for preventing drying during dry, windy conditions.

F. Detailed plan for hot weather placements including curing and protection for concrete placed and cured in hot weather. Plan shall include, but not be limited to, the following:

1. Procedures for measuring and recording temperatures of reinforcement and other embedded items prior to concrete placement.

2. Use of retarding admixture.

3. Methods for controlling temperature of reinforcement and other embedded items and concrete materials before and during placement.

4. Types of shading and wind protection to be provided.

5. Curing methods, including use of evaporation retardant.

6. Procedures for measuring and recording concrete temperatures.

7. Procedures for preventing drying during dry, windy conditions.

G. Informational Submittals:

1. Preinstallation Conference minutes.

2. Manufacturer's application instructions for bonding agent and bond breaker.

3. Manufacturer's Certificate of Compliance to specified standards:

a. Bonding agent.

b. Bond breaker.

4. Statement of Qualification:

a. Batch Plant: Certification as specified herein.

b. Mix designer.

c. Installer.

d. Testing agency.

5. Field test reports.

6. Recorded temperature data from concrete placement where specified.

7. Tightness test results.

8. Concrete Delivery Tickets:

a. For each batch of concrete before unloading at Site.

b. In accordance with ASTM C94, including requirements 14.2.1. through 14.2.10.

c. Indicate amount of mixing water withheld and maximum amount that may be permitted to be added at Site.

1.5 QUALITY ASSURANCE

A. Concrete construction shall conform to requirements of ACI 117 and ACI 301, except as modified herein.

B. Qualifications:

1. Batch Plant: NRMCA Program for Certification of Ready-Mixed Concrete Production Facilities or approved equivalent program.

2. Mix Designer: Person responsible for developing concrete mixture proportions certified as NRMCA Concrete Technologist Level 2 or DOT certified mix designer in jurisdiction of the Work. Requirement may be waived if individual is Contractor's Licensed Design Engineer.

3. Testing Agency: Unless otherwise permitted, an independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 for testing indicated.

    a. Where field testing is required of Contractor, personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-l or an equivalent certification program.

    b. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade 1. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician – Grade II.

C. Preinstallation Conference:

1. Required Meeting Attendees:

    a. Contractor, including pumping, placing and finishing, and curing subcontractors.

    b. Ready-mix producer.

    c. Admixture representative.

    d. Testing and sampling personnel.

    e. Engineer who authored Statement of Special Inspection Plan or Engineer's designee.

2. Schedule and conduct prior to incorporation of respective products into Project. Notify Engineer of location and time.

3. Agenda shall include:

    a. Admixture types, dosage, performance, and redosing at Site.

    b. Mix designs, test of mixes, and Submittals.

    c. Placement methods, techniques, equipment, consolidation, and form pressures.

    d. Slump and placement time to maintain slump.

    e. Finish, curing, and water retention.

    f. Thermal control plan.

    g. Protection procedures for weather conditions.

    h. Other specified requirements requiring coordination.

4. Conference minutes as specified in Section 01 31 19 - Project Meetings.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Portland Cement: Use Portland cement conforming to the requirements of ASTM C150 Type II for low alkali cement.

B. General Admixtures: Admixtures, other than air-entraining agents, may be used when the type and amount to be used are approved. Calcium chloride will not be allowed as an admixture.

C. Air-Entraining Agents: Use air-entraining agents to the requirements of ASTM C260 added to the mixing water.

D. Water Reducing Agents: Water reducing or water reducing and retarding admixtures may be used to increase workability of the concrete when approved by the Engineer. Use only admixtures produced by a company approved by the Engineer. Use water reducing admixtures conforming to ASTM C494.

E. High Range Water Reducer: Conforming to ASTM C494, Type F or G. The preferred admixture shall be free of chlorides and alkalines. A second-generation-type high-range water reducer shall be Type G and be batch-plant-added,

F. Water: Use potable water for mixing concrete.

G. Coarse Aggregate: Use coarse aggregate that consists of gravel, crushed slag, crushed stone or other approved inert materials, composed of hard, strong and durable particles, free of injurious coatings, and conforming to the requirements of ASTM C33, except as modified herein.

1. Use only aggregates that include deleterious substances not exceeding the following:

	Percent Passing (by weight)
Soft Fragments	0.20
Coal and Lignite	0.30
Clay Lumps	0.30
Other Deleterious Substances	2.00
Minus 200 Material	1.75

2. Use coarse aggregate meeting the following gradations when tested in accordance to the requirements of ASTM C136.

	Percent Passing (by weight)				
Coarse Aggregate Size	1"	3/4”	3/8"	No. 4	No. 8
3/4” to No. 4	100	90-100	20-55	1-10	0-5

H. Fine Aggregate: Use aggregate of natural sand or other approved inert materials composed of hard, strong, and durable particles conforming to the requirements of ASTM C33 except as modified herein.

1. Use only aggregates that include deleterious substances not exceeding the following:

	Percent (by weight)
Clay Lumps	0.50
Coal and Lignite	0.30
Other Deleterious Substances	2.00
Minus 200 Material	1.75

2. Moisture content of fine aggregate shall not exceed 8 percent.

3. Use fine aggregate that is uniformly graded from coarse to fine within the following gradation, when tested in accordance to the requirements of ASTM C136.

Sieve Size	Percent Passing (by weight)
3/8"	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

I. Curing Compounds: Use curing compounds that meet the requirements of ASTM C309.

J. Chemical Hardener:

1. Colorless, aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent.

2. Not less than 2 pounds fluosilicate per gallon.

3. Provide materials which do not react with, inhibit, or otherwise interfere with adhesives and bonding of future floor finishes.

4. Acceptable Products: L&M Chem-Hard by Laticrete; MasterKure HD 300WB by BASF, or approved alternate.

K. Waterstops and Joint Fillers:

1. Waterstop of Joints: Extruded PVC waterstop, shape and size as shown on the drawings. Thermo bond all joints in PVC waterstops.

2. Expansive Water Stop: Expansive waterstop shall be a bentonite/butyl rubber based waterstop that expands on exposure to water. It shall be applied in accordance with manufacturer's recommendations.

3. Joint Filler: Type B: Provide closed cell polyvinyl chloride foam per ASTM D1752 requirements with resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness.

L. Fly ash shall be Class F conforming to AASHTO M 295 with the additional requirement that the available alkalis in the fly ash shall not exceed 2 percent.

M. Concrete Sealer: Concrete sealer is intended to be used on concrete slabs to prevent dusting and staining. The products listed are not intended to be used as curing compounds or for sealing the slab against water leakage.

1. Manufacturers: One of the following or equal:

a. Euco Diamond Hard by Euclid Chemical

b. L&M Seal Hard by Laticrete

2.2 PROPORTIONING

A. In proportioning materials for mixing, use certified scales. Do not use volume measurement except for water and liquid admixtures.

B. Proportion the materials to produce concrete having the following properties or limitations:

Property of Mix	5,000 psi Concrete	4,000 psi Concrete	3,000 psi Concrete
Minimum Compressive Strength (at 28 day test) fc (pounds per square inch)	5,000	4,000	3,000
Minimum Compressive Strength (at 7 day test) (pounds per square inch)	2,800	2,600	1,800
Maximum Water Cement Ratio (by weight)	0.40	0.44	0.42

Property of Mix	5,000 psi Concrete	4,000 psi Concrete	3,000 psi Concrete
Min. Cement Content (94 pound sacks of cement per cubic yard of concrete)	6.5 sacks	6 sacks	5 sacks
Entrained Air Content (percent by volume)	6 ± 1	6.5 ± 1	5 ± 1
Slump Range (inches)	2-4	2-4	2-5

C. Fly ash may be used to replace a portion of the Portland cement in the concrete mix. The fly ash used shall not exceed 25 percent of the total cement material in the mix. The cement material in the mix includes both Portland cement and fly ash.

2.3 READY MIX CONCRETE

A. Ready-mixed concrete shall conform to the provisions in AASHTO M157 regarding batching, mixers and agitators, mixing and delivery, inspection, consistency and air content, and certification of batches.

2.4 GROUT

A. Where grout is shown for leveling, concrete (at least 3,000 pounds per square inch) shall be used.

PART 3 - EXECUTION

3.1 CONVEYING

A. Handle concrete from mixer to location of final placing as rapidly as practicable by methods which prevent segregation or loss of ingredients and assure that quality is maintained.

B. Use only equipment conforming to ASTM C94.

C. Use only approved pumping equipment that is rated for the lift and the capacity required for placement.

1. Control pneumatic placement to prevent segregation.

2. Loss of slump in pumping or pneumatic conveying equipment shall not exceed 2 inches.

3. Do not use aluminum or aluminum alloy pipes.

3.2 PLACING CONCRETE

A. Place concrete continuously or in layers of such thickness that no concrete is deposited on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within section.

1. If a section cannot be placed continuously, locate construction joints as indicated, or as approved by the Engineer.

2. If not indicated, locate construction joints not over 20 feet on center.

3. Place at such a rate that concrete which is being integrated with fresh concrete is still plastic.

4. Limit size of each placement to allow for strength gain and volume change as a result of shrinkage.

5. Make lifts not over 24 inches.

6. Do not deposit concrete which has partially hardened or has been contaminated by foreign materials.

7. Remove temporary spreaders in forms where concrete placing has reached an elevation rendering their service unnecessary.

8. Temporary spreaders may remain embedded in the concrete only if made of metal or concrete, and if prior approval has been obtained.

9. Do not allow concrete to fall over 6 feet, except when starting a wall pour. Do not drop concrete over 24 inches when starting a wall pour.

10. Joints in Footings and Slabs:

    a. Ensure space beneath plastic waterstop is completely filled with concrete.

    b. During concrete placement make visual inspection of entire waterstop area.

    c. Limit concrete placement to elevation of waterstop in first pass, vibrate concrete under waterstop, lift waterstop to confirm full consolidation without voids, and place remaining concrete to full height of slab.

    d. Apply procedure to full length of waterstop.

B. Deposit concrete as nearly as practicable in its final position to avoid segregation due to rehandling or flowing.

C. Control placement to prevent segregation.

D. Pumping of Concrete:

1. Provide standby pump, conveyor system, crane and concrete bucket, or other system onsite during pumping, for adequate redundancy to ensure completion of concrete placement without cold joints in case of primary placing equipment breakdown.

2. Minimum Pump Hose (Conduit) Diameter: 4 inches.

3. Replace pumping equipment and hoses (conduits) that are not functioning properly.

E. Minimum Time between Adjacent Placements:

1. Construction or Control Joints: 7 days unless otherwise specified.

2. Construction joint between top of footing or slab, and column or wall: As soon as can safely be done without damaging previously cast concrete or interrupting curing thereof, but not less than 24 hours.

3. Expansion or Contraction Joints: 1 day.

4. For columns and walls with a height in excess of 10 feet, wait at least 2 hours before depositing concrete in beams, girders, or slabs supported thereon.

5. For columns and walls 10 feet in height or less, wait at least 1 hour prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.

F. Hot Weather:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 301, ACI 305.1, and as follows:

a. Maintain concrete temperature below 90 degrees Fahrenheit at time of placement, or furnish test data or other proof that admixtures and mix ingredients· do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.

b. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.

G. Cold Weather Placement:

1. Unless otherwise permitted, shall be in accordance with requirements of ACI 306.1 and as follows:

a. Cold weather requirements shall apply when ambient temperature is below 40 degrees Fahrenheit or approaching 40 degrees Fahrenheit and falling.

b. Do not place concrete over frozen earth or against surfaces with frost or ice present. Frozen earth shall be thawed to acceptance of the Engineer.

c. Unless otherwise permitted, do not place concrete in contact with surfaces less than 35 degrees Fahrenheit; requirement is applicable to all surfaces including reinforcement and other embedded items.

d. Provide supplemental external heat as needed when other means of thermal protection are unable to maintain minimum surface temperature of concrete as specified in ACI 306.1.

e. Maintain minimum surface temperature of concrete as specified in ACI 306.1 for no less than 3 days during cold weather conditions.

1) Protect concrete from freezing until end of curing period and until concrete has attained a compressive strength of 3,500 pounds per square inch or design compressive strength if less than 3,500 pounds per square inch.

2. Provide maximum and minimum temperature sensors placed on concrete surfaces spaced throughout Work to allow monitoring of concrete surface temperatures representative of Work. Unless otherwise permitted, record surface temperature of concrete at least once every 12 hours during specified curing period.

3.3 CONSOLIDATION

A. Consolidate by vibration so that concrete is thoroughly worked around reinforcement, embedded items, and into corners of forms to eliminate air or stone pockets.

B. Use internal vibrators with minimum frequency of 8,000 vibrations per minute. Do not use "jitterbugs" or similar devices.

C. Do not use vibrators to transport concrete.

D. Insert vibrators approximately 18 inches apart. Leave in long enough to consolidate concrete without segregation; generally, from 5 to 15 seconds maximum. Insert vibrator through new lift into previous lift to ensure good bond between lifts.

E. Keep spare vibrator available during concrete operations.

F. Vibrate concrete in vicinity of joints to obtain impervious concrete.

G. Where concrete is to have an as-cast or smooth-rubbed finish, bring a full surface of mortar against form by vibration process, supplemented if necessary, by spading, to work coarse aggregate back from formed surface.

3.4 CONSTRUCTION JOINTS

A. Locate construction joints, if not indicated, so as to least impair strength of structure, subject to Engineer approval.

1. In general, locate near middle of the spans of slabs, beams, and girders unless a beam intersects a girder at this point. In this case, offset joint in girder a distance equal to twice the width of the beam.

2. Locate joints in walls and columns at underside of floors, slabs, beams or girders, and at tops of footings or floor slabs.

3. Place beams, girders, brackets, column capitals, haunches, drop panels, and slabs concurrently.

4. Make joints perpendicular to main reinforcement.

B. Continue reinforcement across joints.

1. Provide keys and inclined dowels as directed by the Engineer.

2. Provide longitudinal keys at least 1-1/2 inches deep in all joints in walls and between walls and slabs or footings.

C. Clean concrete surface at joints.

D. Remove all laitance prior to placing adjoining concrete.

E. When required, obtain bond by one of the following:

1. Use of an approved adhesive.

2. Use of an approved chemical retarder which delays setting of surface mortar. Remove retarded mortar within 24 hours after placing to produce a clean, exposed aggregate bonding surface.

3. Roughen surface of concrete in an approved manner which will expose aggregate uniformly.

F. Dampen, but do not saturate, hardened concrete at construction joints, joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in unexposed walls and all others not mentioned below immediately prior to placing fresh concrete.

G. Dampen, but do not saturate hardened concrete at joints in exposed Work; joints in middle of beams, girders, hoists, and slabs; and joints in Work designed to contain liquids.

1. Thoroughly cover with a coat of cement grout of similar proportions to mortar in concrete.

2. Use grout as thick as possible on vertical surfaces and at least 1/2 inch thick on horizontal surfaces.

3. Place fresh concrete before grout has attained its initial set.

H. Prepare joints receiving an adhesive and apply adhesive in accordance with manufacturer’s recommendations prior to placing of fresh concrete.

I. Prior to placing of fresh concrete, prepare surfaces of joints which have been treated with a chemical retarder in accordance with manufacturer’s recommendations.

3.5 BLOCKOUTS FOR PIPE AND CONDUIT

A. Where pipe or conduit passes into or through concrete walls, floors, or roof slabs, the Contractor may, to facilitate proper alignment, leave holes through the concrete and pour the concrete opening after the pipe or conduit is in place. The size of such openings shall be 2 inches larger than the outside diameter of the bell, flange, or coupling, and shall conform to the special details for pipe openings shown on the plans. When the piping or conduit is entirely placed and securely anchored, the concrete openings through the walls will be poured in accordance with the requirements for bonding new concrete to old as set forth herein. Concrete used to pour these openings shall consist of 1 part cement, 1 part fine aggregate, 1 part non-shrinking aggregate, and 1-1/2 parts coarse aggregate of maximum size of 1/2 inch when the concrete is part of a basin which must hold liquids. Otherwise, the non-shrinking aggregate in these proportions shall be replaced by fine aggregate. Concrete poured in these openings shall be thoroughly vibrated or rodded to insure a watertight joint between the new and old concrete and the new concrete and the pipe or conduit. The form for the closure shall be constructed with a pouring funnel. A plug of concrete shall be left in the pouring funnel. After the concrete has taken its initial set, the plug shall be removed and the exposed, broken face ground smooth. Pouring of blockout holes shall be done from the pressure side whenever possible. Such joints shall be thoroughly cured by keeping them constantly wet for not less than 7 days.

B. Where approved by the Engineer, blockout holes may be dry packed using non-shrink grout for basins which must hold liquid, and normal grout in other places. Only sufficient water shall be added to make a dry, crumbling mass. When the mixture is pressed tightly together into a ball with the hands, there should not be sufficient water in the mixture to stain the hands, and when such a ball is broken, it should crumble. This mixture shall be tamped or rodded solidly into the space, preferably from the pressure side. A backing board or stop shall be provided at the back side of this space against which the mixture can be tamped. Curing shall be specified as above.

3.6 GROUTING MACHINERY FOUNDATIONS

A. Where machinery is to be secured by anchor bolts set in concrete and supported on foundations which are to be grouted in place, the original concrete pour shall be blocked out or finished off a sufficient distance below the bottom of the machinery foundation to provide for the thickness of grout specified on the plans. After the machinery has been set in position and wedged to the proper elevation by steel wedges, the space between the bottom of the machinery foundation and the original pour of concrete shall be caulked with a dry-tamped in mixture of non-shrink grout. When the mixture is pressed tightly together into a ball with the hands, there should not be sufficient water in the mixture to stain the hands; and when such ball is broken, it should crumble. This dry mixture shall be tamped or rodded solidly into the space between the machinery foundations and the original concrete. A backing board or stop shall be provided at the back side of this space against which the dry mixture can be tamped.

3.7 PLACING SLABS

A. Preparation of sub-grade for Slabs on Grade:

1. At a minimum, place 6 inches of gravel material and compact to 95 percent of the laboratory maximum density per ASTM D1557.

2. Keep subgrade free of frost.

3. If temperature where concrete is to be placed is below freezing, enclose, heat, and maintain temperature above 50 degrees Fahrenheit, long enough to remove all frost from subgrade.

4. Keep subgrade moist at time of concreting. If necessary, dampen with water in advance of concreting. Allow no free-standing water or muddy or soft spots when concrete is placed.

B. Locate Joints in Slabs as Indicated:

1. If saw-cut joints in slabs on grade are required or permitted, time cutting to eliminate raveling during sawing and before shrinkage cracks develop.

2. Cut as soon as concrete has hardened sufficiently to prevent aggregates being dislodged by saw.

3. Compact before shrinkage stresses become sufficient to produce cracking.

C. Thoroughly Consolidate Concrete in Slabs:

1. Obtain consolidation of slabs with vibrating screeds, roller pipe screeds, internal vibrators, or other approved means.

3.8 PATCHING

A. Repair surface defects immediately after form removal. Coat all repaired areas with Sikagard 62.

B. Fill and finish tie holds with non-shrink grout and coat with Sikagard 62.

C. Repair defective areas.

1. Use of plaster coat embeco or calcium chloride is prohibited.

2. Remove honeycomb and defective concrete down to sound concrete.

3. Make edges perpendicular to surface or slightly undercut.

4. Featheredges are not permitted.

5. Dampen area to be patched and at least 6 inches surrounding it to prevent absorption of patching mortar water.

6. Prepare bonding grout of approximately 1 part cement to 1 part fine sand passing a No. 30 sieve.

D. Make patching mixture of same materials and of approximately same proportions as used for concrete, except omit coarse aggregate.

1. Mortar: 1 part cement to 2 parts sand by damp loose volume.

2. Mix white and gray Portland cement as required to match surrounding concrete.

3. Keep mixing water to a minimum.

4. Mix patching mortar in advance and allow to stand with frequent manipulation, without addition of water, until it has reached stiffest placeable consistency.

E. After surface water has evaporated from patch area, brush bond coat into surface.

1. When bond coat begins to lose water sheen, apply patching mortar.

2. Thoroughly consolidate mortar into place and strike-off so as to leave patch slightly higher than surrounding surface.

3. Leave undisturbed for at least 1 hour before final finish.

4. Keep patched area damp for 7 days.

5. Do not use metal tools in finishing an exposed patch.

F. Repair of concrete shall provide structurally sound surface finish, uniform in appearance or upgrade finish by other means until acceptable by the Engineer.

G. Tie Holes: After being cleaned and thoroughly dampened, fill tie holes solid with non-shrink grout and coat with Sikagard 62. Round tie holes less than 1/4 inch diameter by 1-1/2 inch deep in rough form finished surfaces need not be filled.

H. Remove metal objects not intended to be exposed in as-built condition of structure including wire, nails, and bolts, by chipping back concrete to a depth of 1 inch and then cutting or removing metal object. Repair chipped out concrete as specified for defective areas.

3.9 SLAB FINISHES

A. Float Finish: After concrete has been placed, consolidated, struck-off, and leveled, do not work further until ready for floating. Begin floating when water sheen has disappeared, and surface has stiffness sufficient to permit operation. Re-float slab immediately to a uniform sandy texture.

B. Troweled Finish: Float finish surface first. Power or hand trowel to produce smooth surface relatively free of defects, but which may still show some trowel marks. Final trowel when a ringing sound is produced as trowel is moved over surface. Leave finished surface essentially free of trowel marks, uniform in texture and appearance.

C. Broom Finish: Immediately after concrete has been floated, apply coarse transverse scored texture by drawing broom or burlap belt across surface.

D. "Dry Shake" Finish: Give surface a float finish. Apply mineral aggregate with Portland cement in proportions recommended by manufacturer of aggregate. Begin floating immediately after application of “dry shake."

E. Nonslip Finish: Give surface a "dry shake" application, as specified above, using crushed ceramically bonded aluminum oxide particles. Apply at 25 pounds per 100 square feet.

F. Exposed Aggregate Finish: Immediately after the surface of the concrete has been leveled to tolerance and surface water has disappeared, spread aggregate of the color and size selected by the Engineer uniformly over surface to provide complete coverage to the depth of a single stone. Float surface until embedded aggregate is fully coated with mortar and surface has been brought to tolerance. Flow water, without force, over surface of concrete while matrix encasing aggregate is removed by brushing with a fine bristle brush.

G. Slab Finish Schedule: The slab finishes are shown on the drawings. Where finishes of slabs are not shown, provide broom finish on exterior slabs and trowel finish on interior slabs.

H. Finish Slab Elevation: Slope slabs to floor drains and gutters. Slabs shall adequately drain regardless of tolerances.

3.10 FORMED CONCRETE FINISH

A. Rough Finish: Patch defects, chip or rub off fins exceeding 1/4 inch in height.

B. Smooth Finish: Patch tie holes and defects and remove fins completely. When surface texture is impaired and form joints misaligned by more than 1/8 inch, grind or bushhammer. Slurry grout areas evidencing minor mortar leakage to match adjacent concrete.

C. Rubbed Finish: Remove forms and perform necessary patching as soon after placement as possible. Finish newly hardened concrete no later than day following form removal. Wet surfaces and rub with carborundum brick or other abrasive until uniform color and texture are produced. No cement grout to be used other than cement paste drawn from concrete by rubbing process.

D. Sacked Finish: Mix one-part Portland cement and 1½ parts fine sand with sufficient water to produce grout having consistency of thick paint or use commercial premixed sacking grout. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly. Immediately after grouting, scrub surface vigorously with cork float or stone to coat surface and fill voids. While grout is still plastic, remove excess grout by working surface with rubber float or sack. After surface whitens from drying, rub vigorously with clean burlap. Keep damp for at least 36 hours after final rubbing.

E. Formed Concrete Finish Schedule. The finish required for formed concrete is shown on the drawings. Where finishes of formed concrete are not shown, provide rough finish for concrete not exposed to view and rubbed finish for concrete exposed to view

3.11 CURING AND PROTECTION

A. To preserve moisture in unformed concrete surfaces, apply one of the following immediately after placement and finishing.

1. Continuous mist spray.

2. Waterproof sheet materials, ASTM C171.

3. Curing compound, ASTM C309. Apply in accordance with recommendations of manufacturer immediately after water sheen has disappeared. Do not use on any surface against which additional concrete or other material is to be bonded or adhesively applied, unless it is proven that curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications. Provide curing compound compatible with hardener in areas where hardener is to be used.

B. Continue curing concrete for 7 days.

C. When mean daily outdoor temperature is less than 40 degrees Fahrenheit, maintain temperature of concrete between 50 degrees Fahrenheit and 70 degrees Fahrenheit for required curing period.

D. Floors and slabs to receive concrete sealer as specified in the Contract Documents and Room Finish Schedule.

1. Apply concrete sealer at a coverage rate not to exceed 300 square feet per gallon.

2. Apply as soon as slab or floor will bear weight.

3. Before applying concrete sealer, sweep entire surface clean with very soft bristled brush that will not mark concrete finish and remove any standing water.

4. Apply concrete sealer with sprayer.

5. Use of paint rollers or mop is not acceptable.

6. Workmen shall wear flat soled shoes which will not mark or scar concrete surface.

7. Do not allow traffic on floors and slabs until concrete sealer has dried and hardened.

3.12 BACKFILL AGAINST STRUCTURES

A. Do not backfill against walls until concrete has obtained specified 28 day compressive strength.

B. Refer to General Structural Notes on the Drawings for additional requirements, including elevated slab and diaphragm completion prior to backfill.

C. Unless otherwise permitted, place backfill simultaneously on both sides of structure, where such fill is required, to prevent differential pressures.

3.13 FIELD QUALITY CONTROL

A. The Contractor shall obtain and pay for services of certified testing laboratory to perform sampling and testing of installed materials to assure that the requirements of this

Specification are met. Testing and analysis of concrete shall be performed under provisions of Section 01 45 00 – Quality Control.

B. Provide adequate facilities for safe storages and proper curing of concrete test specimens onsite for first 24 hours, and for additional time as may be required before transporting to test lab.

C. Unless otherwise specified, sample concrete for testing for making test specimens, from point of delivery.

D. When concrete is pumped, sample and test air content at point of delivery and at point of placement.

E. The frequency herein specified for each field control test is approximate. A greater or lesser number of tests may be made, as required by the Engineer, to verify compliance with these Specifications.

F. Submit proposed mix design of each class of concrete to the Engineer for review prior to commencement of Work.

G. Each 100 tons of fine aggregate and each 200 tons of coarse aggregate shall be sampled and tested in accordance with ASTM D75 and C136.

H. Entrained air: Test every load of concrete delivered to the project. Air content shall be determined in accordance with ASTM C231.

I. Slump: Test every load of concrete delivered to the project.

J. Pumped Concrete: Take concrete samples for slump, ASTM C143 and test specimens ASTM C31.

K. Strength characteristics: 1 set of 4 concrete test cylinders shall be made for every 40 cubic yards or less of each class of concrete placed each day. 1 additional set shall be taken from each additional 40 cubic yards, or major fraction thereof, placed in any 1 day. 1 cylinder of each set shall be tested at an age of 7 days and 2 cylinders shall be tested at an age of 28 days. The fourth cylinder of the sets shall be tested only if deemed necessary by the Engineer. Test results shall be evaluated in accordance with ACI 214 and 318.

L. 3 additional test cylinders will be taken during cold weather and shall be cured on site under the same conditions as the concrete it represents. 1 cylinder shall be tested at an age of 7 days and the other cylinder at an age of 28 days.

END OF SECTION 03 30 00

SECTION 03 60 00 – GROUTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish labor, materials and equipment as required for grouting as shown on the plans.

B. The following types of grout are covered in this Section:

1. Cement Grout
2. Non-Shrink Grout – Class I (cement based)
3. Non-Shrink Grout – Class II (cement based)
4. Non-Shrink Epoxy Grout
5. Epoxy Anchor Grout for Adhesive Anchors
6. Topping Grout and Concrete/Grout Fill

1.2 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

1. Certification of Materials:
   a. Use bags of materials showing that the contents meet the Specifications.
   b. Submit mill test certificates covering materials shipped as furnished by material manufacturers.
2. Certification that grouts used on the project contain no chlorides or other chemicals that cause corrosion.
3. Manufacturer’s literature containing instructions and recommendations on the mixing, handling, placement, curing and appropriate uses for each type of grout used in the Work, and locations of use. ICBO/ES report shall be submitted for epoxy anchor grout for adhesive anchors.
4. Manufacturer’s certification that its non-shrink grout does not contain aluminum, zinc, or magnesium powders as a method of expansion.
5. Contractor shall submit manufacturer’s written warranty.

1.3 QUALITY ASSURANCE

A. Construction Tolerances: Construction tolerances shall be as indicated in Section 03 30 00 – Cast-in-Place Concrete unless indicated otherwise.

B. Field Tests:

1. Compression test specimens will be taken during construction from the first placement of each type of grout, and at intervals thereafter as selected by the Engineer to ensure continued compliance with these Specifications. The specimens will be made by the Engineer or its representative.

2. Compression tests and fabrication of specimens for concrete grout and cement based non-shrink grout will be performed in accordance with ASTM C1107 – Packaged Dry, Hydraulic-Cement Grout (Non-shrink), at intervals during construction selected by the Engineer. A set of 3 specimens will be made for testing at 7 days, 28 days, and each additional time period as appropriate.

3. Compression tests and fabrication of specimens for topping grout, and concrete/grout fill will be performed in accordance with Section 03 30 00 – Cast-in-Place Concrete, at intervals during construction as selected by the Engineer.

4. Compression tests and fabrication of specimens for epoxy grouts will be performed in accordance with ASTM C579 – Test Methods for Compressive Strength of Chemical-Resistant Mortars and Monolithic Surfaces and Polymer Concretes, Method B, at intervals during construction as selected by the Engineer. A set of 3 specimens will be made for testing at 7 days, and each earlier time period as appropriate.

5. The cost of laboratory tests on grout will be paid by the Contractor.

6. The Contractor shall assist the Engineer in obtaining specimens for testing and shall furnish materials necessary for fabricating the test specimens

PART 2 - PRODUCTS

2.1 CEMENT GROUT

A. Cement grout shall be composed of 1 part cement, 3 parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 4,000 pounds per square inch.

B. Cement-based non-shrink grout shall be a prepackaged, inorganic, fluid, non-gas-liberating, non-metallic, cement type grout requiring only the addition of water. Cement from kilns burning metal-rich hazardous waste fuel shall not be used.

C. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout indicated herein shall be that recommended by the manufacturer for the particular application.

D. Grout shall not contain chlorides or additives that may contribute to corrosion and shall be formulated to be used at any consistency from fluid to plastic.

E. Cement-based non-shrink grout shall have the following minimum properties when tested at a fluid consistency at 28 days:

1. Minimum tensile splitting strength of 500 pounds per square inch per ASTM C496 - Splitting Tensile Strength of Cylindrical Concrete Specimens.

2. Minimum flexural strength of 1,000 pounds per square inch per ASTM C580 - Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

3. Minimum bond strength (concrete to grout) of 1,900 pounds per square inch per modified ASTM C882 - Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.

4. Grout shall be certified for use in freeze/thaw environments.

2.2 NON-SHRINK EPOXY GROUT

A. Class I Non-Shrink Grout: Class I non-shrink grout shall have a minimum 28 day compressive strength of 5,000 pounds per square inch when mixed at a fluid consistency. Class I non-shrink grout shall meet the requirements of ASTM C1107, Grade B or C, when mixed to fluid, flowable and plastic consistencies.

1. Grout shall have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C827 - Early Volume Change of Cementitious Mixtures. The grout when tested shall not bleed or segregate at maximum allowed water.

2. Grout shall have no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090 - Measuring Changes in Height of Cylindrical Specimens from Hydraulic-Cement Grout.

3. Furnish certification that the non-shrink property of grout is not based on gas production or gypsum expansion.

4. Class I Non-Shrink Grout shall be MasterFlow 713 by BASF; Five Star Grout by Five Star Products; Sikagrout 212 by Sika Corporation; L&M Duragrout by Laticrete; High-Flow Grout by Euclid Chemical Company; or equal.

B. Class II Non-Shrink Grout: Class II non-shrink grout shall be a high precision, fluid, extended working time, grout. The minimum 28-day compressive strength shall be 7500 pounds per square inch, when mixed at a fluid consistency. Grout shall have a maximum early age height change of 4.0 percent expansion, and shall have no shrinkage (0.0 percent) in accordance with ASTM C827. Class II non-shrink grout shall meet the requirements of ASTM C1107 Grade B or C when tested using the amount of water needed to achieve fluid consistency per ASTM C939.

1. Grout shall have no shrinkage (0.0 percent) and a maximum of 0.3 percent expansion in the hardened state when tested in accordance with ASTM C1090.

2. Class II non-shrink grout shall have an extended working time of 30 minutes minimum when mixed to a fluid consistency as defined in ASTM C827 at temperature extremes of 45 to 90 degrees Fahrenheit in accordance with ASTM C1107.

3. The grout when tested shall not bleed or segregate at maximum allowed water content.

4. Provide certification that its non-shrink property is not based on gas production or gypsum expansion.

5. Class II non-shrink grout shall be Masterflow 928 by BASF; Five Star Fluid Grout 100 by Five Star Products; L&M Crystex by Latitcrete; or equal.

2.3 EPOXY ANCHOR GROUT

A. Epoxy anchor grout shall conform to ASTM C881 - Epoxy-Resin-Base Bonding Systems for Concrete, Type IV, Class A, Band C, Grade 3 with the exception of gel time.

B. Heat deflection temperature per ASTM D648 - Deflection Temperature of Plastics Under Flexural Load shall be a minimum 120 degrees Fahrenheit.

C. Manufacturer shall certify that the epoxy anchor grout will maintain 90 percent of its strength up to a temperature of 125 degrees Fahrenheit.

D. Grout shall come in a 2 chambered cartridge with a metering system that provides the proper ratio of hardener and resin. The grout shall also come with a static mixer nozzle to thoroughly mix the hardener and resin together.

E. Epoxy anchor grout shall be capable of being used in submersed applications once cured.

F. Compressive strength per ASTM D695 - Compressive Properties of Rigid Plastics shall be 10,000 pounds per square inch minimum.

G. If the average working or operating temperature will be over 100 degrees Fahrenheit or in a high fire risk area, use cement based non-shrink grout and oversized holes.

H. Overhead anchors and anchors in fire-resistive construction shall be cast-in anchors.

I. Embedment of adhesive anchors/rebar shall be deep enough to develop the anchor/rebar. Embedment shall not exceed 67 percent of the member depth.

J. Epoxy anchor grout shall be SET-XP by Simpson; Pure110+ by DeWalt; RE 500 V3 by Hilti, or equal.

2.4 TOPPING GROUT AND CONCRETE/GROUT FILL

A. Where fill is thicker than 3 inches, structural concrete, as indicated in Section 03 30 00 - Cast-in-Place Concrete, may be used when accepted by the Engineer.

B. Grout for topping of slabs and concrete/grout fill for built-up surfaces of tank, channel, and basin bottoms shall be composed of cement, fine aggregate, coarse aggregate, water, and admixtures proportioned and be mixed as indicated herein. Materials and procedures indicated for normal concrete in Section 03 30 00 - Cast-in-Place Concrete shall apply unless indicated otherwise.

C. Topping grout and concrete/grout fill shall contain a minimum of 564 pounds of cement per cubic yard with a maximum water cement ratio of 0.45.

D. Coarse aggregate shall be graded as follows:

U.S. Standard Sieve Size	Percent by Weight Passing
1/2	100
3/8	90-100
No. 4	20-55
No. 8	5-30
No. 16	0-10
No. 30	0

E. Final mix design shall be as determined by trial mix design as indicated in 03 30 00 – Cast-in-Place Concrete, except that drying shrinkage tests are not required.

F. Strength: Minimum compressive strength of topping grout and concrete/grout fill at 28 days shall be 4,000 pounds per square inch.

2.5 CURING MATERIALS

A. Curing materials shall be in accordance with Section 03 30 00 – Cast-in-Place Concrete and as recommended by the manufacturer of prepackaged grouts.

2.6 CONSISTENCY

A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where dry pack is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as indicated herein for the particular application.

B. The slump for topping grout and concrete/grout fill shall be adjusted to match placement and finishing conditions but shall not exceed 4 inches.

2.7 MEASUREMENT OF INGREDIENTS

A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurements shall not be allowed.

B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 - EXECUTION

3.1 PRODUCT DELIVERY. STORAGE AND HANDLING

A. Grout shall be stored in accordance with manufacturer's recommendations.

3.2 GENERAL

A. Contractor shall arrange for the manufacturer of prepackaged grouts to provide on-Site technical assistance within 72 hours of request, as part of the Work.

B. Grout shall not be placed until base concrete or masonry has attained its design strength, unless authorized otherwise by the Engineer.

C. When cementitious grouts are used on concrete surfaces, the concrete surface shall be saturated with water for 24 hours prior to placement. Upon completion of the saturation period, excess water shall be removed with clean, oil free compressed air prior to grouting. Concrete substrate shall not be wet prior to placement of epoxy grouts.

D. Surface preparation, curing, and protection of cement grout shall be in accordance with Section 03 30 00 – Cast-in-Place Concrete. The finish of the grout surface shall match that of the adjacent concrete unless otherwise indicated.

E. Surfaces that will be in contact with grout shall be free of dirt, loose rust, oil, wax, grease, curing compounds, laitance, loose concrete, and other deleterious materials.

F. Contact the grout manufacturer's representative for assistance on hot and cold weather grouting techniques and precautions if applicable. Shade the Work from sunlight for at least 24 hours before and 48 hours after grouting.

3.3 APPLICATION

A. Unless indicated otherwise, grouts shall be provided as listed below:

Application	Type of Grout
Anchor bolts and reinforcing steel required to be set in grout in which the average working or operating temperature will be over 100 degrees Fahrenheit, or in high fire risk areas.	Non-Shrink – Class I
Anchor bolts and reinforcing steel required to be set in grout that is not high temperature or high fire risk areas.	Epoxy Anchor Grout
Beam and column (1 or 2 story) base plates less than 16 inches in the least dimension.	Non-Shrink Class I
Column base plates (greater than 2 story or larger than 16 inches in the least dimension).	Non-Shrink Class II
Storage tanks and other non-motorized equipment and machinery under 30 horsepower.	Non-Shrink Class I

Machinery over 30 horsepower and equipment under 30 horsepower but subject to severe shock load and high vibration.	Non-Shrink Epoxy
Filing blockout spaces for embedded items such as railing posts, gate guide frames, etc.	Non-Shrink Class I (Class II where placement time exceeds 20 min.)
Under precast concrete elements.	Non-Shrink Class II
Topping and concrete/grout fill greater than 3 inches thick.	Structural Concrete per Section 03 30 00 – Cast-in-Place Concrete
Surface repairs.	Cement Grout
Repair of holes and defects in concrete members which are not water bearing and not in contact with soil or other fill material.	Non-Shrink Class I
Repair of holes and defects in concrete members which are water bearing or in contact with soil or other fill materials.	Non-Shrink Class II
All application not listed above, where grout is called for on the drawings.	Non-Shrink Class I, unless noted otherwise.

3.4 GROUTING PROCEDURES

A. Mixing, surface preparation, handling, placing, consolidation, curing, and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

B. Structural, equipment, tank, and piping support bases shall be grouted, unless indicated otherwise.

1. The original concrete shall be blocked out or finished off a sufficient distance below the plate to provide for a minimum one-inch thickness of grout, or a thickness as indicated.

2. After the base plate has been set in position at the proper elevation by steel wedges or double nuts on the anchor bolts, the space between the bottom of the plate and the original pour of concrete shall be filled with non-shrink-type grout through a headbox of appropriate size. The mixture shall be of a fluid consistency and poured continuously into the space between the plate and the base concrete. Forms for grout shall be tight against retaining surfaces, and joints shall be sealed as recommended by the grout manufacturer to be liquid-tight. Forms shall be coated as recommended by the grout manufacturer for easy form release. Where this method of placement is not practical or where required by the Engineer, alternate grouting methods shall be submitted for acceptance by the Engineer.

C. Drilled anchors and Reinforcing Bars: Drilled anchors and reinforcing bars shall be installed in strict accordance with the manufacturer's instructions. Holes shall be roughened with a brush on a power drill and cleaned. Drilled anchors shall not be installed until the concrete has reached the required 28 day compressive strength. Anchors shall not be loaded until the grout has reached its indicated strength in accordance with the manufacturer's instructions.

1. The Contractor shall identify position of reinforcing steel and other embedded items prior to drilling holes. Care shall be exercised in coring and drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and communications conduit, and piping.

D. Epoxy Adhesive Anchors: Grout shall be proportioned and mixed with automatic equipment. Unless otherwise indicated, embedment shall be sufficient to develop the ultimate tensile strength of the anchor or reinforcing bar per the manufacturer's recommendations, but shall not be less than 8 diameters for threaded rod, or 12 diameters recommendations for reinforcing or smooth bars. Holes shall be dry.

E. Cement Based Non-Shrink Grout: In places of high temperature or fire hazard, anchor bolts shall be grouted in using cement based non-shrink grout, Class I. Unless otherwise indicated, embedment shall be sufficient to develop the ultimate tensile strength of the anchor or reinforcing bar per the manufacturer's ICBO report, but shall not be less than 16 diameters for threaded rod or 24 diameters for reinforcing or smooth bars.

1. When the bolt diameter is 1 inch or less, the hole diameter should be a minimum of 2-inches. When the bolt diameter is greater than 1 inch, the hole diameter should be at least twice the bolt diameter.

2. Drilled holes shall be saturated with water for not less than 24 hours before installation of anchor/rod/rebar.

3. The non-shrink grout should be placed in the holes in a non-sag (trowelable) consistency. The grout should be placed in the holes before the anchor and then the anchor inserted and vibrated to ensure proper coverage.

F. Topping Grout and Concrete/Grout Fill: Mechanical, electrical, and finish work shall be completed prior to placement of topping or concrete/grout fill. To ensure bonding to the base slab, the base slab shall be given an exposed aggregate finish. Alternatively, where accepted by the Engineer, the base slab shall be given a roughened textured surface by a close- spaced rake while the surface is green. After curing, high pressure washing shall expose the aggregates and produce not less than a 3/16 inch amplitude roughness. Jackhammers or chipping hammers shall not be used.

1. The minimum thickness of grout topping and concrete/grout fill shall be 1 inch. Where the finished surface of concrete/grout fill is to form an intersecting angle of less than 45 degrees with the concrete surface it is to be placed against, a key shall be formed in the concrete surface at the intersection point. The key shall be a minimum of 3-1/2 inches wide by 1-1/2 inches deep.

2. The base slab shall be thoroughly cleaned and wetted to Saturated Surface Dry (SSD) condition per the International Concrete Repair Institute (ICRI) -- Technical Guide for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays, prior to placing topping and fill. No topping concrete shall be placed until the slab is completely free from standing pools or ponds of water. A thin coat of neat cement grout shall be broomed into the surface of the slab just before topping or fill placement. The neat cement grout shall not be allowed to dry before topping placement. If it does dry, it must be immediately removed using wet stiff brooms and reapplied. The topping and fill shall be compacted by rolling or thorough tamping, brought to established grade, and floated. Grouted fill for tank and basin bottoms where scraping mechanisms are to be installed shall be screeded by blades attached to the revolving mechanism of the equipment in accordance with the procedures outlined by the equipment manufacturer after the grout is brought to the established grade. Coat surface with evaporation retardant as needed to prevent plastic shrinkage cracks.

3. Topping grout placed on sloping slabs shall proceed uniformly from the bottom of the slab to the top, for the full width of the placement.

4. The surface shall be tested with a straight edge to detect high and low spots which shall be immediately eliminated. When the topping or fill has hardened sufficiently, it shall be steel troweled to a smooth surface free from pinholes and other imperfections. An approved type of mechanical trowel may be used as an assist in this operation, but the last pass over the surface shall be by hand-troweling. During finishing, no water, dry cement, or mixture of dry cement and sand shall be applied to the surface.

5. As soon as topping or fill finishing is completed, coat surface with curing compound. After the topping is set and sufficiently hard in clarifiers and where required by the Engineer, the tank shall be filled with sufficient water to cover the entire floor for 14 days.

3.5 CONSOLIDATION

A. Grout shall be placed in such a manner, for the consistency necessary for each application, to assure that the space to be grouted is completely filled.

3.6 CURING

A. Cement based grouts shall be cured per Section 03 30 00 – Cast-in-Place Concrete and per the manufacturer's recommendations.

3.7 GROUTING MACHINERY FOUNDATIONS

A. Where machinery is to be secured by anchor bolts set in concrete and supported on foundations which are to be grouted in place, the original concrete pour shall be blocked out or finished off a sufficient distance below the bottom of the machinery foundation to provide for the thickness of grout specified on the Plans. After the machinery has been set in position and wedged to the proper elevation by steel wedges, the space between the bottom of the machinery foundation and the original pour of concrete shall be caulked with a dry, tamped-in mixture of non-shrink grout. When the mixture is pressed tightly together into a ball with the hands, there should not be sufficient water in the mixture to stain the hands; and when such ball is broken, it should crumble. This dry mixture shall be tamped or rodded solidly into the space between the machinery foundations and the original concrete. A backing board or stop shall be provided at the back side of this space against which the dry mixture can be tamped.

END OF SECTION 03 60 00

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to erect all structural steel framing members, structural steel support members, struts, and miscellaneous structural steel members with required bracing, welds, and fasteners.

B. Furnish all baseplates, shear stud connectors, expansion joint plates, and related structural steel items.

1.2 REFERENCES STANDARDS

References herein to "Building Code" or IBC shall mean the 2015 International Building Code of the International Code Council (ICC). The edition of the codes adopted as of the date of award of this contract shall apply to the Work herein.

A.	ASTM A6	General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piping, and Bars for Structural Use
B.	ASTM A36	Structural Steel
C.	ASTM A53	Hot-Dipped, Zinc-Coated, Welded and Seamless Steel Pipe
D.	ASTM F3125	High Strength Bolts for Structural Steel Joints and Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints
E.	ASTM A500	Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes
F.	ASTM A501	Hot Formed Welded and Seamless Carbon Steel Structural Steel
G.	ASTM A502	Steel Structural Rivets
H.	ASTM A572	High Strength Low Alloy Columbian-Vanadium Steel of Structural Quality
I.	AWS D1.1	Structural Welding Code
J.	AISC	Code of Standard Practice for Steel Buildings and Bridges
K.	AISC	Specification for Architecturally Exposed Structural Steel
L.	RCSC	Specification for Structural Joints Using High-Strength Bolts

1.3 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

B. Shop drawings shall conform to AISC recommendations and specifications and shall show all holes, etc. required for other work. Drawings shall include complete details showing all members and their connections, anchor bolt layouts, schedules for fabrication procedures, and diagrams showing the sequence of erection.

1. Indicate profiles, sizes, spacing and locations of structural members, connections, attachments, fasteners, cambers, loads, and any special details.

2. Indicate welded connections using standard AWS welding symbols. Indicate net weld lengths.

3. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed by others.

1.4 QUALITY ASSURANCE

A. Certification: Furnish to the Engineer before fabrication, a mill certified report (in duplicate) of the tests for each heat of steel or iron from which the material is to be fabricated containing the results of chemical and physical tests required by the ASTM Specifications for the materials.

B. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure." Provide certification that welders to be employed in the Work have satisfactorily passed AWS qualification tests within the previous 12 months on the same type work to be done. If recertification of welders is required, retesting will be Contractor's responsibility.

C. Supplementary Tests: The Owner reserves the right to require or make additional mill and laboratory tests. "Identifiable stock" is material for which authentic records of the chemical and physical properties are available. Cut and machine test specimens in accordance with the ASTM Specifications for the material to be tested. Except that in the case of failure of the material to comply with the ASTM requirements, more tests may be made, or the material rejected. The number of such additional tests will be limited as follows:

1. Structural Steel - One complete test for each heat number or each 10 tons of identifiable stock

2. Rivets - One complete test for each size

3. Bolts - One complete test for each lot

D. Stock Material: When fabrication is to be done using material already in stock, obtain the approval of the Engineer prior to fabrication.

E. Mill Tolerances: Furnish steel with rolling and cutting tolerances, permissible variations in weight and dimensions, defects, and imperfections that meets the limits contained in ASTM A-6.

PART 2 - PRODUCTS

2.1 GENERAL

A. For fabrication of the Work which will be exposed to view, use only materials which are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove such blemishes by grinding or by welding and grinding prior to cleaning, treating, and application of surface finishes.

B. All steel members in contact with aluminum shall be galvanized per Section 05 50 00 – Metal Fabrications, unless indicated otherwise.

C. All structural members shall be furnished full length without splices unless otherwise indicated or approved by the Engineer.

2.2 MATERIALS

A. Stock Materials: Select the material intended for use from stock and place it in a location apart from other stock material and accessible for inspection. Select the material from as few heat numbers as possible and furnish certified mill test reports for each of the heat numbers.

B. Schedule: All structural steel materials shall comply with the following:

Structural Steel Shapes, Plates, and Bars	ASTM A36, except where other type steel is indicated
High Strength Low-Alloy Structural Steel	ASTM A242, A572, A606, A653, or A1008 (Grades C, D, or E) as specified
Cold-Formed Steel Tubing:	ASTM A500, Grade B
Steel Pipe	ASTM A53, Type E or S, Grade B with black finish, except where indicated to be galvanized
Copper Bearing Structural Steel	Copper bearing structural steel shall conform to the requirements of ASTM A36, A570, A653, or A1011 as specified
Steel Castings	ASTM A27, Grade 65-35, medium strength carbon steel
All wide flange shapes (W shapes)	ASTM A992 unless otherwise indicated

2.3 ACCESSORIES

A. All fasteners inside hydraulic structures and where shown on drawings shall be stainless steel.

B. Anchor Bolts: Provide non-headed type bolts that satisfy all requirements of ASTM A307, unless otherwise indicated.

C. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low carbon steel bolts and nuts with hexagonal heads and nuts for all connections.

D. High Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers. Quenched and tempered medium carbon steel bolts, nuts and washers complying with ASTM F3125. For high strength low alloy steel provide Type 3 fasteners of similar composition as members to be connected.

E. Rivets: Provide high strength, hot-drive type rivets made of carbon-manganese steel that satisfy ASTM A502 requirements.

F. Welding Materials: Material shall comply with AWS D1.1 and shall be of type required for materials being welded. For high strength, low alloy steel provide electrodes, welding rods, and filler metals equal in strength and compatible in appearance with parent metal joined.

G. Primer: All structural steel shall have red primer applied.

2.4 SHOP PAINTING

A. General: Structural steel may be shop painted, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel which is partially exposed on exposed portions and initial two (2) inches of embedded areas only. Do not paint surfaces which are to be welded or high strength bolted with friction type connections. Do not paint surfaces of exposed high strength, low alloy steel members. Apply two (2) coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Surface Preparation: After inspection and before shipping, clean steel work to be painted in accordance with Section 09 99 00 – Painting and Coating. Remove loose rust, loose mill scale, spatter, slag, or flux deposits. Clean steel in accordance with Steel Structures Painting Council (SSPC).

2.5 FINISH PAINTING

A. All protective coatings shall be applied per requirements listed in Section 09 99 00 – Painting and Coating.

PART 3 - EXECUTION

3.1 FABRICATION

A. Fabricate structural steel members in accordance with AISC Specifications, and as indicated on the final shop drawings.

B. Fabricate and assemble structural members in shop to greatest extent possible. Provide camber in structural members where indicated. Properly mark and match-mark materials for fixed assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials. Where finishing is required, complete assembly,

including welding of units before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs, and other defects.

C. Connections: Weld or bolt shop connections as indicated. Bolt field connections except where welded connections or other connections are indicated. Provide high strength, threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

D. High Strength Bolted Construction: Install high strength, threaded fasteners in accordance with RCSC Specification for Structural Joints Using High-Strength Bolts.

E. Welded Construction: Comply with AWS Code for procedures, appearance and quality of welds and methods used in correcting welding work. For high strength, low alloy steels, follow welding procedures as recommended by steel producer for exposed and concealed connections.

F. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members as shown on final shop drawings. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

3.2 DELIVERY, STORAGE AND HANDLING

A. Deliver anchor bolts and anchorage devices which are to be embedded in cast-in-place concrete or masonry in ample time to not delay that work.

B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Do not store materials on structure in a manner that might cause deterioration or damage to members or supporting structures. Repair or replace damaged materials or structures as directed by the Engineer.

3.3 MEASUREMENT

A. The Contractor shall verify all dimensions and shall make any field measurements necessary and shall be fully responsible for accuracy and layout of the Work. The Contractor shall review the Drawings, and any discrepancies shall be reported to the Engineer for clarification prior to starting fabrication.

3.4 INSPECTION

A. Examine areas and conditions under which structural steel work is to be installed and notify the Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

B. Testing & Inspection Schedule: The Contractor shall engage inspectors to inspect welded connections and high-strength bolted connections, to perform tests and prepare test reports per the following:

1. Ten percent of all butt and bevel welds which extend continuously for 24 inches or less shall be completely tested in accordance with AWS D1.1, Chapter 6, Part E, Radiographic Testing Groove Welds in Butt Joints. All butt and bevel welds which extend continuously for more than 24 inches shall be spot tested at intervals not exceeding 36 inches.

2. Welds that are required by the Engineer to be corrected shall be corrected or redone and retested as directed, at the Contractor's expense and to the satisfaction of the Engineer and/or approved independent testing lab.

3. The Contractor shall test to failure three bolts from each heat lot of bolts furnished to the job to verify compliance with this Specification. The testing laboratory shall be approved by the Engineer and all test reports shall be supplied to the Engineer in accordance with Section 01 33 00 – Submittal Procedures. In addition, high-strength bolts shall be inspected using one of the methods set forth in the RCSC Specification for Structural Joints Using High-Strength Bolts.

C. The costs for all initial testing will be paid by the Contractor. The Contractor shall pay for all costs for any additional testing and investigation on Work which does not meet Specifications. The Contractor shall supply material for testing at no cost to the Owner and shall assist the Engineer in obtaining material for test samples.

3.5 ERECTION

A. Erect structural steel in accordance with AISC Specifications. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds. Level and plumb individual members of structure within specified AISC tolerances.

B. Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Do not field cut or alter structural members without approval of the Engineer. Have all torque wrenches or impact wrenches certified by a testing laboratory prior to starting construction. Splice members only where indicated and accepted on shop drawings. Do not enlarge unaligned holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

C. Make provision for erection loads and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing. Establish required leveling and plumbing measurements on mean operating temperature of structure. Tighten anchor bolts after supported members have been positioned and plumbed.

D. Clean concrete and masonry bearing surfaces. Clean bottom surface of base and bearing plates. Set loose and attached base plates and bearing plates for structural members on jack nuts for leveling adjustments.

E. Pack non-shrink grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure.

F. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

G. On exposed welded construction, remove erection bolts, fill holes with plug welds, and grind smooth at exposed surfaces.

3.6 SETTINGS BASES AND BEARING PLATES

A. Prior to the placement of non-shrink grout beneath base and bearing plates, the bottom surface of the plates shall be cleaned of all bond-reducing materials, and concrete and masonry bearing surface shall also be cleaned of all bond-reducing materials and roughened to improve bonding.

B. Loose and attached baseplates, and bearing plates for structural members shall be set on wedges, leveling nuts, or other adjustable devices.

C. Anchor bolts shall be tightened after the supported members have been positioned and plumbed and the non-shrink grout has attained its indicated strength.

D. Baseplates shall be grouted with non-shrink grout to assure full uniform bearing. Grouting shall be done prior to placing loads on the structure.

3.7 WELDED CONSTRUCTION

A. The Contractor shall comply with the current AWS D1.1 Code for procedures, appearance, and quality of welds and welders, and methods used in correcting welding work. All welded architectural metal work where exposed to view shall have welds ground smooth. Shielded metal is welding method or gas metal arc welding methods shall be used for welding structural steel.

B. Unless otherwise shown, all butt and bevel welds shall be complete penetration.

3.8 TOUCH-UP PAINTING

A. Immediately after erection, field welds, bolted connections, and abraded areas shall be cleaned of the shop paint primer. Touch-up paint primer shall be applied by brush or spray which is the same thickness and material as that used for the shop paint. Galvanized surfaces which have been field-welded or damaged shall be repaired in accordance with Section 09 99 00 – Painting and Coating.

END OF SECTION 05 12 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 05 50 00 – METAL FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install miscellaneous metal items as shown on the drawings and specified herein.

1.2 STANDARDS

A. AISC “Code of Standard Practice.”

B. AWS “Code for Welding in Building Construction.”

1.3 SUBMITTALS

A. Shop Drawings: Prepare and submit shop drawings for miscellaneous metal items prior to fabrication. Identify items with location and drawing or specifications reference. Show connections, anchors, anchor or fastener spacing dimensions and details.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect materials from moisture with waterproof paper, tarpaulin or polyethylene sheeting.

PART 2 - PRODUCTS

2.1 MATERIALS

A. HSS (Hollow Structural Shapes): ASTM A500 Grade B

B. Bars, plates, miscellaneous shapes: ASTM A36

C. Aluminum: Alloy 5052-H32, mill finish

D. Pipe: Steel pipe shall be ASTM A120 Galvanized Steel. Aluminum pipe shall be ASTM B241 alloy 6061 – T6

E. Miscellaneous Bolts and Nuts: ASTM A307

F. High Strength Bolts and Nuts: ASTM F3125 Grade A325

G. Concrete Anchors: Use cast in anchor bolts where cast in anchor bolts are shown on the drawings. Provide attachment to concrete with concrete anchors where shown on the drawings conforming to the following types. Use only type of concrete anchor shown on the drawings.

1. Expansion Anchors: Expansion anchors shall be wedge type with a single piece three section wedge to anchor the stud in the hole. The stud nut and wedge shall be ANSI 304 stainless steel.

2. Adhesive Anchors: Adhesive anchors shall be an all thread rod with a nut. The all thread rod and nut shall be ANSI 304 stainless steel. The rod shall be anchored in the hole using a premeasured adhesive capsule consisting of vinyl urethane methacrylate adhesive.

3. Undercut Anchors: Undercut anchors shall be an undercut style with a brazed tungsten carbide edge on the undercutting end to perform the self-cutting undercut as the anchor is installed. The anchor shall cut and undercut bearing area of at least 2.5 times the nominal anchor bolt size. The anchor stud shall be ANSI 316 stainless steel.

H. Stainless Steel Bolts and Nuts: Type 316 Stainless Steel

2.2 BOLTS AND ANCHORS

A. Standard Service (Non-Corrosive Application): Unless otherwise indicated, bolts, anchor bolts, washers, and nuts shall be steel as indicated herein. Threads on galvanized bolts and nuts shall be formed with suitable taps and dies such that they retain their normal clearance after hot-dip galvanizing. Except as otherwise indicated, steel for bolt material, anchor bolts and cap screws shall be in accordance with the following:

Structural Connections	ASTM A307, Grade A or B, hot-dip galvanized
Anchor Bolts	ASTM A307, Grade A or B, or ASTM A36, hot-dip galvanized
High Strength Bolts	ASTM F3125 Grade 325
Pipe and Equipment Flange Bolts	ASTM A193, Grade B- 7

B. Stainless steel bolts and nuts for corrosive service

1. Corrosive Service: All bolts, nuts, and washers in the locations listed below shall be stainless steel as indicated below.

a. All buried locations.

b. All submerged locations.

c. All locations subject to seasonal or occasional flooding.

d. Inside hydraulic structures below the top of the structure.

e. Inside buried vaults, manholes, and structures which do not drain through a gravity sewer or to a sump with a pump.

f. All chemical handling areas.

g. Inside trenches, containment walls, and curbed areas.

h. Locations indicated by the Contract Documents or designated by the Engineer to be provided with stainless steel bolts.

2. Unless otherwise indicated, stainless steel bolts, anchor bolts, nuts, and washers shall be Type 316 stainless steel, Class 1, conforming to ASTM A193 for bolts and to ASTM A194 for nuts. All threads on stainless steel bolts shall be protected with an antiseize lubricant suitable for submerged stainless steel bolts, to meet government specification MIL-A-907E. Buried bolts in poorly drained soil shall be coated the same as the buried pipe.

a. Antiseize lubricant shall be classified as acceptable for potable water use by the NSF.

b. Antiseize lubricant shall be "PURE WHITE" by Anti-Seize Technology, Franklin Park, IL, 60131, AS-470 by Dixon Ticonderoga Company, Lakehurst, NJ, 08733, or equal.

C. Bolt Requirements: The bolt and nut material shall be free-cutting steel. The nuts shall be capable of developing the full strength of the bolts. Threads shall be Coarse Thread Series conforming to the requirements of the American Standard for Screw Threads. All bolts and cap screws shall have hexagon heads and nuts shall be Heavy Hexagon Series.

D. Bolts and nuts shall be installed with washers fabricated of material matching the base material of bolts, except that hardened washers for high strength bolts shall conform to the requirements of the AISC Specification. Lock washers fabricated of material matching the bolts shall be installed where indicated.

E. The length of each bolt shall be such that after the joint is made up, the bolt extends through the entire nut, but in no case more than 1/2 inch beyond the nut.

F. Adhesive Anchors: Unless otherwise indicated, all drilled, concrete or masonry anchors shall be adhesive anchors. No substitutions will be considered unless accompanied with ICBO report verifying strength and material equivalency.

1. Adhesive anchors are required for drilled anchors for indoor installations, in submerged, wet, splash, overhead, and corrosive conditions, and for anchoring reinforcing bars. Threaded rod shall be stainless steel Type 316. Epoxy adhesive shall be Hilti HIT RE 500 V3.

2. Unless otherwise indicated, glass capsule, polyester resin adhesive anchors will be permitted in locations not included above and shall be Hilti HVA or Cobra Anchors. Threaded rod shall be galvanized steel.

G. Expanding-Type Anchors: Expanding-type anchors if indicated or permitted, shall be galvanized steel expansion type ITW Ramset/Redhead "Trubolt" anchors; Hilti "Kwik-Bolt;" or equal. Lead caulking anchors will not be permitted. Size shall be as indicated. Embedment depth shall be as the manufacturer recommends for the load to be supported. Expansion type anchors which are to be embedded in grout may be steel. Non-embedded buried or submerged anchors shall be stainless steel.

H. Overhead Applications: Use Hilti HDA undercut anchors.

2.3 POWDER-DRIVEN PINS

A. Power-driven pins to be installed in concrete or steel shall be heat-treated steel alloy. If the pins are not inherently sufficiently corrosion-resistant for the conditions to which they are to be exposed, they shall be protected in an acceptable manner. Pins shall have capped or threaded heads capable of transmitting the loads the shanks are required to support. Pins that are connected to steel shall have longitudinal serrations around the circumference of the shank. Complete information describing pin capacities, connections, and proposed use locations shall be submitted to the Engineer.

2.4 IMPACT ANCHOR

A. Impact anchors shall be an expansion type anchor in which a nail type pin is driven to produce the expansive force. The pin shall have a zinc sleeve with a mushroom style head and stainless steel nail pin. Anchors shall be Metal HIT Anchors, manufactured by Hilti, Inc., Rawl Zamac Nailin, manufactured by the Rawlplug Company; or equal.

2.5 FABRICATION

A. Fabrication of Miscellaneous Metal Items:

1. Workmanship: Conform to accepted shop practices. Form work true to details, with clean, straight, sharply defined profiles. Unless otherwise shown or specified, finish exposed welds flush and smooth.

2. Joints and Connections: Weld all joints, unless other fastening methods are shown, specified or specifically approved. Close fit exposed joints; making joints where least conspicuous. Unless otherwise shown or specified, use flat and countersunk beaded bolts or screws in exposed connections.

3. Cutting, Drilling; Perform cutting, drilling, punching required for accurate fitting and assembly work. In addition, perform similar operations as required for attachment of work of other trades, provided that directions for such work are supplied prior to shop drawing approvals.

4. Provisions for Attachment to Structure: Furnish miscellaneous metal items complete with framing, supports, hangers, bracing, anchors, and other devices shown specified or necessary for reinforcement and proper, secure setting or attachment to building construction.

B. Dissimilar Materials Protection: Insulate aluminum surfaces in contact with metals other than galvanized or stainless steel, or with plaster or concrete, by means of chromate gasketing or heavy coat of alkali-resistant bituminous paint.

C. Workmanship: Fabricate all items neatly and rigidly in accordance with details in first-class finished, workmanlike manner. Form curved work neatly to radii indicated. Provide members of sizes indicated and weld, bolt or rivet securely together. Furnish bolts, nuts, washers, and other fastening devices required for anchoring and securing work.

D. Welding: Use electric shielded-arc process in accordance with Welding Specifications of American Welding Society. Use only welding operators properly trained and highly skilled in arch welding. Grind smooth surface welds exposed to view.

2.6 SHOP FINISHING

A. Steel Metal Items: Galvanize all iron or steel items. Prior to galvanizing, all items after fabrication shall be cleaned thoroughly, removing scale, flux deposits, rust, oil, dirt, and other foreign matter. Except as otherwise indicated, iron or steel items specified to be galvanized shall be hot-dip galvanized after fabrication in accordance with ASTM A123. Fabricate units complete or in largest practical sections before galvanizing.

B. Aluminum Metal Items: Aluminum shall be finished with a 0.7 mil clear anodized finished. Other aluminum items shall be mill finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Embedded Items: Deliver miscellaneous metal items to be embedded or installed in concrete with setting instruction to concrete contractor for setting. Verify grade and line positioning of items as set, report errors or deviations in order that corrective adjustments may be made before placement of concrete or laying of masonry.

B. Coat all aluminum surfaces in contact with concrete with an approved bituminous coating or zinc chromate primer.

3.2 GENERAL

A. Install work, other than that to be embedded in concrete, in strict accordance with drawings. Perform cutting, drilling, and fitting required. Accurately set, place and properly, securely attach work in true planes, alignment, plumb and level; properly, adequately reinforce and stiffen.

B. Concrete Anchors: Install concrete anchors in cast in place concrete and masonry according to the details shown on the drawings and as recommended by the anchor manufacturer. When installing concrete anchors in masonry always install anchors in masonry cells that have been grouted solid. Do not install anchors into hollow cell masonry.

C. Expansion, Contraction: Assemble and install work with adequate provisions to prevent objectionable distortion and overstressing from expansion, contraction. Where necessary, provide properly designed expansion joints, construct to be weather tight if to be exposed to the weather.

D. Field Touch-up: After installation of miscellaneous metal items, tough-up field bolts, field welds, uncoated connections and abrasions with ship protective coatings. Clean items of mud, dirt, and other objectionable foreign matter.

E. Finishing: Where indicated, metal fabrication items shall be painted after installation in accordance with Division 9.

END OF SECTION 05 50 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to construct all rough carpentry work, which is generally not exposed and is covered by finish work.

1.2 REFERENCES STANDARDS

A. International Building Code - Latest Edition

B. NFPA - National Design Specification for Stress Grade Lumber and its Fastenings

C. PS 1 - Construction and Industrial Plywood

D. PS 20 - American Softwood Lumber Standard

PART 2 - PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Materials

1. General: Factory mark each piece of lumber with type, grade, mill and grading agency.

2. Provide dimensioned lumber as required by PS 20.

3. Use S4S lumber, unless otherwise indicated.

4. Use seasoned lumber with 19 percent maximum moisture at time of use.

5. Use No. 2 grade Douglas Fir or Larch, or any species and grade meeting the following requirements:

a. Fb: 900 psi minimum

b. E: 1,600,000 psi minimum

B. Pressure-Treated Lumber: All wood nailing blocks, sills, and plates resting on or embedded in concrete or masonry within 18 inches of grade shall be pressure-treated in accordance with AWPA C1. Preservative shall conform to American Wood Preservers Assn. and American Wood Preservers Bureau Standard Specifications. Creosote shall not be used.

2.2 PLYWOOD MATERIALS

A. Plywood: Plywood shall conform to the requirements of U.S. Product Standard PS-1 as specified herein. All plywood panels shall be marked with grade mark of the American Plywood Association. The mark shall identify the plywood as to species, glue type, and grade in compliance with the applicable commercial standard. Plywood shall be Douglas Fir, Exterior, C-D, S1S.

B. Hardboard: Hardboard shall be temper-treated panels manufactured from interfelted ligno-cellulose fibers consolidated under heat and pressure in a hot press to produce a smooth, hard-surfaced material which is resistant to water and stains. Hardboard shall conform to the requirements of ANSI/AHA A 135.4.

C. Oriented Strand Board (OSB): Where shown on Plans, OSB shall conform to American Plywood Association Sturd-I-Floor and conform to the Council of American Building Officials NER 108. Use edge sealed tongue and groove OSB for flooring. Use glue nail application approved by the American Plywood Association for Sturd-I-Floor construction

2.3 ACCESSORIES

A. Nails, Spikes and Staples: Galvanized for exterior locations, high humidity locations; plain finish for other interior locations; size and type to suit application.

B. Bolts, Nuts, Washers, Lags and Screws: Medium carbon steel; size and type to suit application; galvanized for exterior locations, high humidity locations, and treated wood; plain finish for other interior locations.

C. Fasteners: Expansion shield and lag bolt type for anchorage to concrete. Bolts or power activated type for anchorage to steel.

D. Metal Framing Devices: Provide metal framing devices as shown on the Drawings. Acceptable products include “Strong-Tie” by Simpson Company, Silver Metal Products, or equivalent by approval.

E. Plyclips shall be extruded aluminum clips, manufactured from 6063-T6 aluminum alloy, and designed for intended use. Size shall be as required for plywood or shall be as shown.

PART 3 - EXECUTION

3.1 GENERAL

A. Discard units of material with defects which might impair quality of the Work, and units which are too small to use in fabricating work with minimum joints or optimum joint arrangement.

B. Set carpentry work accurately to required levels and lines with members plumb and true and accurately cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as shown, and as required by recognized standards. Countersink nail heads and fill holes in exposed carpentry work.

D. Use common wire nails, except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood and pre-drill as required.

E. Rough Hardware: All rough hardware not otherwise specified and which is necessary for the satisfactory execution of framing, including nails, spikes, dowels, fasteners, and similar incidentals shall be provided and installed by the Contractor. Rough hardware shall be coordinated, furnished, installed, and embedded as shown and as required for a complete Work.

F. Framing: Framing members and assemblies shall be closely fitted, accurately set, and rigidly secured to required lines, levels, and arrangements shown. Framing shall be accurately and neatly cut and shall be securely nailed, spiked, or otherwise fastened in place in a workmanlike manner. Timber connectors and installation thereof shall conform to applicable requirements of AITC 104 and AITC 105.

3.2 FRAMING DEVICES

A. Metal Framing Devices: Metal framing devices shall be furnished and installed where shown. Nails for the framing devices shall be as furnished or recommended by the manufacturer of the anchor device. All nails shall be driven to their full depth at all holes in anchors. Bolt and lag fasteners shall be drawn tight.

3.3 FRAMING

A. Plate and Sill Installation: Bottom plates and sill plates which are secured to concrete shall be located as shown. The anchor bolts shall be located as shown or as required by Referenced Standard if not shown. The plates and sills shall be leveled with shims. Washers shall be placed and nuts shall be tightened to level bearing, after which the space (1/2-inch minimum) between the sill and concrete shall be dry-packed with concrete.

B. Blocking and Backing: All blocking and backing in walls and ceilings shall be nominal 2-inch thick material of a depth as needed and shall be accurately located around light fixtures, ceiling registers, grilles, and other required mechanical and electrical items. The blocking shall fit snugly and shall be spiked into the supporting framing members. Wood blocking (backing) to receive sheathing, siding, metal lath, and gypsum board shall be provided wherever necessary for securing the facing materials.

C. Plywood Sheathing: Plywood sheathing shall be installed with face grain across supports and end joints shall be over joists and shall be staggered. Blocking shall be provided at all unsupported edges.

D. Fire Stops: Fire stops shall be not less than 2-inch nominal thickness and of the same width as the studs. Strips of full-thickness fiber glass or rock wool shall be installed around pipes, ducts, conduits, and other penetrations through fire stops.

E. END OF SECTION 06 10 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 06 17 53 – SHOP - FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Finish and install wood roof trusses as indicated on the Drawings and as specified herein.

1.2 SUBMITTALS

A. Shop Drawings: The Contractor shall submit shop drawings for approval showing complete details of wood trusses. Show the following information:

1. Design and fabrication data.
2. Thickness, nominal sizes and location of metal connectors at all joints.
3. Pitch span and spacing of trusses.
4. Species and stress grades of lumber to be used as members.
5. Design loading of trusses and allowable stress increase.
6. Force analysis in each member.
7. Any bracing required to prevent compression buckling of truss members.
8. Camber and deflection.
9. Final truss plans shall be stamped by a registered Professional Engineer licensed in the State of Idaho.

1.3 QUALITY ASSURANCE

A. Standards: The design and fabrication of wood trusses shall comply with the following standards latest edition:

1. "National Design Specifications for Stress-Grade Lumber and Its Fastenings" by NFPA.
2. "Timber Construction Standards" by AITC.
3. "Design Specifications for Light Metal Plate Connected Wood Trusses" by Truss Plate Institute.

1.4 DESIGN STANDARDS

A. The truss manufacturer is responsible for the design and fabrication of the truss system and it’s bracing requirements.

B. Design trusses to support the following loads:

Flat Roof Snow Load	(Top chord)	38.5 PSF
Dead Load	(Top chord)	17.5 PSF
Live Load	(Bottom chord)	20 PSF
Dead Load	(Bottom chord)	3 PSF
Total Load		79 PSF

(See General Structural Notes - Basis of Design, on Construction Drawings for Additional Loading Requirements, I.E. Wind, Seismic and Importance Factors)

C. Truss design shall conform to the requirements of the current edition of IBC Section 1608 and ASCE 7 Section 7. These requirements shall include, but are not limited to, the following:

1. Partial loading.
2. Unbalanced snow loads.
3. Drifts on lower roofs and roof projections.
4. Sliding snow.
5. Ice dams and Icicles along eaves (double eave loads).
6. Wind Loading
7. Deflection

D. The truss manufacturer shall consider the effects of eccentric loading in the design of heel joints.

E. No stress increase for plate connectors will be allowed.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Fabricated trusses shall be handled with care so that they are not subject to damage. If trusses are stockpiled prior to erection, they shall be set in vertical position, resting on temporary supports, and braced to prevent unusual bending or tipping over.

PART 2 - PRODUCTS

2.1 MATERIALS OF CONSTRUCTION

A. All lumber used for the truss members shall be Douglas Fir Dense No. 1 Grade. All lumber used for truss members shall conform to the published stress ratings for the species and grades as set out in the official grading rules of the Lumber Association.

1. Moisture content of lumber shall not exceed 19% nor be less than 7% at the time of fabrication.

2. Lumber shall be uniformly sized S4S and conform to the nominal sizes shown on the shop drawings.

3. All members shall be cut from lumber which bears the proper grademarks stamp of a recognized grading association.

2.2 CONNECTORS

A. All truss connector plates shall be fabricated from galvanized sheet steel which has minimum uncoated thickness of 0.0359 inches 20 gauge and a minimum yield strength of 33,000 psi. Corrosion-resistant coating shall be 1.25 oz. per square foot commercial class hot-dipped galvanized.

2.3 FABRICATION

A. Trusses shall be fabricated in a properly equipped manufacturing facility. They shall be manufactured by experienced workmen using proper truss fabricating equipment.

B. Truss members shall be accurately cut to length, angle and be true to line to assure tight joints in finished trusses.

C. Truss members and connector plates shall be properly placed in special jigs and the members tightly clamped in place until the connector plates have been pressed into the lumber simultaneously on both sides of the joints.

PART 3 - EXECUTION

3.1 ERECTION

A. During erection, care shall be taken to keep horizontal bending of the trusses to a minimum.

B. Proper erection bracing shall be installed to hold the trusses true and plumb until the permanent truss bracing system is solidly nailed in place.

C. Erection of permanent bracing shall be installed before application of any leads.

END OF SECTION 06 17 53

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 07 11 13 – BITUMINOUS DAMPPROOFING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and apply cold-applied asphalt emulsion damp-proofing as shown on the drawings and as specified herein.

1.2 REFERENCE STANDARDS

A.	ASTM D449	Standard Specification for Asphalt Used in Dampproofing and Waterproofing
B.	ASTM D1187	Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal
C.	ASTM D1227	Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing
D.	NRCA (WM)	The NRCA Waterproofing Manual

1.3 SUBMITTALS

A. Submit manufacturer's technical product data in accordance with Section 01 33 00 – Submittal Procedures. Shop drawing information shall include installation instructions, and recommendations for each damp-proofing material required. Provide properties of primer, bitumen, and mastics.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Applier shall be a firm which has specialized for not less than three years in installation of types of damp-proofing required for this project and which is acceptable to manufacturer of primary materials.

B. Warranty: Furnish a written warranty for unconditional water-tightness for a period of two years from the date of substantial completion.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.

1. Composition – Vertical Application: ASTM D1227 Type III or ASTM D1187 Type I

2. VOC Content: Not more than permitted by Local, State and Federal Regulations

3. Applied Thickness: 1/16 inch, minimum, wet film.

2.2 MANUFACTURER

A. The approved manufacturer shall be subject to compliance with specified requirements:

1. Celotex Corporation

2. Manville Building Products Corp.

3. Tamko Asphalt Products, Inc.

4. Tremco Company

5. W.R. Meadows, Inc.

PART 3 - EXECUTION

3.1 PREPARATION

A. Proceed with damp-proofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer’s recommendations.

B. Provide adequate ventilation to prevent accumulation of hazardous fumes during application of solvent-based components in enclosed spaces, and maintain ventilation until coatings have thoroughly cured.

C. Clean substrate of projections and substances detrimental to work; comply with recommendations of prime materials manufacturer. Fill voids, seal joints, and apply bond breakers (if any) as recommended by prime materials manufacturer, with particular attention at construction joints.

3.2 APPLICATION

A. Comply with manufacturer’s instructions as to application rates and application methods.

B. Apply damp-proofing to all exterior below grade surfaces of exterior underground walls in contact with earthwork or other backfill, in any situation where space of any kind is

enclosed on opposite side. Extend over top of footing and turn down minimum of 6 inches over outside face of footing

C. Extend vertical damp-proofing down walls from finished grade line to top of footing. Extend 12-inches onto intersecting walls and footings, but do not extend onto surfaces which will be exposed to view when project is completed.

D. Install protection course over completed and cured damp-proofing to protect the damp-proofing from damage during backfilling. Comply with damp-proofing materials manufacturer's recommendations for support or attachment of protection materials.

END OF SECTION 07 11 13

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 07 20 00 – THERMAL PROTECTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install building insulation as shown on the drawings and as specified herein. Applications of insulation specified in this Section include the following

1. Foundation wall insulation (polystyrene) (supporting backfill).
2. Foam in place insulation (masonry block cells).
3. Rigid Insulation in roof and exterior wall assembly.
4. Cavity wall insulation
5. Batt Insulation at roof.

1.2 REFERENCE STANDARDS

A. Federal Specifications:

1. HH-I-1972/1 Insulation Board, Thermal, Polyurethane or Polyisocyanurate, Faced With Aluminum Foil on Both Sides of the Foam
2. L-P-375C(3) Plastic Film, Flexible, Vinyl Chloride
3. TT -5-001657 Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type (For Buildings and Other Types of Construction)

B. Commercial Standards:

1.	ASTM C665	Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
2.	ASTM D2626	Asphalt-Saturated and Coated Organic Felt Base Sheet Used in Roofing
3.	ASTM E84	Test Method for Surface Burning Characteristics of Building Materials
4.	ANSI/ASTM A653	General Requirements for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
5.	ANSI/ASTM D41	Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

1.3 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

B. Manufacturer's Information: Manufacturer's literature, specifications, installation instructions, technical data, and general recommendations for the vapor retarder materials shall be submitted.

C. Manufacturer's certification or other data substantiating that the proposed materials comply with the Specification shall be submitted.

1.4 QUALITY ASSURANCE

A. Thermal Resistivity: Where thermal resistivity properties of insulation materials are designated by R-values they represent the rate of heat flow through a homogenous material exactly 1-inch thick, measured by test method included in referenced material standard or otherwise indicated. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through on square foot per hour at mean temperatures indicated.

B. Fire Performance Characteristic: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, per methods indicated below, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction.

1. Surface Burning Characteristics: ASTM E84.

2. Fire Resistance Ratings: ASTM E119.

3. Combustion Characteristics: ASTM E136.

PART 2 - PRODUCTS

2.1 GENERAL

A. The materials and application of building insulation shall conform to the applicable requirement of the Underwriters Laboratories, Fire Resistance Index, Factory Mutual requirements, manufacturer's printed recommendations and specifications, and Federal specifications.

B. Thermal and acoustical insulation shall have a flame-spread rating of 25 or less and a smoke density not exceeding 450 when tested in accordance with ASTM E84.

C. Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.

D. Sizes to fit applications indicated, selected from manufacturer's standard thickness, widths and lengths.

2.2 MATERIALS

A. Batt Insulation: Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used at Contractor's option.

1. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit

a. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any

b. Formaldehyde Content: Zero

c. Thermal Resistance: R-value of 38, minimum

d. Facing: Aluminum foil, flame spread 25 rated; one side

2. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 when tested in accordance with ASTM E84

a. Smoke Developed Index: 0, when tested in accordance with ASTM E84

b. Thermal Resistance: R-value of 38, minimum

B. Thermal Wall Insulation: Where indicated on Drawings, thermal wall insulation at exterior masonry or concrete walls shall be reflective membrane face fiber glass batts with a minimum "R" value as shown on the Drawings and conforming to ASTM C665.

C. Sound Insulation: Where indicated on Drawings, sound insulation shall be not less than 3-1/2-inch thick Kraft paper-faced mineral fiber batts, confirming to ASTM C665 Type II, Class B.

D. Below-grade Insulation: Below-grade insulation at floor slabs shall be 2-inch thick rigid expanded polystyrene "Styrofoam- thermal insulation conforming to Federal Specification HH-I-524C, Type II, Class B. Insulation shall have a minimum compressive strength of 25 psi, maximum water vapor transmission rate of 1.5 perm-in, density of 1.5 lb/cu ft and an -R- value of 4 per inch of thickness. Acceptable manufacturers include Amoco Foam Products Co., Dow Chemical U.S.A., Minnesota Diversified Products, Inc., and UC Industries.

E. Foam in Place Insulation: Foam in place insulation shall be a tripolymer product using a phenol based synthetic polymer. The system shall consist of two components: an aqueous resin solution and a foaming catalyst. The two components shall be mixed with compressed air to produce a foam in place operation. Provide foam-in-place insulation as manufactured by C.P. Chemical Co., Inc. or Equal

F. Rigid Insulation: Rigid insulation shall be used in roofing applications and in exterior wall panels of Pre-Engineering Metal Building. Provide insulation that is a polisocyanurate foam core bonded during the foaming process to factory routed 5/8" oriented strand board on one side and a fiber reinforced facer on the other. Nailboard shall be manufactured

under controlled factory conditions with routed edges in order to provide the required expansion joint between panels. Each sheet of Nailboard shall be precisely, cut resulting in a seamless panel. Acceptable manufacturers include NRG Barriers Inc., Atlas Energy Products, or Equal.

1. Nailboard shall conform to the following properties:

Property	Test Method	Value
Foam Core Density	ASTM D1622	2.0 per Nominal
Dimensional Stability	ASTM D2126	2 % max. 7 days
Compressive Strength	ASTM D2126	2 % max. 7 days
Moisture Vapor Trans.	ASTM E96	<1 perm
Flame Spread (foam core)	ASTM E84	25 max.

2. Nailable Base: APA rated, Exposure l; UL Class A substrate

G. Thermal Spacer Blocks: Fabricated from extruded polystyrene, 1”

2.3 ACCESSORIES

A. Fasteners: Fasteners shall be per written recommendations of the manufacturer of the insulating materials.

B. Aluminum Foil Tape: Aluminum foil tape shall be 2 inches wide "Aluma-Grip No. AF7-701" manufactured by Hardcast, Inc. (800-527-7092), or equal.

C. Concrete Primer: Concrete primer shall conform to ANSI ASTM D41.

D. Vapor Retarder Membrane System for Walls and Ceilings: See Section 07 25 00 – Weather Barriers for membrane requirements.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with manufacturer's instruction for particular conditions of installation in each case. If printed instructions are not available or do not apply to protect conditions, consult manufacturer's technical representative for specific recommendations before proceeding with the Work.

B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

C. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

3.2 DELIVERY AND STORAGE

A. Protection insulation (minimum level B or better) during delivery and store against moisture absorption or other damage. Reject material with broken wrappers or cartons.

3.3 INSTALLATION AND PREPARATION

A. Insulation shall be installed in accordance with the manufacturer's printed installation instructions.

B. Require Installer to examine substrates and conditions under which insulation work is to be performed. A satisfactory substrate is one that complies with requirements of the Section in which substrate and related work is specified. Obtain Installer's written report listing conditions detrimental to performance of the Work in this Section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

C. Clean substrates of substances harmful to insulation or vapor retarders, including removal of projections which might puncture vapor retarders.

D. Blocking for wall-mounted items and items installed within furring and walls shall be securely installed prior to installation of insulation.

E. Extruded polystyrene foam board insulation shall be secured by construction adhesive.

F. Below-grade insulation shall have insulation protective board installed between below-grade insulation and backfill.

G. Insulation shall be installed to provide maximum sound and thermal benefits for material specified. The insulation shall be installed to completely fill or cover voids between furring studs, providing a continuous blanket of insulation. Insulation shall be cut neatly to snugly fit angles, corners and irregular areas and carefully wrapped around pipes, conduits, outlets, switches, beams, etc., to maintain continuity of insulation. Gaps or bridges shall be avoided. Insulation shall be tight fitting batts and shall be secured as recommended by the Code and the material manufacturers for job conditions.

H. Vapor retarder shall be installed continuously on the warm side of insulation.

3.4 INSTALLATION OF FOAM IN PLACE INSULATION

A. Foam in place insulation shall be installed by an applicator certified by the product manufacturer using special equipment for installation of the foam product.

3.5 INSTALLATION OF NAILBOARD

A. Installation shall be in strict accordance with manufacturer’s published instructions, details and drawings that are part of the contract documents for the project. Panel shall be installed over structurally sound substrate. Install vapor retarder to the existing substrate prior to the installation of the panels.

B. Panels shall be mechanically fastened with screws long enough to penetrate decking and/or structural members a minimum of 1" and provide adequate hold. Fastener spacing shall be designed by the panel supplier.

C. Approximately 1/8" spacing between panels shall be provided to allow for expansion. Wood blocking shall be provided at all perimeters and openings. Connection splines shall be provided.

D. Roofing materials shall be installed per manufacturer's specifications and recommendations.

END OF SECTION 07 20 00

SECTION 07 25 00 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install vapor barrier under concrete slabs on grade, exterior walls and roofing systems as shown on the drawings and as specified herein.

1.2 REFERENCE STANDARDS

A.	ASTM D 882	Tensile Properties of Thin Plastic Sheeting; 2001.
B.	ASTM D 1709	Impact Resistance of Plastic Film by the Free-Falling Dart Method; 2001.
C.	ASTM D 2582	Puncture-Propagation Tear Resistance of Plastic Film and Thin Sheeting; 2000.
D.	ASTM D 3776	Mass Per Unit Area (Weight) of Woven Fabric; 1996.
E.	ASTM D 4833	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products; 2000.
F.	ASTM E 84	Surface Burning Characteristics of Building Materials; 2001.
G.	ASTM E 96	Water Vapor Transmission of Materials; 2000.
H.	ASTM E 1643	Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 1998.
I.	ASTM E 1745	Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 1997.
J.	NFPA 701	Fire Tests for Flame-Resistant Textiles and Films; 1999.

1.3 SUBMITTALS

A. Shop Drawings: Submit manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations and installation methods.

2. Storage and handling requirements and recommendations.

3. Samples: Submit manufacturer's samples of reinforced vapor retarders. Submit verification samples for each product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

1.4 QUALITY ASSURANCE

A. Preinstallation Meeting: Convene a pre-installation meeting two weeks before start of installation of reinforced vapor retarders. Require attendance of parties directly affecting work of this Section, including Contractor, Engineer, and installer. Review installation, protection, and coordination with other work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fire and Vapor retardants shall meet the following requirements:

Characteristic	Fire Retardant 5-Ply Laminate	Vapor Retardant 3-Ply Laminate	Vapor Retardant 4-Ply Laminate
Weight	70 lb/1,000 ft^2	70 lb/1,000 ft^2	80 lb/1,000 ft^2
Puncture Propagation Tear	36 lb	15 lb	55 lb
Permeance	0.028 grains/hr-ft^2-in Hg	0.000 grains/hr-ft^2-in Hg	0.038 grains/hr-ft^2-in Hg
Drop Dart	1,200 g	590 g	2,900 g
Tensile Strength	185 lb/4,250 PSI	100 lb/2,200 PSI	220 lb/1,220 PSI
Puncture Strength	47 lb	42 lb	102 lb
Surface Burning Resistance	Class I, Class B flame spread rating	Class I, Class A flame spread rating	Class A
Smoke Developed Rating	135	70	N/A
Usable Temperature Range	-40 to 170 Deg F	-10 to 170 Deg F	-25 to 170 Deg F

2.2 FIRE RETARDANT

A. Roofing System Vapor Barrier shall be 5 ply linear low density polyethylene and nylon yarn laminate. Yarn shall be suspended in a permanently flexible adhesive media. Material shall have a reinforced woven grid with PPT tear strength of at least 36.0 pounds as determined by ASTM D2582.

2.3 VAPOR RETARDANT

A. Under-Slab: Vapor barrier installed under concrete slabs shall be 4 ply linear low density polyethylene and nylon yarn laminate. Yarn shall be suspended in a permanently flexible adhesive media.

B. Exterior Walls: Vapor barrier installed in exterior walls where shown on Drawings shall be 3 ply linear low density polyethylene and nylon yarn laminate. Yarn shall be suspended in a permanently flexible adhesive media.

PART 3 - EXECUTION

3.1 GENERAL

A. Install reinforced vapor retarders in accordance with manufacturer's instructions. Install vapor barriers continuously at locations as indicated on the Drawings.

B. Immediately repair holes in vapor retarder with self-adhesive repair tape. Tears or punctures shall be repaired using Forifiber pressure sensitive tape Grade 495 to restore the vapor barrier.

C. Protect reinforced vapor retarders from damage during installation of reinforcing steel and utilities and during placement of granular materials or concrete slab. Protect reinforced vapor retarders from damage until covered by roof insulation and wall finish.

3.2 VAPOR RETARDER BELOW GRADE

A. Apply under-slab vapor barrier over graded and compacted base with roll parallel to the direction of casting. Lap joints a minimum of 6 inches, guided by control lines on the material.

3.3 VAPOR RETARDER MEMBRANE SYSTEM FOR WALLS

A. Vapor retarder membrane shall be attached to metal stud members by gluing per written recommendations of the membrane manufacturer. Glue shall be covered with not less than 2-inch square tape strip to provide an unbroken membrane.

B. All membrane seams shall be lapped at least 6 inches, sealed and taped.

C. The vapor retarder membrane shall be lapped, attached, and taped to other surfaces at extremities, windows, door frames, penetrations, floor and ceiling.

D. A 1/8-inch bead of sealing compound shall be applied to the vapor retarder at framing members, blocking, and supports, wherever a finish material such as, but not limited to, the following: gypsum board, plywood, wainscots, insulation, support framing, and paneling will be anchored through it.

3.4 VAPOR RETARDER FOR ROOF

A. Membrane material shall be applied in the widest practicable widths. Side and end joints shall be lapped at least 6 inches. Membrane shall be close fitted around pipes, conduits and other protrusions. Areas surrounding protrusions shall be made damp-proof by using small pieces of membrane to form a collar and sealed with tape. Any punctures or tears shall be repaired using sealing tape.

END OF SECTION 07 25 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 07 40 00 – ROOFING AND SIDING PANELS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install architectural roof, wall and soffit panels as shown on the drawings and as specified herein. All metal panel products shall be provided by a single manufacture.

1.2 STANDARD

A. American Iron and Steel Institute (AISI), Specification for the Design of Cold-Formed Steel Structural members

B. American Institute of Steel Construction (AISC) Manual of Steel Construction (Current Edition).

C. American Society for Testing and Materials (ASTM) (Current Edition).

1. A653 Structural Quality Grade 33, Steel Sheet, Zinc-Coated, (Galvanized) by the hot-dip process, structural (physical) quality with coating applied in accordance with A924 general requirements for Steel Sheet, Zinc-Coated (Galvanized) by the hot-dip process.

2. E283 Test for Rate of Air Leakage through Exterior Windows, Curtain Wall, and Doors.

3. E331 test Method for Water Penetration of Exterior Windows, Curtain Wall and Doors by Uniform Static Air Pressure Difference.

D. Coating Performance Reference Standards

E. Underwriters Laboratories (UL)

1. Fire Resistance Directory (Current Issue)

1.3 SUBMITTALS

A. Submit all independent laboratory test reports, design, and performance data as specified. Being mentioned in specification does not exempt manufacturer from submitting this data.

B. Submit prior to fabrication, erection/shop drawings for products specified showing all erection procedures and accessories required.

C. Panel samples.

PART 2 - PRODUCTS

2.1 PANELS

A. Wall Systems:

1. Panel manufacturer shall furnish trim and accessories, such as head jamb, sill, drip edge and corner flashings. All custom trim and flashings shall be made to project requirements, and trim coil and sheet stock shall be used for field forming where required. Accessories such as fasteners, sealants, neoprene plugs and closures shall be included in the installation.

2. Multi-Purpose panels shall be fabricated with a concealed fastening system. Panel width shall be 12 inches. Panel lengths shall be cut to proper length to fit the installation requirements. The semi-standing seam panels shall be rollformed from 24 gage steel. Installation shall be by hook, pull, and fasten. The fasteners will be concealed by the rib of the consecutive panel.

B. Soffit Panels:

1. Soffit panels shall be coated metal panels consisting of a concealed fastener soffit system for long overhang soffits. Installation shall be with framing system, girts or a solid substructure. No fasteners shall be visible after installation. The special locks shall prevent slipping of the panel. Provide smooth solid panels and lanced panels for ventilation where soffit vents are shown on the drawings. Install the strip first, followed by the J channel and soffit panel.

2. Soffit panels shall be fabricated with a concealed fastening system. Panel width shall be 12 inches. Panel lengths shall be cut to proper length to fit the installation requirements. The soffit panels shall be rollformed from 24 gage steel. Panel depth shall be a minimum of 7/16”.

C. Roof Panels:

1. Profile Configuration: Batten Seam Metal Roof: Vertical 2" high seams with 12-inch panel width and 2-inch-high battens. 24-gauge panels with striations.

2. Length: Provide panels in the maximum length recommended by the manufacturer to minimize end laps.

3. Panel: The panel shall be a non-structural panel with a batten style seams between the panels.

D. Profile Composition:

1. Base Metal:

a. Material: Steel conforming to ASTM A792 Grade 50 (D) with a minimum yield strength of 50,000 psi. and thickness not less than 24 gauge.

b. Protective Coating: Galvanized G-90 coating in accordance with ASTM A653 and coated with a paint system specified below.

2. Coating:

a. Paint system (Signature 300™) 0.8 mil Signature 300™ 70% resin finish coat applied over a 0.2 mil baked-on base primer to a total film thickness of 1.0 mil.

b. Color selected by the Owner from manufacturer's standard or premium color chips.

E. Concealed-Clips:

1. Material: 20 gauge galvanized steel.

2. Configuration: Clips shall be designed as to fix by concealed fasteners, and fully engage the rib of every panel.

F. Fasteners:

1. Clip Fasteners: As per manufacturer's recommendations to attach clip to the substrate shown on the drawings. Batten style cover over the seams to conceal the fastening.

2. Other Fasteners: Self-drilling or self-tapping screws or stainless steel pop rivets painted to match the panels where visible, per the panel manufacturer's recommendations.

G. Flashing and Trim:

1. Flashing and/or trim shall be supplied at rakes, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and/or a finished appearance.

2. Standard trim configurations and/or finishes for given conditions shall be determined by the specific roof and wall panel system and finish combinations.

3. Trim finish shall be paint system (Signature 300) 0.8 mil Signature 300™ 70% resin finish coat applied over a 0.2 mil baked-on base primer to a total film thickness of 1.0 mil. Color of the exterior finish shall be selected by the Owner/Engineer from the manufacturer's standard or premium colors.

H. Mastics and Sealants:

1. Pre-formed tape mastics, and/or non-skinning tube sealants shall be used for the sidelaps and endlaps of all roof coverings.

2. Tape Mastic shall be pre-formed butyl rubber-based compound conforming to TT-C-1796-A or approved equivalent. The compound shall be non-hardening, non-corrosive to metal and have excellent adhesion properties. Tape mastic shall

be white or light gray in color. Tube Sealant shall be a synthetic elastomer-based material in gray or bronze.

3. Gunable Sealant: Use sealant to meet TT-S-00230C or approved equivalent.

I. Preformed End Closures:

1. Closures, formed to match roof panel profiles shall be used to provide weather tightness. Closures shall be of a closed cell, non-absorbent, laminated, semi-rigid material, EPDM (Ethylene-Propylene-Duene-Monomer) foam in a gray or neutral color shaped to tightly fit the panel configuration.

J. Finish:

1. FLUOROFINISH® (Polyvinylidene Fluoride) consisting of 0.25 +/- 0.05 mil primer on both sides with 0.75 +/- 0.1 mil 70 percent Signature 300 or Kynar 500 top coat.

2. The exterior color shall be selected by the Owner/Engineer from manufacturer's standard or premium colors.

K. Trim and Flashing Material:

1. Shall be of the same material, gage, finish and color as the panels, unless otherwise indicated.

L. Accessories:

1. Fasteners:

a. Type 304 Stainless Steel with 5/8" diameter combination neoprene bonded metal washers, shall be #14 Type A for sheet to sheet and Type B for sheet to structural steel support.

b. Exposed fasteners color coated to match panels.

2. Closures:

a. Provide where called for on the drawings pre-molded flexible, cross-linked, closed-cell gray polyethylene foam to fit the contour of the panel specified.

b. Metal closures shall be manufactured from material that is the same finish and color of the adjacent metal panels and furnished where shown on drawings.

3. Tape Sealant shall be installed in all side and end laps of all metal panels and for all flashings, to assure weather tightness.

4. Sub-girts shall be hat shaped or zee shaped.

a. Sub-girts shall be roll-formed from 16 gage, G-90 Galvanized Steel.

b. Sub-girts shall be located at each structural building support and not more than 6'-0" on center between supports.

M. Approved Manufacturers

1. MBCI Metal Roof and Wall Systems

2. Atas International Inc.

3. Metal Sales Manufacturing Corporation

2.2 FABRICATION

A. Must be in compliance with dimensions, profile limitations, gages and fabrication details of Manufacturer.

B. Components shall be fabricated to the greatest extent possible in the factory ready for field assembly.

PART 3 - EXECUTION

3.1 DELIVERY AND STORAGE

A. Materials shall be delivered to the site in a dry and undamaged condition and unloaded per the manufacturer's instructions. The installer shall inspect materials for damage and stains upon arrival to the site. Materials shall be stored out of contact with the ground in weathertight coverings to keep them dry per the manufacturer's recommendations. Storage accommodations shall provide good air circulation and protection from surface staining.

3.2 INSPECTION

A. The installer shall examine the building to verify that the structure is ready for panel installation.

B. All structural supports shall be in place before the Work proceeds.

C. Field-check dimensions and check support alignment with a taut string or wire; support misalignment will cause panel "oil-canning."

D. Should any condition be found which, in the opinion of the installer, will prevent proper execution of his work, the installer shall report such condition.

E. Do not proceed until unsatisfactory conditions are corrected.

3.3 INSTALLATION

A. Protect installed panels from abuse by other trades. The Contractor shall be responsible for protecting the panels from wet cement, plaster, painting operations, etc. The installer shall provide walk boards in heavy roofing traffic areas to prevent damage to panels. The

metal roof panels shall be mechanically seamed with appropriate equipment as recommended by the manufacture.

3.4 DAMAGED MATERIAL AND CLEANING

A. Replace damaged panels and other components of the Work which cannot be repaired by finish touch-up or similar minor repair.

B. To prevent rust staining, remove immediately from finished surfaces any filings caused by drilling or cutting.

END OF SECTION 07 40 00

SECTION 07 60 00 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide sheet metal and appurtenant work, complete, in accordance with the Contract Documents.

B. The principal items of sheet metal work shall include, but not be limited to the following: sheet metal flashings, collars, pitch pockets (pans), equipment platforms, and equipment (sleeper) supports at all roof penetrations which are not provided as part of the roofing system.

1.2 REFERENCE STANDARDS

A. Federal Specifications

1.	QQ- T -201 E	Terneplate, For Roofing and Roofing Products
2.	TT -P-641 G(1)	Primer Coating, Zinc Dust-Zinc Oxide (For Galvanized Surfaces)
3.	UU-B-790A INT AMD 1	Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellent and Fire Resistant)

B. Commercial Standards

1.	ASTM A240	Stainless and Heat-Resisting Chromium Steel Plate. Sheet. and Strip
2.	ASTM A653	Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process
3.	ASTM B32	Solder Metal
4.	ASTM B209	Aluminum and Aluminum-Alloy Sheet and Plate
5.	ASTM D226	Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing
6.	ASTM D1187	Asphalt-Base Emulsions for Use as Protective Coatings for Metal

C. Trade Standards

1. Sheet Metal and Air Conditioning Contractors National Association. Architectural Sheet Metal Manual. (ASMM).

2. The Aluminum Association .Specifications for Aluminum Sheet Metal Work in Building Construction, American Welding Society (AWS).

D. Manufacturer's Standards: In addition to the standards listed above, the flashing products and their installation shall be in accordance with the manufacturer's published recommendations and specifications.

1.3 SUBMITTALS

A. General: All submittals shall be submitted in accordance with the requirement of Section 01 33 00 – Submittal Procedures.

B. Samples: Color samples and samples shall be submitted where required for color selections and/or review by the Engineer.

C. Shop Drawings: Shop drawings showing materials, gauges, finishes, layout, jointing, profiles, fasteners, fabrication of special shapes, and method of attachment to adjacent construction shall be submitted.

D. Submit manufacturers literature indicating materials, finish, construction, and method of installation of prefabricated items and sealants.

PART 2 - PRODUCTS

2.1 GENERAL

A. Sheet metal shall be aluminum and/or galvanized steel unless otherwise specified or shown. Sheet metal work in connection with roofing shall be in accordance with roofing manufacturer's published specifications.

B. All sheet metal flashings necessary to make building weathertight shall be provided, whether or not specified or shown.

2.2 ALUMINUM PRODUCTS

A. Aluminum shall be 0.032-inch minimum thickness and shall conform to ASTM B209, alloy 3003-H 14, with dark bronze anodized finish AA-C12-A42 unless specified or shown otherwise. Thickness of aluminum to be welded shall be as necessary for welding method being used.

B. Reglets shall be extruded aluminum with protective coating such as manufactured by Superior Concrete Accessories; Morrison and Company "Cushion-Lock"; Fry Reglet; or equal.

2.3 FERROUS METALS

A. Unless otherwise specified, galvanized steel shall be 24 gauge minimum thickness conforming to ASTM A653.

B. Stainless steel shall be 24 gauge minimum thickness conforming to ASTM A176, Type 3.04, dull No. 20 finish.

C. Terne metal for roofing and roofing products shall be not less than 40 Ib in thickness conforming to Federal Specification QQ- T -201 E.

2.4 LEAD AND SOLDERING MATERIALS

A. Lead shall be 4 to 6 percent antimony and remainder shall be lead. Lead sheet shall be soft temper I except hard temper for flanges. Weight shall be not less than 4 Ib/sq ft unless otherwise shown.

B. Solder shall conform to ASTM B32, Alloy 5b, 50 percent tin, 50 percent lead.

C. Soldering flux shall be of a type not injurious to metal surface being treated.

2.5 FASTENERS

A. Fastening devices shall be of the same material as the sheet metal being used or corrosion-resistant metal compatible with sheet metal being used. Fasteners exposed to the weather shall have neoprene washers. Washers shall be 0.04 in minimum thickness. A rubber-type washer shall be used beneath the aluminum washer or fastener head where weathertightness is required.

2.6 SEALING MATERIALS

A. Sealants shall be as specified under Section 07 92 00 – Joint Sealants or shall be of the silicone type. Colors shall be selected by the Engineer from manufacturer's standard colors.

B. Sealer tape shall be polyisobutylene sealer tape specifically formulated for setting flanges on bituminous roofing, as manufactured by Morrison and Company CL-50; plasticity 579.6; or equal.

2.7 COATING MATERIALS

A. Primer coat for galvanized steel shall conform to Federal Specification TT -P-641 G(1) Type II.

B. Asphaltic coating compound shall conform to ASTM D1187.

2.8 BUILDING PAPER OR FELT

A. Unless other specified, provide asphalt saturated roofing felt underlayment (No. 30) conforming to ASTM D226

2.9 SHOP FABRICATION REQUIREMENTS

A. Gutters and downspouts shall be of sizes as shown with wire basket type strainers of 14 gauge stainless steel wire or cast bronze.

B. All aluminum shall be welded where specified or shown. Welding shall conform to Reference Standards.

C. Galvanized steel corner joints shall be soldered. Other joints shall be as specified, or as required by the Reference Standards.

D. All Work and finishes shall be protected from scratches and abrasions.

E. All flashings, reglets and counter-flashing and associated flashings shall be fabricated by the same manufacturer and be installed as a complete flashing system. All flashings shall be creased longitudinally or otherwise formed with sufficient spring action to hold bottom edges firmly against base flashing or similar material.

F. Intersecting corners of copings shall be accurately fitted and welded. Corners may be shop-assembled, manufactured, or extruded units. Coping shall be per ASMM Plate 68 except modified as shown, with Alternate 5 seams that allow for 1/4 inch expansion per each 10 feet of length.

G. All required access doors, unless specified elsewhere, shall be provided. Size and location shall be as required by governing authorities, codes, and as shown. Key-locked access doors shall be provided where shown.

H. Flashing required through concrete or clay tile shall be flexible flashing in order to assure against undue separation between tiles on account of rigidity of the flashing material. Flashing around pipes, vents, flues, chimneys, etc., shall be of lead, copper, or other approved flexible flashing material.

2.10 FABRICATED SHEET METALWORK

A. Scuppers in walls shall be constructed of 0.040 inch aluminum and/or 16 gauge material similar to design shown on ASMM Plate 26 with all joints welded. Scuppers through top course without head shall be similar to ASMM Plate 28.

B. Stamped sheet metal vents or louver-type vents (where shown) shall be designed to provide watertight flush corners and shall be of size shown. Each vent shall be equipped with 1/4-inch square galvanized or aluminum mesh hardware cloth insect screen. Stamped metal items shall be made of coated aluminum or galvanized sheet metal.

C. Downspouts with conductor head 1/2 inch below gutter or scupper and hangers shall be designed similar to design shown on ASMM Plates 32, 25, and 34, Figure B or D. Downspout and conductor head shall be constructed of 1/16 inch aluminum or 16 gauge metal and shall have all joints welded except joint between head outlet pipe and downspout.

D. Surface mounted, downspout and hangers shall be designed similar to design shown on ASMM Plates. Downspout shall be constructed of 16 gauge metal and shall have all joints soldered except joint between gutter outlet pipe and downspout.

E. Metal vent screeds shall be plaster channel screeds PCS-V-300 as manufactured by Fry Reglet Corp.; H.K. Porter Co., Inc.; or equal. Screeds shall be extruded aluminum with either clear plastic coating, clear anodized coating, or clear acrylic baked- on coating. All corners shall be mitered.

F. Wall louvers shall be extruded aluminum louvers conforming to ASMM Plate 14, unless otherwise specified or shown. Louvers and screens shall have clear anodized finish. All

exterior louvers shall be provided with 1/2-inch by 1/2-inch mesh bird screen and frame. Screen units shall be removable.

G. Scuppers in walls and parapets shall be constructed of 0.040-inch aluminum similar to ASMM Plate 30. All joints shall be welded.

H. Access doors shall be as manufactured by Milcor Division of Enryco, Inc.; Karp Associates, Inc.; Inland Ryerson Steel Corporation; or equal and shall be of the types necessary to suit job conditions.

I. Equipment supports conforming to Reference Standards shall be provided where required or necessary and may be of galvanized steel construction unless otherwise shown.

J. The roof penetrations sheet metal work items shall be provided and shall be coordinated with the roofing system. The design and details shall conform to the Reference Standards unless otherwise shown.

K. The roof penetrations shall be provided with the following flashing:

1. Vent pipes: Lead collars vent pipe flashing with top of lead sleeve flashing bent into vent pipe. Ref. ASMM. Plate 66, F18.B and 71 Figure A.

2. Single pipes: Sheet metal or lead collars with sheet metal or lead draw band with sealant or cap top. Ref. ASMM. Plate 65 & 66, F18.C.

3. Multi-pipes: Lead collar with cap. Ref. Stoneman Engineering and Mfg. Co.

4. Multi-pipes w/curb: Sheet metal with sealant and draw bands. Ref. ASMM. Plate 65, Figure B.

5. Equipment support and/or Platform (See Note 1): Sheet metal. Ref. ASMM. Plate 68.

6. Pitch pockets for supports: Sheet metal with all joints welded or soldered. Ref. ASMM. Plate 61, figure E.

7. Ducts with curb (See Note 1): Sheet metal. Ref. ASMM Plate 148, Figure B 150, 151.

8. Prefabricated products, curbs, supports, and platforms which are part of mechanical equipment and are specified in other Sections of these Specifications, shall be provided with equipment as specified.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall coordinate the flashings necessary with the different trades to make sure all items which penetrate the roof are provided with all necessary sheet metal items and work, such as (but not limited to) the following: pipes, ducts, support racks, equipment

platforms or sleepers, and supports. Sheet metal shop manufactured curbs, equipment supports, and equipment platforms shall be provided where prefabricated curbs, support or platform are not specified in other Sections of these Specifications.

B. All Work shall conform to Reference Standards. Flashing work shall be coordinated with roofing work. Sheet metal and roofing shall provide a weather-tight and watertight assembly.

C. Sheet metal work shall be accurately formed to dimensions and shapes shown. The Work shall be fitted snugly, with straight, true lines with exposed faces aligned in proper plane, free from waves and buckles. Arises and angles shall have true and sharp lines, and surfaces shall be free from waves and buckles. All exposed edges shall be hemmed. Holes for fasteners within sheet metal work exposed to temperature changes shall be elongated holes for material expansion and movement.

D. All sheet metal work shall be furnished complete with supports, hangers, bracing, anchors, and other devices as required for reinforcement and proper attachment to adjacent construction. Fastenings shall be concealed wherever possible. Joints, fastenings, reinforcements, and supports shall be sized and located as required to preclude distortion or displacement due to thermal expansion and contraction.

E. All surfaces upon which sheet metal is to be placed shall be dry, smooth, even, and free of any projections and hollows. Sheet metal shall be laid with all joints true and even and firmly attached with all fastener heads flush with the top surface.

F. The underlayment shall be overlapped at least 2 inches so as to shed water and shall be secured along the lapped edges. Aluminum fasteners shall be used with aluminum sheet metal.

G. Dissimilar materials shall be isolated with 2 coats of asphaltic paint, asphaltic coating compound, or sealer tape. Only stainless-steel fasteners shall be used to connect isolated dissimilar metals.

H. Joints shall be sized and spaced to permit sheet movement for thermal expansion and contraction of 1/4 inch per 10 feet length, on 140 degree Fahrenheit temperature difference. Holes for fasteners or anchors shall be elongated to provide for movement.

I. Roofing sheet metal items shall be built into the roofing in strict accordance with directions of roofing manufacturer.

3.2 INSTALLATION

A. Flashing at vertical surfaces shall be installed at intersections of roof with vertical surfaces and at projections through roof. Corner units shall be factory-fabricated and shall have mitered soldered or welded corner joints and shall be installed with 3-inch (min) lap joint over flashings on each side.

B. Copings shall have joints at 10 feet (max) spacing and at 2-1/2 feet from corners. Joints shall be butted with 3/16 inch space centered over matching 8 inch long backing plate with sealer tape in laps. Corner units shall be welded or soldered units. All joints shall be provided with cover plates.

C. Flanges of sheet metal items shall be set on continuous sealer tape on top edge envelope ply of roofing. Flanges shall be nailed through sealer tape at 3 inch (max) spacing or securely fastened per Reference Standards.

END OF SECTION 07 60 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This Section includes the following:

1. Roof edge flashings.

1.2 PERFORMANCE REQUIREMENTS

A. Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:

B. Design pressure is determined by formulas in SPRI ES-1 that account for basic wind speed, exposure factor, building height, building importance factor, and pressure coefficient that combines a gust factor.

1.3 SUBMITTALS

A. Submit product data for each type of product indicated in accordance with Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work.

C. Samples: For each type of manufactured roof specialty indicated with factory-applied color finishes.

D. Product Test Reports: Verifying compliance for each type of product indicated with performance requirements.

PART 2 - PRODUCTS

2.1 EXPOSED METALS

A. Prefinished, Zinc-Coated Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation, structural quality, and prefinished by the coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Per manufacturers recommendation.

2. High-Performance Organic Finish: Three-coat, thermocured system with color coats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2604, except as modified for below:

2.2 CONCEALED METALS

A. Aluminum Sheet: ASTM B209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.

B. Aluminum Extrusions: ASTM B221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

C. Stainless-Steel Sheet: ASTM A240, Type 304.

D. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653, G90 (Z275) coating designation; structural quality.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.

C. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

D. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.4 ROOF EDGE FLASHINGS

A. Roof Edge Fascia: Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed- or extruded-aluminum anchor bar with integral drip edge cleat to engage fascia cover. Provide matching mitered and welded corner units.

1. Available Manufacturers:

a. Hickman, W. P. Company.

b. Metal-Era, Inc.

c. MM Systems Corporation.

2. Fascia Cover: Fabricated from the following exposed metal:

a. Prefinished, Zinc-Coated Steel: thickness as indicated on drawings.

3. Fascia Cover Color: As indicated on drawings.

4. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.

2.5 ROOF EDGE DRAINAGE SYSTEMS

A. Available Manufacturers:

1. Architectural Products Co.

2. ATAS International, Inc.

3. Berger Bros. Co.

4. Castle Metal Products.

5. Cheney Flashing Company.

6. Hickman, W. P. Company.

7. Merchant & Evans, Inc.

8. Metal-Era, Inc.

9. Metal-Fab Manufacturing LLC.

10. MM Systems Corporation.

11. Obdyke, Benjamin Incorporated.

12. Perimeter Systems, a division of Southern Aluminum Finishing Co.

13. Petersen Aluminum Corp.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.

1. Install manufactured roof specialties with provisions for thermal and structural movement.

2. Torch cutting of manufactured roof specialties is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

C. Install manufactured roof specialties level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil-canning, buckling, or tool marks.

D. Install manufactured roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.

E. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.

F. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

G. Seal joints with elastomeric or butyl sealant as required by manufacturer of roofing specialties.

3.2 ROOF EDGE FLASHING INSTALLATION

A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings to resist uplift and outward forces according to performance requirements.

END OF SECTION 07 71 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Furnish and install joint sealers shown on the drawings and as specified herein.

1.2 CONDITIONS

A. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

B. Except as otherwise indicated, joint sealers are required to establish and maintain waterproof continuous seals on a permanent basis, which recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

A. Submit manufacturer's product specifications, handling/installation//curing instructions, and performance tested data sheets for each elastomeric product required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Elastomeric Sealants

1. Joints in Concrete Floors and Sidewalks: One component self-leveling polyurethane sealant conforming to ASTM C920, Type M, Grade P.

2. Joints in Water Containing Structures and Intermittently Submerged Joints: Two component, non-sag, water immersion, polysulfide polymer based elastomeric sealant conforming to ASTM C920, Type M, Grade NS.

3. Exterior Joints in Building Construction: One component, non-sag, SBR polymer based elastomeric sealant conforming to ASTM C920, Type M, Grade NS. Sealant color match substrate.

4. Interior Joints in Building Construction: One component multipurpose silicone sealant conforming to ASTM C920, Type S, Grade NS. Color of sealant to match substrate. Translucent where color match is not available.

B. Fire Stopping: Where piping, conduit, wire, or other materials pass through fire rated walls, floors, ceilings or roofs, provide a 1-hour fire rated sealant in accordance with ASTM E814 and UL 1479. Fire-resistant penetration sealant shall be a medium-density, fire-resistant foam that retains form and stability at high temperature.

C. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

D. Sealant Backer Rod: Provide compressible rod stock of polyethylene foam, polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorbent materials as recommended by sealant manufacturer for back-up of and compatibility with sealant.

PART 3 - EXECUTION

3.1 JOINT PREPARATION

A. Clean joint surfaces immediately before installation of gaskets, sealants, or caulking compounds. Remove dirt, insecure coatings, moisture and other substrates which could interfere with seal. Prepare all joint surfaces as recommended by sealant manufacturer. Use primer on all surfaces as recommended by the product manufacturer. Use backer rod on all joints to control the depth of sealant application to manufacturer's recommended sealant depth.

3.2 INSTALLATION

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

B. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. When horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove so that joint will not trap moisture and dirt.

C. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

D. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.

3.3 CURE AND PROTECTION

A. Cure sealants in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability. Advise Contractor of procedures required for cure and protection of joint sealers during construction period so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in a manner which will minimize effects. Replace or restore sealants which are damaged during construction period.

END OF SECTION 07 92 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install hollow metal doors and frames with mitered and mechanically joined door frames as shown on the contract drawings.

1.2 REFERENCE STANDARDS

A.	SDI 100	Steel Door Institute
B.	SDI 111-C	Standard Door Louvers
C.	ASTM A653	Cold-rolled Hot Dipped Galvanized Steel
D.	ASNI A250.10	Test Procedure and Acceptance Criteria Prime Painted Steel Surfaces for Steel Doors and Frames
E.	ANSI/SDI A250.3	Test Procedures and Acceptance Criteria for Factory Applied Finish Painted Steel Surfaces for Steel Doors and Frames.
F.	Underwriters Laboratories	

1.3 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Show all data needed for fabrication and installation of the Work. Adjust details for field conditions including but not limited to elevations, door edge details, frame profiles, metal thickness and preparations for hardware. Refer to the Special Provisions for number and manner of submittal of shop drawings.

C. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish. Schedule showing sizes, types, and locations of door louvers and glass shall be submitted along with manufacturer’s installation instructions.

D. Product Data: For each type of product indicated.

E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

PART 2 - PRODUCTS

2.1 GENERAL

A. Shop Fabrication and Assembly: All steel doors and frames shall be shop fabricated and shop assembled. Temporary stiffeners, spacers, and other accessories necessary to facilitate handling and accurate erection shall be provided. After fabrication, all tool marks and other surface imperfections shall be filled and ground smooth.

B. Fire Rating and labeling: Doors and frames indicated as fire-rated shall bear a UL label indicating the type of rating for which certified. Designs and construction of such products shall have specific UL approval according to current procedures for the fire rating, either 3-hour, 1-1/2-hour, 3/4-hour, or 20-minute as indicated. Hollow steel doors and frames for fire-rated openings shall conform to Underwriters' Laboratories listing and shall be UL labeled.

2.2 MATERIALS

A. Doors shall be 1-3/4 inch thick full flush type (nonpanel) "Full Flush" as manufactured by Fenestra, Republic, or equal, subject to specified quality herein and of the dimensions shown, constructed with not more than 1/8-inch edge clearance from frame. Construct floor clearance of ½-inch and bevel both vertical edges of door 1/8-inch in 2 inches.

B. Doors, frames and frame components shall be manufactured from ASTM A653 cold-rolled, hot-dipped galvanized steel having an A60 zinc coating conforming to ASTM A924. Galvanized steel shall be treated to insure proper paint adhesion. All component parts used in galvanized doors and/or frames shall meet the galvanize specification.

C. Core Filler: Door cores shall be polystyrene core consisting of 1 pound per cubic foot polystyrene slab.

2.3 FABRICATION

A. Fabricate doors in accordance with SDI 100 except as modified herein. Doors shall be constructed by laminating the metal face panels to the polystyrene core and enclosed with steel perimeter channels mechanically interlocked to the face sheets. The interlock shall be epoxy filled and finished with no visible edge seam.

B. Door shall have continuous vertical mechanical interlocking joints at lock and hinge edges with visible edge seams or with edge seam filled and ground smooth. The internal portion of the seam shall be sealed with epoxy. An intermittent fastening along the seam is not permitted.

C. Hardware Reinforcement: Reinforce doors with 7-gauge steel plate for butts, 14-gauge for lockset, drilled and tapped in accordance with templates furnished by hardware supplier. Provide 14-gauge or thicker reinforcement plates for all surface applied hardware. Hinge and lock reinforcements shall be projection welded to the edge of the door. Galvanized doors shall have galvanized hardware reinforcements. Adequate reinforcements shall be provided for other hardware as required. Top and bottom steel reinforcement channels shall be 14-gage and spot welded to both panels. Location of the hardware shall be as follows:

Top Hinge	11-5/8 inches center of butt to top of door
Bottom Hinge	12-3/8 inches from center of butt to floor
Intermediate Hinge	Equidistant between upper and lower hinge

D. Transom Panels: Transom panels shall be provided where shown and shall be of construction same as doors.

E. Louvers: Door louvers for steel doors shall be of steel the type which integrally frames the opening and can be securely attached. Louvers shall be of the inverted "V" blade type for exterior use and "V" blade for interior use. Exterior louvered openings shall be provided with removable type insect screens. Door louvers shall be uniformly located in doors and shall be of sizes shown. Louvers at labeled doors shall be equipped with concealed fusible links

F. Glazed Openings: Glazed openings in doors shall be of sizes shown, and be provided with mitered metal stops. Glazed openings in fire-rated doors shall meet UL requirements. Glass shall be as specified in Section 08 51 13 – Aluminum Windows.

G. Double Doors: Double doors shall be provided with a 8r type steel astragal unless otherwise specified in Section 08 71 00 – Door Hardware.

H. Manufacturers, or Equal:

1. Forderer Cornice Works

2. Krieger Steel Products Co.

3. Overly Manufacturing Co.

4. Trussbuilt, Inc.

2.4 STEEL FRAMES

A. Door frames shall be of the Section and dimension shown, fabricated from 16-gauge galvanized steel, at mitered corners. Frames shall be of the welded unit type. Provide frames with proper, approved anchorage as required. Jamb anchor shall not exceed 24-inch spacing. A temporary metal spreader shall be provided at the bottom of frame.

B. Hardware Provisions: Door frames shall be neatly, accurately mortized and properly, adequately reinforced for hinges, lock and other finish hardware samples. Drill and tap as required. Hinge reinforcing shall be 3/16-inch thick steel; reinforcements for surface closer shall be 14-gage steel. Reinforcing for other hardware shall be minimum 12-gauge steel. All hinge and strike reinforcements shall be projection welded to the door frame. Adequate reinforcements shall be provided for other hardware when required. Galvanized frames shall have galvanized hardware reinforcements. Provide three rubber mutes per frame.

C. Floor Anchors: Floor anchors shall be welded inside each frame jamb head, and holes shall be provided for floor anchorage. Minimum thickness of floor anchors shall be 14-gage.

D. Anchors for Masonry/Concrete Installations: Frames for installation in masonry and/or concrete walls shall be provided with adjustable jamb anchors of the T-strap, stirrups and strap, or wire type. The number of anchors provided per frame jamb and head shall be as follows:

Frames up to 7’-6” in height	3 anchors
Frames over 7’-6” to 8’-0” in height	4 anchors
Frames over 8’-0” in height	One anchor for each 2’-0” or fraction in height.
Frame head anchors shall be not less than those required by the Reference Standards.	

E. Anchors for Stud Wall Installation: Frames for installation in stud partitions shall be provided with steel anchors of suitable design for job conditions. They shall be not less than 18-gage thickness; and shall be securely welded inside each jamb and head as follows:

Frames up to 7’-6” in height	3 anchors
Frames over 7’-6” to 8’-0” in height	5 anchors
Frames over 8’-0” in height	5 anchors plus one additional for each 2 feet
Frame head anchors shall be not less than those required by the Reference Standards.	

F. Anchors to existing Construction: Frames to be anchored to previously placed concrete, masonry, or structural steel shall be provided with anchors of suitable design to meet job requirements or as shown.

2.5 FINISH

A. All doors, frames and frame components shall be cleaned, phosphatized and finished as standard with one coat of baked-on rust inhibiting prime paint in accordance with the ANSI A250.10 “Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames”.

PART 3 - EXECUTION

3.1 GENERAL

A. All Work shall be recommendations and specifications in accordance with manufacturer's published recommendations and specifications.

B. All Work shall be coordinated with appropriate related subcontractors work to assure a proper installation. Field conditions and dimensions shall be verified prior to fabrication.

3.2 PRODUCT DELIVERY

A. Doors and frames shall be shipped and stored with temporary stiffeners and spacers in place to prevent distortion.

B. Doors and frames shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.

C. Doors and frames shall be carefully stored on wood blocking in an area that is protected from the elements. Storage shall be in a manner that will prevent damage or marring of finish.

3.3 PREPARATION

A. Coordinate delivery of templates from hardware supplier to frame fabricator for installation of hardware.

B. Order doors protected, prehung, prefitted and blocked in frames covered in polyethylene bags. Keep doors in polyethylene bags until ready to finish.

3.4 INSTALLATION

A. Frames shall be set plumb and square in a true plane, and be securely anchored to the adjoining construction. Steel shims shall be provided and shall be set tight and rigidly attached between frame anchors and structure. All finished metal frames shall be strong and rigid; neat in appearance; and square, true, and free of defects, warp, or buckle.

B. Molded members, trims, and stops, shall be clean cut, straight, and shall be of a uniform profile throughout their lengths.

C. Corner joints shall have all contact edges tightly closed with all trim faces mitered, welded, and finished smooth. The use of gussets will not be permitted.

3.5 DOOR INSTALLATION

A. Doors shall be installed plumb, square, and level. Doors shall operate freely, but not loosely. They shall be free from rattling while in a closed position.

B. The door clearances shall be plus 3/32-inch or minus 1/32-inch and shall not exceed the limits specified in the manufacturer's printed recommendations.

C. Any door that becomes warped more than 3/16-inch out-of-plane shall be replaced by the Contractor.

D. Doors and door's finish hardware shall be removed and rehung prior to painting as specified in Section 08 71 00 - Door Hardware.

3.6 FINISH HARDWARE

A. Finish hardware shall be installed in accordance with hardware manufacturer's standard templates and printed instructions. Operable parts shall be adjusted for correct function and operation.

3.7 FIELD TOUCH-UP

A. Clean metal door and frame thoroughly and touch up any spots where shop coat is damaged with same paint used for shop coat.

END OF SECTION 08 11 13

SECTION 08 31 00 – ACCESS DOORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide and install access doors in locations as shown on the drawings and as specified herein. Access doors for valve vaults shall be standard doors as specified herein. Access doors for pump hatch at wet wells shall be safety barrier doors, designed with safety grate to provide fall protection.

1.2 STANDARDS

A. "Architectural Sheet Metal Manual" by Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACCNA).

B. ASTM A 36-93a: Standard Specification for Structural Steel

1.3 SUBMITTALS

A. Submit shop drawings for each type of door, showing all data required for installation and anchoring.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum: ASTM B 209 plate alloy 3003-H 14 or 5005-H 14, 0.25" minimum thickness and 6063 T5 extruded frame.

B. Neoprene: Closed cell foam, ASTM C 509, 1025 pcf density.

2.2 FABRICATION

A. Standard Doors: Fabricate a frame of extruded aluminum and doors of diamond plate aluminum. All doors shall be reinforced to support 300 psf. Provide with neoprene seal. Equip door with lock key. Provide lower side with handle, hold open arm, and torsion spring or other opening assisting device. Provide Bilco Model J or JD, Babcock-Davis, Milcor or equal. Provide frame anchors (8) min.

B. Safety Barrier Doors: Safety barrier doors shall be designed to combine covering of the opening, fall through protection and controlled confined space entry. The safety barrier doors shall be installed inside the pump hatch opening for the lift station.

1. Material shall be 6061-T6 aluminum for bars, angles, and extrusions; ¼-inch diamond plate shall be 5086 aluminum. Safety grate shall be rated at 14.4 kPa (300 lbs/sq.ft.). Cover without safety grate shall be rated at 7.2 kPa (150

lbs./sq/ft.). Hatch frame shall be of extruded aluminum, with a continuous anchor flange.

2. Cover hinges shall be grade 316 stainless-steel. Hinge shall be fastened to the frame extrusion and diamond plate with grade 316 stainless steel bolts and ny-lock nuts. All hardware shall be stainless steel except for the rail nuts, which shall be in aluminum.

3. Each hatch shall be supplied with a recessed padlock clip. (Padlock will be provided by the Owner.) Each door shall be equipped with a cover stay. Door shall lock open in the 90-degree position.

4. Grate openings shall allow for visual inspection, limited maintenance and float adjustments while the safety grate fall through protection is left in place. Design shall assure that the fall through protection is in place before the doors can be closed, thereby protecting the next operator. Each grate shall be provided with a permanent hinging system, which shall lock the grate in the 90-degree position once opened. Each grate shall have a pull open arm, designed so the grate can be pulled open, with the grate acting as a barrier between the operator and the pit. The opening arm shall also be equipped with a controlled confined space entry lock to said in controlling unauthorized entry to the confined space. The grating system shall allow anyone to make visual inspection and float adjustments without entering the confined space.

5. Each aluminum safety grate shall be coated with a safety orange color, promoting visual awareness of the hazard. The coating shall be provided by manufacturer and shall be a thermosetting, powder coat finish with a minimum thickness of 2-4 mils, and shall be baked at 350-375 degrees F until cured.

6. Safety barrier shall be as manufactured by ITT Flygt (Safe Hatch) or approved equal.

2.3 FINISH

A. Mill finish aluminum with lacquer on exposed sides and bituminous coatings on concealed surfaces that comes in contact with concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate with trades installing adjacent materials. Anchor firmly to lid by casting into concrete or equivalent fasteners as approved.

B. Install in accordance with Manufacturer’s instructions and approved shop drawings.

END OF SECTION 08 31 00

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install finish hardware for all hollow metal doors shown on the contract drawings.

B. In addition thereto, the Contractor shall provide and install all trim, attachments, and fastenings specified or required for proper and complete installation. The Work of this Section shall include all hardware that is not specified in other Sections, whether or not such hardware is herein specifically scheduled.

1.2 REFERENCE STANDARDS

A. Conform to appropriate sections of Chapter 5 of ANSI/NFPA 101 for life safety and egress requirements.

B. Commercial Standards

1.	ANSI A250.4	Specification for Standard Steel Door and Frame Preparation for Mortise. Locks for 1-3/8 and 1-3/4 inch Doors
2.	ANSI A115.2	Specification for Standard Steel Door and Frame Preparation for Bored or Cylindrical Locks for 1-3/8 and 1-3/4 inch Doors
3.	ANSI A117.1	Specifications for making buildings and facilities accessible to and usable by physically handicapped people
4.	ANSI/BHMA A156.2	Bored and Preassembled Locks and Latches
5.	ANSI/BHMA A 156.13	Mortise Locks and Latches
6.	ANSI/BHMA A 156.18	Materials and Finishes
7.	ANSI/NFPA 101	Life Safety Code
8.	ANSI/NFPA 80	Fire Doors and Windows
9.	NFPA 70	National Electric Code
10.	UL 437	Standard for Safety [High Security Key Locks]
11.	Hardware Institute (DHI)	“Recommended Procedure for Processing Hardware Schedules and Templates and Architectural Hardware Scheduling and Format”

C. Manufacturers' Standards: In addition to the standards listed above, the finish hardware and its installation shall be in accordance with the manufacturer's published recommendations and specifications.

1.3 SUBMITTALS

A. Templates: Hardware applied to metal doors and frames shall be of types shown but made to template. Required blueprint templates shall be made available to door and/or frame manufacturer not later than ten (10) days after acceptance of the hardware schedule.

B. Submit hardware schedule, product data, shop drawings, and keying schedule in accordance with Section 01 33 00 – Submittal Procedures. Include product data on each type of hardware listed in hardware schedule.

1. The hardware schedule submitted by the Contractor shall list the actual product series numbers. Manufacturer's catalog requirements for actual size of door closers, brackets, and holders shall be observed. All door sizes shall be noted on the hardware schedule and all hardware shall be in strict accordance with height, width, and thickness requirements.

2. The schedule shall indicate groups, type, manufacturer's name, catalog number, location, and finish of each item to be provided, all in accordance with the DHI "Architectural Hardware Scheduling Sequence and Format".

3. Catalog cuts and physical samples clearly labeled, must accompany requests for approval. Physical samples must be left for whatever time is required for evaluation.

4. Upon return of the reviewed finish hardware schedule, arrange for a keying meeting with the Owner, hardware supplier, and other involved parties to ensure all locksets are functionally correct and keying fulfills the project requirements. As soon as possible after the keying conference, typed copies of the keying schedule shall be furnished to the Owner.

C. Indicate locations and mounting heights of each type of hardware.

D. Samples, clearly labeled, must accompany product data for approval. Samples may not be incorporated into the Work.

1.4 QUALITY ASSURANCE

A. Hardware Supplier: Company specializing in the supply of door hardware with five years' experience and Architectural Hardware Consultant to properly handle, detail and service hardware in a satisfactory manner.

B. Manufacturer: Companies specializing in manufacturing door hardware with a minimum of five years' experience.

C. Warranty: Provide three year warranty for materials, workmanship, and parts per manufacturer's limited warranty. Provide 90-day warranty on all labor.

PART 2 - PRODUCTS

2.1 GENERAL

A. Finish hardware shall be coordinated with all other work requiring builder's hardware or attaching to it. Copies of schedules, templates, etc., shall be furnished in ample time to avoid fabrication and construction delays. Each item of hardware shall be identified according to the approved list and schedule. All hardware shall be made to template.

B. All hardware furnished in connection with doors bearing Underwriters' Labels or where necessary to meet special requirements shall be in strict accordance with conditions established by the authority having jurisdiction and shall be subject to approval of that authority.

C. Hand of lock shall be as shown. If door hand is changed during construction, the Contractor shall make necessary changes at no extra cost to the Owner.

D. Exit doors shall be openable at all times from the inside without the use of key or any special knowledge or effort.

2.2 LOCKSETS & LATCHSETS

A. All locksets and latchsets shall be cylindrical type with anti-friction 2-piece latch bolts with a minimum 3/4-inch-throw and 1-inch-throw dead bolts with hardened roller inserts. Locksets and latch sets at fire rated doors shall meet code requirements and shall be modified as necessary. All locksets, latchsets, privacy sets, and passage sets shall be provided with lever handles conforming to handicapped person requirements unless specified elsewhere. All locksets and latchsets shall be provided with satin stainless-steel finish 630 (US32D) unless otherwise specified. Locksets and latchsets shall be as manufactured by Corbin Russwin (Emhart).

B. Provide locksets with Best 7-pin interchangeable core.

C. Mortise deadlocks shall be of weight and quality comparable to locksets and latchsets specified.

D. Lock strikes shall be boxed type of sufficient length and having curved lips to protect the trim and jambs and be so shaped as to avoid the possibility of tearing clothing. All strikes shall be provided with metal strike boxes.

E. All locks shall be provided with the same cylinder and keyway for master keying. They shall be the product of the same manufacturer as the locksets unless otherwise specified. The correct cylinders with all necessary modifications and components such as cams, collars, rings, retainers, plates, fasteners, etc., shall be provided for other specialty hardware such as exit devices, store front locksets, and sliding door locks where the hardware manufacture specified is different than cylinder manufacturer.

F. Locksets and latchsets shall conform to ANSI A156.2, Series 4000, Grade 1, and be UL listed. Locksets and latchsets with knobs must fit ANSI A115.2 door preparation.

G. Keyed knob to be protected by means of a “Break-Away” mechanism to prevent forced entry.

H. Knob locksets to be constructed so as to be capable of change of hand before and after installation by rotation of face of knob.

I. Permanent core face must be the same finish as the lockset finish.

2.3 KEYING

A. A keying schedule shall be worked out between the Owner, the Contractor, and the hardware supplier. The Contractor shall have the hardware supplier submit a keying schedule for approval prior to placing an order for the locks and keying of cylinders.

B. Provide construction cores and keys during the construction period. Construction control and operating keys and cores shall not be part of the Owner’s permanent keying system or furnished on the same key as the Owner’s permanent keying system. Permanent cores and keys shall be furnished to the Owner prior to occupancy.

C. Permanent keys and cores shall be stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped “Do Not Duplicate”.

D. Master keys shall be transmitted to the Owner by registered mail, return receipt requested.

E. Furnish keys in the following quantities:

Number of Keys	Type of Key
4 each	Master keys per set
2 each	Change keys each keyed core
6 each	Construction master keys
2 each	Control keys

F. Contractor shall install permanent cores in locksets.

2.4 HINGES AND PIVOTS

A. Two hinges or pivots shall be provided for each door leaf up to and including 5 feet in height, and an additional hinge shall be added for each 2-1/2 feet or fractions thereof of additional door height. Dutch doors shall be provided with not less than 2 pairs of hinges.

B. All hinges and pivots shall be of stainless steel unless otherwise specified.

C. Width of hinges shall be determined by trim conditions.

D. Ball-bearing hinges shall be furnished on all doors having door closers and/or exit devices. All ball-bearing hinges shall have flush tips.

E. All hinges on exterior doors shall be provided with non-removable pins and security studs.

F. Hinges and sizes shall be as follows:

Door Thickness (inches)	Door Width (inches)	Hinge Width	Hinge Height (inches)
1-3/8	36 and under	Reg. Wt., interior use only	3-1/2
1-3/8	37 and over	Reg. Wt., interior use only	4
1-3/4	30 and under	Reg. Wt., interior use/exterior use	4-1/2
1-3/4	30 to 39	Hvy. Wt., exterior use	4-1/2
1-3/4	40 and over	Reg. Wt., 4 ball bearing, interior use	4-1/2
1-3/4		Hvy. Wt., 4 ball bearing, exterior use	4-1/2

G. Hinges shall be plain bearing type (regular weight) conforming to BHMA No. A 2133; ball bearing hinges (regular weight) conforming to BHMA No. A 2112 or No. A 5112; and/or ball bearing hinges (heavy weight) conforming to BHMA No. A 2111 or No. A 5112. Hinge manufacturers design options such as 3-knuckle hinges and concealed ball bearing hinges are acceptable. Plain hinges shall be provided with self-lubricating bushings.

2.5 CLOSERS

A. All overhead closers shall be the product of one manufacturer. Closers shall have high-strength cast-iron cases with rectangular covers, adjustable spring power and adjustable back-check, and full rack and pinion action. Closers shall have back-check regulating screws, with separate screws for closing and latching speeds.

B. Surface door closers shall be standard manufacturer color as selected.

C. Soffit shoes shall be provided where corner brackets or regular arm closers are not used and where they are necessary for proper function of the hardware.

D. Where door closers or other items have lever or similar arms, attachment to doors shall be with sex bolts only.

E. Closers for outswinging exterior doors shall be top-jamb-mounted and furnished with adapter plates for doors under 7 feet-6 inches in height. If necessary closers may be mounted on drop brackets on doors above 7 feet-6 inches in height.

F. The Contractor and its hardware supplier shall be responsible to provide the right arm with the closers. Arms shall be parallel with the closed door whenever possible.

G. Closers shall be provided with sex bolts for fastening through doors, frames and transoms.

H. Closers shall be Corbin; Russwin 2800; Sargent 250; Norton 8500; or equal.

2.6 DOORSTOPS

A. Unless otherwise specified, all closers shall be Hager Floor Stop 267F, US26D Finish.

B. Door stops shall be of the type specified in the hardware schedule and shall be provided with the proper fasteners.

C. Stops shall be provided with machine screws and anchors at concrete and masonry conditions, and toggle bolts at plaster, gypsum board, and wood conditions.

2.7 THRESHOLDS

A. All doors so detailed shall receive a threshold similar to that specified with a maximum of 1/2-inch rise at entry ways. Return miters shall be furnished at thresholds on floor closers.

2.8 HOLDERS

A. Overhead type door holders shall be of correct size for door, 90 degree openable unless 180 degree opening shown, and allowing for checkmating. Interior doors shall be provided with overhead stops if wall type stops can not be used and floor stops make a tripping hazard. Finish shall be chrome plated bronze with satin finish, US 260, unless otherwise specified. Door holders shall be one of the following, or equal.

1. Hager

2. Stanley

2.9 SILENCERS OR MUTES

A. All interior doors shall be provided with rubber silencers, 3 for each single door and 2 for each pair of doors. Silencers or mutes shall be one of the following, Of-equal.

2.10 WEATHERSTRIPPING AND SEALS

A. Weatherstripping and seals shall be as manufactured by Pemko Manufacturing Co.; National Guard Products Inc. (NGP); Zero Weatherstripping Co.; or equal.

B. Exterior doors (except for roll-up doors and entrance doors) shall have head, jambs, and astragals weatherstripped with not less than 5/16-inch by 5/8-inch closed cell, neoprene sponge rubber, unless otherwise specified or shown.

C. Interior doors shall have head, jambs, and astragals sealed with self-adhesive bubble configuration door seal designed against smoke, air, sound, and weather infiltration. The seals shall be fire tested and labeled as a gasketing for use on steel frames with wood or steel doors for 20-minutes C-label, 1 hour B-label, and 1-1/2-hour B-label doors. Seals shall be S88D by Pemko; ITM 181 by NGP; or equal.

2.11 MANUFACTURERS OR EQUAL

A. Dor-O-Matic, Chicago, IL

B. LCN-Closers, Princeton, IL

C. Pemko Mfg. Co., Emeryville, CA

D. P & F Corbin, Berlin, CT

E. Quality Hardware, Hawthorne, CA

F. Rixson-Firemark, Franklin Park, IL

G. Corbin Russwin, Berlin, CT

H. The Stanley Works, New Britain, CT

PART 3 - EXECUTION

3.1 GENERAL

A. All required items of hardware, including cylinders for locks, and all fitting, adjusting, and securing of each item neatly and firmly in place, shall be in perfect working order. Any work less than this shall form a basis for corrective measures.

B. All finish hardware shall be fitted and dismantled before painting work and shall be reinstalled after finish painting work. After completion of the painting work and reinstallation the finish hardware cleaned and polished.

C. Conform to ANSI A117.1 for positioning requirements for the disabled.

3.2 HARDWARE SCHEDULED

A. The hardware schedule is arranged for convenience of locating hardware and does not preclude in any way the requirements that all necessary hardware shall be furnished and properly installed. Hardware not specifically called out shall be similar to that required for similar uses.

1. Hardware Set 1: Each single, exterior door shall have:

Quantity	Description
Per spec	Hinges
1	Lockset, entrance
1	Interior panic bar
1 set	Surface closer
1	Seals & WS (provide both),
1	Angle Sill (per detail)
1 pair	Kick plates
1	Door bottom

3.3 INSTALLATION

A. Verify that doors and frames are ready to receive work, and dimensions are as indicated on shop drawings. Install each hardware item in compliance with manufacturer’s instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item. Do not install surface-mounted items until finishes have been completed on the substrate.

B. All mounting height measurements are from finish floor except top butt.

1. Butts: Top 11-5/8 inches center of butt to top of door; intermediate equal distance between top and bottom butts; bottom 12-3/8 inches to center of butt.

2. Knob Locks: 40-5/16 inches to center of strike.

3. Door Closers: Per manufacturer's instructions.

C. Latches and Bolts: Latches and bolts shall be installed to automatically engage in keepers, whether activated by closers or by manual push. In no case should additional manual pressure be required to engage latch or bolt in keepers.

D. Closers and Hinges: Closers and hinges shall be carefully adjusted to operate the doors noiselessly and evenly, and hinges shall be installed so as not to bind. Closers, closer arms, and hold- open arms shall be attached with sex bolts. Except at exterior doors, closers shall not be mounted on corridor or vestibule side of door.

E. Weatherstripping and Seals: All doors shall be provided with weatherstripping or seals unless mutes, product weatherstripping or other special seals are specified. Whenever two types of seals are shown on the Finish Hardware Schedule on a given door they both are to be provided.

F. Protective Tape and Coatings: The Contractor shall provide a strippable coating or removable tape protection or other approved means to prevent any damage or staining of hardware during construction. Such protective measures shall be removed prior to final cleaning and the hardware polished before the Owner's acceptance of project.

3.4 FINAL ADJUSTMENT

A. Whenever hardware is installed more than one month prior to acceptance or occupancy of a space or area, return during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area.

B. At the completion of the project, manufacturer's suppliers or representatives shall inspect their hardware and make any final adjustments.

C. The Contractor shall protect the finish hardware from damage during construction, painting, and clean-up.

END OF SECTION 08 71 00

SECTION 08 91 00 - LOUVERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Work includes furnishing and installing fixed louvers at the locations and size shown on the drawings.

1.2 REQUIREMENTS

A. Structural Performance: Provide exterior metal louvers capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of louver components including blades, frames, and supports; noise or metal fatigue caused by louver blade rattle or flutter; or permanent damage to fasteners and anchors.

1. Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft. acting inward or outward.

B. Air-Performance, Water-Penetration, and Air-Leakage Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units 48 inches wide by 48 inches high. Test units according to AMCA 500.

1. Perform testing on unpainted, cleaned, degreased units.

2. Perform water-penetration testing on louvers without screens.

C. Weather Louver Effectiveness: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer’s stock units for a 60 minute test in accordance with AMCA Standard 500-L-99, Wind Driven Rain Water Penetration Test.

1.3 SUBMITTALS

A. Product Data: For each type of product specified.

B. Shop Drawings: For louver units and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of louver blades. Show unit dimensions related to wall openings and construction; free area for each size indicated; profiles of frames at jambs, heads, and sills; and anchorage details and locations.

1. For installed louvers and vents indicated to comply with design loadings, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209 alloy 3003 or 5005 with temper as required for forming.

C. Aluminum Castings: ASTM B 26/B alloy 319.

D. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated.

E. Anchors and Inserts: Stainless steel.

F. Provide stainless steel where shown.

2.2 FIXED LOUVERS

A. Louver Construction: Provide fixed-blade louvers with extruded-aluminum frames and blades.

B. Horizontal Louvers: Drainable blade type complying with the following:

1. Louver Depth: 4 inches

2. Frame Thickness: 0.125 inch

3. Blade Thickness: 0.081 inch, Blade angle: 45 degrees or 37.5 degrees

4. Performance Requirements: Maximum standard airflow point for water penetration 1,192 fpm

5. Performance Requirements: Maximum standard airflow not less than 7500 cfm with not more than 0.18 inch wg static pressure loss.

6. Minimum percent of free area of louver: 40

7. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.3 SCREENS

A. General: Provide each exterior louver with louver screens complying with the following requirements:

1. Screen Location for Fixed Louvers: Interior face

2. Screen Location for Adjustable Louvers: Exterior face

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate screen frames with mitered corners to louver sizes and to comply with the following requirements:

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached.

a. Reinforce extruded-aluminum screen frames at corners with clips.

2. Finish: Same finish as louver frames to which louver screens are attached.

3. Type: Non-rewirable, U-shaped frames for permanently securing screen mesh.

4. Louver Screening for Aluminum Louvers: Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inch wire.

2.4 FINISH

A. All louvers shall be finished with a full strength Kynar 500 fluoro-coating. Color to be selected by the Engineer from Manufacturer's standard color chart. All steel shall be thoroughly cleaned, etched and given a chromate conversion pretreatment before the application of an epoxy baked-on prime coat. The subsequent top finish color coating shall have a minimum baking cycle of 450º F for 20 minutes and shall be no less than 0.8 mils thick. All finishing procedures shall be one continuous operation and take place in the plant of the manufacturer. There shall be no checking, peeling, or caulking.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate and place louver units level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather-tight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Install concealed gaskets, flashings, joint fillers, and insulation, as louver installation progresses, to provide weather-tight louver joints. Use proper sealants during louver installation.

END OF SECTION 08 91 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install gypsum drywall ceilings and walls over metal framing as shown on the Drawings and as specified herein.

B. Furnish and install gypsum panels over metal roof decking as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS

A. Federal Specifications:

1. QQ-W-461H Wire, Steel, Carbon {Round, Bare, and Coated}

B. Commercial Standards:

1.	ASTM C1396 X	Gypsum Wallboard
2.	ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials
3.	ASTM C475	Joint Treatment Construction Materials for Gypsum Wallboard Construction
4.	ASTM C514	Specification for Nails for the Application of Gypsum Wallboard
5.	ASTM C754	Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board
6.	ASTM C1177	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing

C. Trade Standards:

1.	GA-253	Application of Gypsum Sheathing
2.	GA-216	Application and Finishing of Gypsum Panel Products
3.	GA-600	Fire Resistance and Sound Control Design Manual

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance in accordance with Section 01 33 00 – Submittal Procedures.

B. Submit shop drawings indicting fastener and adhesive patterns for FM wind uplift resistance.

C. Certification: Submit manufacturer's written certification that produce meets specified fire resistance requirements.

PART 2 - PRODUCTS

2.1 GENERAL

A. Labeling: All materials shall be delivered to the project site with manufacturer's labels intact and legible. Fire-rated materials shall bear testing agency labels and required fire classification numbers.

2.2 GYPSUM ROOF PANELS

A. Composition: Provide non-structural, glass mat faced, silicone-treated gypsum core panel. Each panel shall have nominal size of 4'-0" x 8'-0" dimensions and shall have a minimum 5/8-inch thickness and where specified as Type X.

B. Fire Resistance: Provide gypsum roof panels with Flamespread "0", smoke developed "0", when tested in accordance with ASTM E84. Panels shall be non-combustible when tested in accordance with ASTM E136.

1. Firestop Type X: Provide UL Classified Type X when tested in accordance with ASTM E119 where specified.

C. Contact adhesives with hydro-carbon based solvents require extended open time for solvent vapor evaporation when used with expanded and extruded polystyrene and when adhered to gypsum panels.

2.3 GYPSUM BOARDS

A. Gypsum Board: Gypsum board shall conform to ASTM C 1396. Unless otherwise specified or shown on Drawings, gypsum board shall be 5/8" type "X" or fireguard board with tapered edges.

B. Where shown on Drawings, water-resistant gypsum board shall conform to ASTM C1396, regular, type "X".

C. Manufacturers or Equal

1. Flintkote Co.

2. Laticrete International

3. National Gypsum Co.

4. United States Gypsum Corporation

5. G-P Gypsum

6. American Gypsum Co.

2.4 TILE BACKING BOARD

A. Where shown on Drawings, tile backing board shall be a Portland cement slurry, reinforced with fiber glass mesh and coated vinyl board. The board shall be not less than 1/2-inch thick and shall be designed for use behind tile. Tile backing board shall be United States Gypsum's "Durock Board"; Laticrete International's "Latipanel"; or Equal.

2.5 ACCESSORIES

A. Metal trim, corner beads, edge, casing beads, and accessories shall be manufactured from galvanized sheet steel unless otherwise specified or shown and shall be manufacturer's standard products. Special shapes shall be provided where specified or shown.

B. Tape and Compound: Provide materials complying with ASTM C475, ASTM C840, and recommendations of manufacturer of both gypsum board and joint treatment materials for the application indicated.

1. Joint Tape: Paper reinforcing tape, unless otherwise indicated. Use pressure sensitive or staple-attached open-weave glass fiber reinforcing tape with compatible joint compound where recommended by manufacturer of gypsum board and joint treatment materials for application indicated

2. Drying-Tape Joint Compounds: Factory-prepackaged vinyl-based products complying with the following requirements for formulation and intended use. Use all-purposed compound formulated for use as both taping and topping compound

C. Fasteners: Nails shall conform to ASTM C514, and shall be of the length recommended by the Gypsum Association referenced standards and the Building Code for various gypsum board thickness. Nails for nailing tile backing board to wood studs shall be 1-1/4-inch galvanized roofing nails unless otherwise required by code, and board manufacturer.

1. Screws shall be self-drilling, self-tapping, bugle head for use with power tools, length as recommended by Gypsum Association referenced standards and the Building Code.

a. Type "5" for wallboard to sheet metal application.

b. Type "W" for wallboard to wood application.

c. Type "8" for wallboard to wallboard application.

D. Adhesives: Adhesives for fastening gypsum board to gypsum board shall be in accordance with the printed recommendations of the gypsum board manufacturer.

E. Waterproof Membrane: Waterproof membrane shall be asphaltic saturated 43 lb (vapor-retarder) membrane conforming to ASTM D2626 Type 1, 25 lb/100 sq ft minimum or 10-mil polyethylene film membrane.

F. Corner Bead and Edge Trim: Metal trim, comer beads, edge, casing beads, and accessories shall be manufactured from galvanized sheet steel unless otherwise specified or shown and shall be manufacturer's standard products. Special shapes shall be provided where specified or shown.

G. Metal Support Materials: Furring channels shall be ASTM C645, 25 gauge Hat shaped channels.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide gypsum panels on drawings using fastening system specified.

B. Use maximum lengths possible to minimize number and joints. Locate edge joints parallel to and located on deck ribs. Stagger end joints of adjacent lengths panel.

C. Gypsum wallboard installation and construction shall conform to applicable codes, reference standards, manufacturers printed recommendations, and Gypsum Association's printed recommendations.

D. Gypsum wallboard shall be applied first to ceiling and then to walls. Wall application shall be horizontal (right angles to framing), or vertical (parallel to framing), conforming to reference standards.

E. All gypsum board shall be nail or screw fastened to metal framing and furring. Fastener spacing shall be per reference standards.

F. Gypsum wallboard surface finish shall be three-coat work. Multi-layer application shall be reference standards and manufacturer's recommendations.

G. Installation of steel framing shall be in accordance with ASTM C754 and code.

3.2 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to the job site in manufacturer’s original packaging, containers and bundles with manufacturer’s brand name and identification intact and legible.

B. Storage and handling: Storage and handle materials to protect against contact with damp and wet surfaces, exposure to weather, breakage and damage to edges. Provide air circulation under covering and around stacks of materials.

3.3 INSPECTION

A. Check framing for accurate spacing and alignment. Verify that spacing of installed framing does not exceed maximum allowable for thickness of wallboard to be used. Do not proceed with installation until deficiencies have been corrected.

3.4 COORDINATION

A. Coordinate with mechanical and electrical sections for the installation of their work in drywall construction.

3.5 CEILING INSTALLATION

A. Place boards with long dimension at right angles to supports and end joints occurring over supports. Perimeters of ceilings and edges of openings shall be placed over solid members.

3.6 FASTENERS

A. Place fasteners not less than 3/8" from edges of boards except when using washers or clips with fasteners in joint. Install when using washers or clips with fasteners in joint. Install fasteners with heads dimpled slightly below surface but not so deep as to cut through paper. Use approved type power tools for self-drilling screws. Obtain final set by turning screw down, not by driving. Space fasteners along all abutting edges and ends occurring over supports and in field at 12" on center. Stagger fasteners along common joints.

3.7 TRIM

A. Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.

B. Install corner beads at external corners.

C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.

1. Install "LC" bead where drywall construction is tightly abutted to other construction and back flange can be attached to framing or supporting substrate.

2. Install "LK" bead where substrate is kerfed to receive long flange of trim.

3. Install "L" bead where edge where edge trim can only be installed after gypsum board is installed

4. Install U-type trim where edge is exposed, revealed, gasketed, or sealant-filled (including expansion joints).

3.8 FINISHING OF DRYWALL

A. Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim, and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.

B. Prefill open joints and rounded or beveled edges, if any, using setting-type joint compound.

C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.

D. Finish interior gypsum wallboard by applying the following joint compounds in 3 coats (not including prefill of openings in base), and sand between coats and after last coat.

E. Unless otherwise specified, all gypsum board shall be sanded smooth, dusted, and provided with an orange peel finish coat. Gypsum board at non-visible locations, such as within attics, shall be finished as required for fire protection.

3.9 RECESSED LIGHT FIXTURES

A. Light fixtures, speakers, and other recessed items in rated ceilings shall be provided with gypsum board enclosure as required fir rated ceiling system.

3.10 CEILING SYSTEM

A. The ceiling system shall be provided with diagonal bracing wires for seismic protection. Horizontal restraints shall be affected by 4 No. 12-gauge wires secured to main runner within 2 inches of the cross runner intersection and splayed 90 degrees from each other at an angle not exceeding 45 degrees from the plane of the ceiling. These horizontal restraint points shall be placed 12 feet on center in both directions with the first point within 4 feet of each wall. Attachment of the restraint wires to the structure above shall be adequate for the imposed load.

B. Lighting fixtures, air diffusers, speakers and other embedments shall be coordinated to provide the ceiling design and to prevent interferences with the locations of the embedded items and the ceiling system.

END OF SECTION 09 29 00

SECTION 09 90 00 – PAINTING AND COATING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required for all painting and coatings as specified herein. All materials, equipment, piping and miscellaneous surfaces shall be coated except for those indicated under Part 1.7. The Work includes, but is not to be limited to, cleaning and preparation of surfaces, paint materials, and the application of all paint and other materials. Provide third party inspection of surface preparation, application and testing of coating and painting during application.

B. Provide coatings for pipe identification as specified in Section 40 05 97 – Piping Identification.

1.2 DEFINITIONS

A. The term paint, coatings, or finishes as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

B. Dry Film Thickness (DFT): The minimum dry film thickness, without any negative tolerance.

C. Submerged Metal: Steel or iron surfaces below tops of channel or structure walls which will contain water even when above expected water level.

D. Submerged Concrete and Masonry Surfaces: Surfaces which are or will be:

1. Underwater.

2. Inside structures which normally contain water.

3. Below tops of walls of water containing structures.

E. Exposed Surface: Any metal or concrete surface, indoors or outdoors that is exposed to view.

F. Volatile Organic Compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.

G. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.

H. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

1.3 REFERENCE STANDARDS

A. Codes and Standards: In addition to the requirements of these Specifications, the Work to be performed under this Section is to comply with the following codes and regulations:

1. The Society of Protective Coatings Specifications (SSPC):

a.	SSPC SP-1	Solvent Cleaning.
b.	SSPC SP-2	Hand Tool Cleaning.
c.	SSPC SP-3	Power Tool Cleaning.
d.	SSPC SP-5	White Metal Blast Cleaning.
e.	SSPC SP-6	Commercial Blast Cleaning.
f.	SSPC SP-7	Brush-Off Blast Cleaning.
g.	SSPC SP-10	Near-White Blast Cleaning.
h.	SSPC SP-11	Power Tool Cleaning to Bare Metal.
i.	SSPC-SP-12	High- and Ultrahigh-pressure Water Jetting.
j.	SSPC-SP-13	Surface Preparation of Concrete
k.	SSPC-SP-16	Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals

2. Underwriters' Laboratory (UL):

a.	UL 3P83	Drinking Water System Components - Health Effects.

3. National Association of Corrosion Engineers Standards (NACE):

a.	RP0188-99	Discontinuity (Holiday) Testing of Protective Coatings.

4. Applicable Standards of American National Standards Institute, Inc. (ANSI)

5. National Association of Pipe Fabricators (NAPF):

a.	NAPF 500-03	Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.

6. American Society for Testing and Materials (ASTM):

a.	ASTM D 4262-83	Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
b.	ASTM D 4263-83	Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

c. ASTM D4285-83 Test Method for Indicating Oil or Water in Compressed Air.

d. ASTM D4541-93 Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.

1.4 QUALITY ASSURANCE

A. Pre-Application Conference: Prior to commencement of any paint application, the Engineer will hold an on-site pre-application meeting. The purpose of meeting is to establish a working understanding between all parties and to discuss items that pertain directly to the paint application.

B. Painter's Qualifications: The Work specified under this Section shall be performed by or under the supervision of a qualified painter. The Contractor shall be required to document the painter's experience, competence and ability to comply with the requirements of these Specifications and to complete the Work in a timely manner. The Painter or Applicator shall have the following qualifications:

1. Minimum of 5 years of experience applying specified type or types of coatings under conditions similar to those of the Work. Provide qualifications of applicator and references listing five similar projects completed in the past two years.

2. Manufacturer approved applicator when manufacturer has approved applicator program.

C. Coatings Inspection: Surface preparation, mixing, thinning, coating application, and measurement of dry film thicknesses shall be performed by a NACE Certified Coatings Inspector. Each requirement of this Specification shall be met and approved by the Inspector prior to moving on to the next step in the progression of the coatings specification.

D. Standard Products: All paints in a paint system are to be the standard products. All products applied in any paint and coating system shall be from a single manufacturer.

E. The NACE Inspector must approve all surface preparation prior to the application of coatings. This will include surface cleanliness, the degree of sandblast and surface profiles.

F. At a minimum of every four hours or more often when conditions change during surface preparation and coatings application, environmental conditions IE: Relative Humidity, dewpoint, surface temperature and the dew-point/surface temperature depression must be measured and recorded. The use of a sling psychrometer and US weather bureau barometric chart or approved equal such as Defelsko or Elcometer test instruments shall be used to measure the environmental conditions.

G. Warranty Inspection: A warranty inspection will be conducted at the end of the one-year warranty period from the substantial completion date. The Contractor and a representative of the coating material manufacturer may attend this inspection. All defective Work shall be repaired in accordance with these Specifications and to the satisfaction of the Owner. The Owner may, by written notice to the Contractor, reschedule the warranty inspection to another date within the warranty period.

H. Quality Assurance Responsibility: The Contractor is responsible to obtain and pay for the services of the NACE inspector referred to above.

1.5 SUBMITTALS

A. Before any paint materials are delivered to the job site, submit a complete list of all materials proposed to be furnished and applied under this Section. Include schedule of where and for what use coating materials are proposed in accordance with requirements for Product Data. Any coating or paint materials ordered by the Contractor prior to receiving submittal response from the Engineer indicating that the submitted material is accepted shall be at the risk of the Contractor.

B. For each paint, furnish the paint manufacturer's specific application instructions and the following information:

1. Paint manufacturer’s data sheet for each product proposed, including statements on the suitability of the materials for the intended use.

2. Surface preparation recommendations

3. Type of primer, if required

4. Maximum dry and wet mil thickness per coat

5. Minimum and maximum curing time between coats, including atmospheric conditions for each

6. Curing time before submergence in water

7. Thinner to be used with each paint

8. General ventilation requirements

9. Atmospheric conditions during which the paint is not to be applied

10. Allowable methods of application

11. Maximum allowable moisture content and minimum age of plaster, concrete and wood surfaces at time of paint application

12. Compatibility of shop and field applied coatings (where applicable)

C. Reports: Submit the following to the Engineer:

1. Reports on visits to project site to view and approve surface preparation of structures to be coated.

2. Reports on visits to project site to observe and approve coating application procedures.

3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are “shop coated.”

1.6 DELIVERY AND STORAGE

A. Deliver, store, and handle products in accordance with manufacturer’s requirements. All materials are to be delivered to the job site in their original, unopened containers bearing

the manufacturer's name, brand, batch number, date of manufacture, and any special directions.

B. Only the approved material shall be stored at the job site and stored only in designated areas restricted to the storage of paint materials and related equipment. All paint is to be stored in enclosed structures and protected from weather and excessive heat or cold. Store coatings in well-ventilated facility that provides protection from the sun, weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.

C. Store flammable materials to conform with State and local safety codes. Protect emulsion type paints from freezing. Take precautions to prevent fire and spontaneous combustion.

D. Materials exceeding storage life recommended by the manufacturer will be subject to rejection.

E. Remove unspecified and unapproved paints from Project site immediately

1.7 SURFACES NOT REQUIRING PAINTING

A. Nonferrous and corrosion-resistant ferrous alloys such as copper, bronze, aluminum, chromium plate, and weathering steel, except where (1) required for electrical insulation between dissimilar metals, (2) aluminum is in contact with concrete or masonry, and (3) color coding of equipment and piping is required.

B. Copper, bronze, aluminum, weathering steel, and stainless steel,

C. Glass, porcelain, and plastics do not require painting.

D. Prefinished architectural finishes such as acoustical tile, cabinets, and wall panels do not require painting.

E. Prefinished electrical items such as motor control centers, switchboards, switchgear, panelboards, transformers, and disconnect switches do not require painting.

F. Exposed electrical conduits shall be painted to match the color of the adjacent wall or equipment to which they are attached, except that non-submerged conduits attached to unpainted masonry and concrete surfaces need not be painted.

G. Exterior concrete slabs, exterior sidewalks, exterior concrete stairs and exterior concrete curbs.

H. Platform gratings, stair treads, door thresholds, and other walk surfaces, unless specifically indicated to be coated.

1.8 MAINTENANCE

A. Extra Materials: Include minimum 1 gallon of each type and color of coating applied. When manufacturer packages material in gallon cans, deliver unopened labeled cans as comes from factory. When manufacturer does not package material in gallon cans, deliver material in new gallon containers, properly sealed and identified with typed labels indicating brand, type and color.

PART 2 - PRODUCTS

2.1 PAINT AND COATING SYSTEM APPLICATIONS

A. Prepare surfaces and apply paint and coating systems in accordance with the following schedules for all surfaces.

Surface Preparation	Description
SSPC SP-1	Solvent Cleaning
SSPC SP-2	Hand Tool Cleaning
SSPC SP-3	Power Tool Cleaning
SSPC SP-5	White Metal Blast Cleaning
SSPC SP-6	Commercial Blast Cleaning
SSPC SP-7	Brush off Blast Cleaning
SSPC SP-10	Near White Blast Cleaning
SSPC SP-11	Power Tool Cleaning to Bare Metal
SSPC SP-12	High- and Ultrahigh-Pressure Water Jetting
SSPC SP-13	Surface Preparation of Concrete
SSPC SP-16	Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals
C-1	Abrasive blast clean in accordance with ASTM D4259 and fill all holes and imperfections with Sika Mono Top 615.

Paint and Coating Application Schedule		
Surface to be Painted or Coated	Surface Preparation	Paint System
Ferrous Metal (ungalvanized), Exposed	SSPC – SP-6	System 1
Gypsum Wall Board, all buildings	Manufacturer’s Inst.	System11
Interior Manholes, all interior walls, floor and underside of cover	Manufacturer's Inst.	System 21

2.2 PAINT AND COATING SYSTEMS

A. Furnish primers and finish coatings as shown on the following coating table schedule. If manufacturers have changed their coating products and the products shown below are no longer available, provide the product that the manufacturer recommends as the improved version of the product shown.

B. Where dry film thicknesses are not shown, the DFT shall be as recommended by the manufacturer for the product and service shown in the Application Schedules above.

C. Paint and Coating Systems:

System	Ameron Coatings	ICI Devoe Coatings	Tnemec Company
1	Ameron 5105 primer Ameron 5405 finish 2 coats, 3.0 mils each	Devguard 4160 primer Devguard 4308 finish (4550) finish 2 coats, 3.0 mils each	Tnemec 66 primer Tnemec 2H finish 2 coats, 3.0 mills each
2	Same as system 1 but pretreat galvanizing	Same as System 1 but for Devoe Coatings but use Devguard 4120 primer	Same as System 1 but pretreat galvanizing
3*	Amercoat 78HB 16 mils total	Catha-Coat 302H primer Devtar 5A finish 8.0 mils	Tnemec N69 8 mils primer Tnemec HS Epoxy 104 10 mils finish
5	Amercoat 370 primer and 351 finish with 20 mils PVC Wrap	Bar Rust 235, 2 coats & 20 mils PVC Wrap	Tnemec HS Epoxy 104, 2 coats 10 mils & 20 mils PVC Wrap
9	Amerlock 400BF Amercoat 220, 2 coats	Devoe Bloxfill 4000 Devran 224 HS primer Devthane 379 finish	Tnemec Masonry filler 54 Primer Series 1254 Tnemec Series 1028 finish, 2 coats
11	Amercoat 220 – 2 coats	DevFlex 4020 primer Devflex 4208QD finish	Tnemec 51-792 Tnemec Tneme Gloss 2H

***Rhino Novolac 9700 Epoxy 10 mils is also an approved product for Painting and Coating System 3.**

System	Ameron Coatings	ICI Devoe Coatings	Tnemec Company
18	NuKlad 105A/ 114A/ Amershield with antislip	Preprime 167/Devran 124	Primer Series 201 4 mils Series 282 finish, 2 coats, 6 mils each
19		Thinned Devtar 5A as recommended by the manufacturer / Devtar 5A; Two finish coats, 10 mils each	Tnemec Surfacing Epoxy 215 surfacer Tnemec PermaShield 446 10 mils finish
20			Tnemec Perma Glaze 435 80 mils Hi Build Application
22			**Prime Coat: Series 61 Tneme-Liner at 8.0-12.0 mils dft** **Stripe Coat: Series 61 Tneme-Liner** **Finish Coat: Series 61 Tneme-Liner at 8.0-12.0 mils dft**

	BASF	Chemical Products, Inc	Aquafin
4	White Roc W	Siloxane CP-500 W	Aquafin CS-250

	SprayRoq	Raven Lining Systems	Polybrid Coatings, Inc.	Tnemec Company
21	SprayWall, 125 mils	Raven 405, 125 mils	Polybrid 670S, 5 mils/ Polybrid705, 120 mils	Surfacer Series 218 minimum 1/16" / base coat Series 434, 125 mils/ top coat Series 435, 20 mils

2.3 OTHER COATINGS

A. Factory Applied Coatings and Touchup: Field touchup shall consist of touching up the shop prime coat to achieve the film thickness, continuity and coating specified in accordance with the paint system data sheets. Badly damaged shop coatings shall be removed and the surfaces recoated in accordance with the specified system requirements.

B. Aluminum Metal Insulation: Where aluminum surfaces come in contact with concrete or with metals not compatible with aluminum, paint the dissimilar materials with a prime coat of zinc-chromate primer or a coating of heavy-bodied bituminous paint.

C. Painting and Identification of Piping: All exposed new piping is to be painted and identified in accordance with Section 40 05 97 – Piping Identification.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Prepare all surfaces prior to application of paint or coatings. Comply with surface preparation requirements of the Society for Protective Coatings (SSPC). If the paint or coating manufacturer recommends a surface preparation different than that shown, follow the more stringent surface preparation requirement.

B. ASTM D4259 – Wet Abrasive Blasting, Vacuum Assisted Dry Abrasive Blasting or Centrifugal Shot Abrasive Blasting

1. Shot Blasting – Before blasting fill defects and holes with filler recommended by the coating manufacturer. Blast with dustless steel shot to remove laitance, residue and loose material to roughen the surface to a texture of No. 40 to 60 grit sandpaper.

C. Surface preparation requirements of the Society for Protective Coatings (SSPC) are as follows:

1. SSPC – SP-1 – Solvent Cleaning
2. SSPC – SP-2 – Hand Tool Cleaning
3. SSPC – SP-3 – Power Tool Cleaning

4. SSPC – SP-5 – White Metal Blast Cleaning

5. SSPC – SP-6 – Commercial Blast Cleaning

6. SSPC – SP-13 – Mechanical or Chemical Cleaning

D. Preparation of Concrete and Masonry Surfaces: Unless otherwise specified, concrete surfaces which are to receive any paint coating shall be allowed to age for a minimum of 28 days. Moisture content shall be tested with a Delmhorst Instrument Company moisture detector prior to application of paint or coating. The moisture content of the concrete shall be within the limits recommended by the manufacturer of the paint or coating before any paint or coating is applied.

E. For Systems 19, 20, 21, and 22, a representative from the coating manufacturer shall inspect the surface preparation prior to coating application and certify in writing that the surface preparation is in compliance with their requirements.

3.2 APPLICATION

A. Workmanship: All Work shall be done in a workmanlike manner so that the finished surface will be free from runs, drips, ridges, waves, laps and unnecessary brush marks. All coats shall be applied in such a manner as to produce an even film of uniform thickness, completely coating all corners and crevices.

B. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in a first-class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Spray equipment shall be equipped with mechanical agitators, pressure gauges, and pressure regulators. Spray nozzles shall be of the proper sizes.

C. Each coat of paint shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs and other adjacent areas and installation shall be protected by taping, drop cloths or other suitable measures.

D. Paint Properties, Mixing and Thinning. All paint, when applied, shall provide a satisfactory film and smooth, even surface. Glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application, adhesion and subsequent coats. Paints shall be thoroughly stirred, strained and kept at a uniform consistency during application. Coatings consisting of two (2) or more components shall be mixed in accordance with manufacturer's instructions. Where necessary to suit conditions of the surface, temperature, weather and method of application, and with the Engineer's approval, the paint may be thinned immediately prior to use by the addition of not more than one pint per gallon of the proper thinner; provided that in no case shall the paint be reduced more than necessary to obtain the proper application characteristics. Where specifically permitted by the Specifications, certain paints may be thinned more than the maximum indicated above. Paint thinner shall be as recommended by the paint manufacturer.

E. Atmospheric Conditions: Except as specified or required for certain water-thinned paints, paints shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperatures of the atmosphere and surfaces to be painted as will cause evaporation rather than condensation.

1. In no case shall any paint be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation without suitable protection, as accepted by the Engineer. Where painting is permitted during damp weather or when the temperature is at or below 40 degrees F, the surfaces shall be heated to prevent moisture condensation thereof.

2. Bar metal surfaces, except those which may be warped by heat, may be dehydrated by flame-heating devices immediately prior to paint application.

3. While any painting is being done and for a period of at least eight (8) hours after the paint has been applied, the temperature of the surfaces to be painted, the painted surfaces and the atmosphere in contact therewith shall be maintained at or above 40 degrees F and 5 degrees above the dew point.

4. All paint, when applied, shall be approximately the same temperature as that of the surface on which it is applied. The use of fans or heaters shall be required in enclosed areas where conditions causing condensation are severe.

F. Method of Paint Application: Where two (2) or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors. Color additives shall not contain lead or any lead compound which may be destroyed or affected by hydrogen sulfide or any gas likely to be found in wastewater treatment plants.

G. Electrical and mechanical equipment, on which the manufacturer's coating is found, shall be touch-up primed and painted with two (2) coats of the specified paint system to match the color scheduled. This does not apply to electrical and instrumental equipment otherwise specified in Division 16.

H. No paint shall be applied to any surface until it has been prepared as specified and approved by the Engineer. Unless otherwise specified, the primer or first coat of paint shall be applied by brush to ferrous surfaces. All subsequent coats for all ferrous surfaces may be either brush or spray applied. Unless stated otherwise, prime and finish coats shall be applied at the rate recommended by the manufacturer for the services involved. After prime coat is dry, all suction spots shall be touched up before succeeding coats are sprayed. All coats for concrete and masonry shall be brushed or rolled unless otherwise specified. Before painting or repainting existing surfaces, the Contractor shall test-paint a small area on the actual surface to show that the color matches the existing surfaces.

I. Unless otherwise specified, do not apply finish coats until all other work in the area is done and until the prime and intermediate coats have been inspected by the Engineer.

J. Film Thickness and Continuity: The actual surface area covered per gallon of oil and varnish vehicle paint for various types of surfaces shall not exceed those recommended by the manufacturer. All paint and coating thickness stated in this Specification are dry film thickness. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. All coatings shall be applied to the thickness in accordance with these Specifications. The minimum thickness at any point shall not deviate more than 25 percent from the required average. Except as specified, no less than two (2) coats shall be applied.

K. Special Requirements: Hangers shall be painted, except for the final coat, prior to installation. Paint underside of all ungalvanized equipment bases and supports with at least

two (2) coats of rust inhibiting primer prior to setting the equipment in place. Paint bolt and bolt holes in flanges, such as those used with couplings or wager type valves, where hold and bolt as finally installed will be exposed to weather or moisture, prior to assembly to prevent rusting of the unprotected metal.

L. For systems 19, 20, and 21, a representative from the coating manufacturer shall certify in writing that the coating installation is in compliance with their requirements.

3.3 FIELD INSPECTION AND TESTING

A. Where two (2) or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors.

B. Unless otherwise specified, do not apply finish coats until all other work in the area is done and until the underlying coats have been inspected and accepted by the NACE Inspector.

C. Film Thickness: All paint and coating thickness stated in this Specification are dry film thickness. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. All coatings shall be applied to the thickness in accordance with these Specifications and the Manufacturer's recommendations as stated in the product data sheets. The dry film thickness of each coating application will be measured using the SSPA-2 standard. The minimum/maximum thickness requirements shall meet the perimeters outlined in this standard. Where the minimums and maximums do not meet the requirements of this standard, corrections must be made.

D. Continuity: Holiday testing will be performed in accordance with NACE RP0188 All surfaces below the waterline shall be tested.

In testing for continuity, all pinholes and holidays located shall be repainted to the required dry film thickness. All ferrous metal surfaces shall meet minimum continuity requirements outlined the NACE RP0188 standard. All holiday repairs will be re-tested following the repairs.

E. It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual field check by the Contractor's quality control subcontractor. Dry-film thickness will be measured by an Elcometer or Mikrotest magnetic type dry-film thickness gauge. Continuity will be tested by a low voltage wet sponge transistorized device, as manufactured by Tinker-Rasor (Model M-1), or equal. The Contractor's quality control subcontractor shall use inspection devices that are in good working condition for detection of holidays and measurement of dry-film thickness. The Contractor's subcontractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors. Provide safe and suitable ladders or temporary scaffolding and adequate illumination to facilitate inspection.

3.4 PROTECTION OF PAINT SURFACES

A. Where protection is provided for painted surfaces, such protection shall be preserved in place until the paint film has properly dried and the removal is authorized. Items which have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is completely dry and hard.

B. After delivery at the site of materials for permanent erection or installation, all shop-coated metalwork shall be repainted or retouched from time to time, which specified paint, whenever, in the opinion of the Engineer, it becomes necessary to maintain the integrity of the film.

3.5 CLEANUP

A. Upon completion of all painting, remove all surplus materials, protective coverings and accumulated rubbish and thoroughly clean all surfaces and repair any overspray or other paint-related damage.

END OF SECTION 09 90 00

SECTION 09 97 13.24 – STEEL WATER STORAGE TANK PAINTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to furnish and apply paint to exterior of the existing elevated water tank as specified herein.

1.2 DEFINITIONS

A. The term paint, coatings, or finishes as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.

B. Dry Film Thickness (DFT): The minimum dry film thickness, without any negative tolerance.

C. Volatile Organic Compound (VOC): Content of air polluting hydrocarbons in uncured coating product measured in units of grams per liter or pounds per gallon, as determined by EPA Method 24.

D. Ferrous: Cast iron, ductile iron, wrought iron, and all steel alloys except stainless steel.

E. Where SSPC surface preparation standards are specified or implied for ductile iron pipe or fittings, the equivalent NAPF surface preparation standard shall be substituted for the SSPC standard.

1.3 REFERENCE STANDARDS

A. Codes and Standards: In addition to the requirements of these Specifications, the work to be performed under this section is to comply with the following codes and regulations:

1. Steel Structure Painting Council Specifications (SSPC):

a. SSPC SP-1 Solvent Cleaning.

b. SSPC SP-2 Hand Tool Cleaning.

c. SSPC SP-3 Power Tool Cleaning.

d. SSPC SP-5 White Metal Blast Cleaning.

e. SSPC SP-6 Commercial Blast Cleaning.

f. SSPC SP-7 Brush-Off Blast Cleaning.

g. SSPC SP-10 Near-White Blast Cleaning.

2. Underwriters' Laboratory (UL):

   a. UL 3P83 Drinking Water System Components - Health Effects.

3. National Association of Corrosion Engineers Standards (NACE):

   a. RP0188-99 Discontinuity (Holiday) Testing of Protective Coatings.

4. Applicable Standards of American National Standards Institute, Inc. (ANSI)

5. National Association of Pipe Fabricators (NAPF):

   a. NAPF 500-03 Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.

6. NSF International (NSF):

   a. NSF 61 Drinking Water System Components - Health Effects.

7. American Society for Testing and Materials (ASTM):

   a. ASTM D 4262-83 Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.

   b. ASTM D 4263-83 Test Method for indicating Moisture in Concrete by the Plastic Sheet Method.

   c. ASTM D4285-83 Test Method for indicating Oil or Water in Compressed Air.

   d. ASTM D4541-93 Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.

1.4 QUALITY ASSURANCE

A. Painter's Qualifications: The work specified under this section shall be performed by or under the supervision of a qualified painter. The CONTRACTOR shall be required to document the painter's experience, competence and ability to comply with the requirements of these Specifications and to complete the work in a timely manner. The Painter or Applicator shall have the following qualifications:

   1. Minimum of 5 years' experience applying specified type or types of coatings under conditions similar to those of the Work. Provide qualifications of applicator and references listing five similar projects completed in the past two years.

   2. Manufacturer approved applicator when manufacturer has approved applicator program.

B. Standard Products: All paints in a paint system are to be the products of a single manufacturer. The standard product of manufacturers other than those specified will be accepted when it is demonstrated to the satisfaction of the Engineer they are equal to the

product specified. All paint and coating products available in selectable colors shall be supplied in the color selected by the OWNER from the manufactures standard color charts.

C. Warranty Inspection: A warranty inspection may be conducted near the end of the three-year warranty period. The CONTRACTOR and a representative of the coating material manufacturer shall attend this inspection. All defective work shall be repaired in accordance with these specifications and to the satisfaction of the OWNER. The OWNER may, by written notice to the CONTRACTOR, reschedule the warranty inspection to another date within the three-year correction period, or may cancel the warranty inspection altogether. If a warranty inspection is not held, the CONTRACTOR is not relieved of its responsibilities under the Contract Documents.

D. Coatings Inspection: Surface preparation, mixing, thinning, coating application, and measurement of dry film thicknesses shall be performed by a NACE Certified Coatings Inspector. Each requirement of this specification shall be met and approved by the Inspector prior to moving on to the next step in the progression of the coatings specification. At a minimum of every four hours or more often when conditions change during surface preparation and coatings application, environmental conditions IE: Relative Humidity, dew-point, surface temperature and the dew-point/surface temperature depression must be measured and recorded. The use of a sling psychrometer and US weather bureau barometric chart or approved equal such as Defelsko or Elcometer test instruments shall be used to measure the environmental conditions.

E. The NACE Inspector must approve all surface preparation prior to the application of coatings. This will include surface cleanliness, the degree of sandblast and surface profiles.

F. Quality Assurance Responsibility: The Contractor is responsible to obtain and pay for the services of the NACE inspector referred to in Paragraph 1.4.D above. The Contractor shall take the atmospheric measurements required in Paragraph 1.4.D above.

1.5 SUBMITTALS

A. Before any paint materials are ordered, submit a complete list of all materials proposed to be furnished and applied under this Section. Any coating or paint materials ordered by CONTRACTOR prior to receiving submittal response from ENGINEER indicating that the submitted material is accepted shall be at the risk of the CONTRACTOR.

B. For each paint, furnish the paint manufacturer's specific application instructions and surface preparation requirements and the following information:

1. Paint manufacturer’s data sheet for each product proposed, including statements on the suitability of the materials for the intended use.

2. Type of primer, if required.

3. Maximum dry and wet mil thickness per coat.

4. Minimum and maximum curing time between coats, including atmospheric conditions for each.

5. Curing time before submergence in water.

6. Thinner to be used with each paint.

7. General ventilation requirements.

8. Atmospheric conditions during which the paint is not to be applied

9. Maximum, allowable moisture content and minimum age of plaster, concrete and wood surfaces at time of paint application.

10. Compatibility of shop and field applied coatings (where applicable).

C. Reports: Submit the following reports to the ENGINEER:

1. Reports on visits to project site to view and approve surface preparation of structures to be coated.

2. Reports on visits to project site to observe and approve coating application procedures.

3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."

D. Submit a quality control plan that outlines the sequence of activities, quality control instruments, third party quality control **NACE inspections**, monitoring program, and other measures to document compliance with applicable standards and specifications.

1.6 DELIVERY AND STORAGE

A. Deliver, store, and handle products in accordance with manufacturer’s requirements. All materials are to be delivered to the job site in their original, unopened containers bearing the manufacturer's name, brand, batch number, date of manufacture, and any special directions.

B. Only the approved material shall be stored at the job site and stored only in designated areas restricted to the storage of paint materials and related equipment. All paint is to be stored in enclosed structures and protected from weather and excessive heat or cold. Store coatings in well-ventilated facility that provides protection from the sun weather, and fire hazards. Maintain ambient storage temperature between 45 and 90 degrees Fahrenheit, unless otherwise recommended by the manufacturer.

C. Store flammable materials to conform with State and local safety codes. Protect emulsion type paints from freezing. Take precautions to prevent fire and spontaneous combustion.

D. Materials exceeding storage life recommended by the manufacturer will be subject to rejection.

1.7 SURFACES NOT REQUIRING PAINTING

A. Exterior concrete slabs, exterior sidewalks, exterior concrete stairs and exterior concrete curbs.

PART 2 - PRODUCTS

2.1 PAINT AND COATING SYSTEM APPLICATIONS

A. Prepare surfaces and apply paint and coating systems in accordance with the following Schedule.

PAINT APPPLICATION SCHEDULE

Surface to be Painted	Surface Preparation	Paint System
Elevated tank exterior and all columns, braces, ladder, handrail and appurtenances.	SSPC – SP-6	System 1

2.2 PAINT AND COATING SYSTEMS

A. Furnish primers and finish coatings as shown on the coating as shown below.

B. Where dry film thickness of the coating are not shown in the table below, the dry film thickness shall be as recommended by the manufacturer.

C. Paint and Coating Systems; provide paint system from one the manufacturers shown below:

System	Tnemec	Devoe Coatings	Carboline
1	Hi Build Epoxoline II Series N69, 8 mils DFT Primer Endura Shield Series 72, 5.0 mils DFT Gloss Finish	Bar Rust 235, 4.0 mils DFT Primer Devthane 379, 3.0 mils DFT Gloss Finish	Carbozinc 859, 5 mils DFT Primer Carbothane 8845, 5 mils DFT Gloss Finish

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

A. Prepare all surfaces prior to application of paint or coatings. Comply with surface preparation requirements of the Steel Structures Painting Council (SSPC), the paint manufacture's instructions. If the paint or coating manufacturer recommends a surface preparation different than that shown, follow the more stringent surface preparation requirement.

1. ASTM D4259 – Wet Abrasive Blasting, Vacuum Assisted Dry Abrasive Blasting or Centrifugal Shot Abrasive Blasting

2. Shot Blasting – Before blasting fill defects and holes with filler recommended by the coating manufacturer. Blast with dustless steel shot to remove laitance, residue and loose material to roughen the surface to a texture of No. 40 to 60 grit sandpaper.

3. Surface preparation requirements of the Steel Structures Painting Council (SSPC) are as follows:

   a. SSPC – SP-1 Solvent Cleaning

   b. SSPC – SP-2 Hand Tool Cleaning

   c. SSPC – SP-3 Power Tool Cleaning

   d. SSPC – SP-5 White Metal Blast Cleaning

   e. SSPC – SP-6 Commercial Blast Cleaning

   f. SSPC – SP-13 Mechanical or Chemical Cleaning

3.2 APPLICATION

A. Workmanship: All work shall be done in a workmanlike manner so that the finished surface will be free from runs, drips, ridges, waves, laps and unnecessary brush marks. All coats shall be applied in such a manner as to produce an even film of uniform thickness, completely coating all corners and crevices.

B. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in a first-class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Spray equipment shall be equipped with mechanical agitators, pressure gauges, and pressure regulators. Spray nozzles shall be of the proper sizes.

C. Each coat of paint shall be applied evenly and sharply cut to line. Care shall be exercised to avoid overspraying or spattering paint on surfaces not to be coated. Glass, hardware, floors, roofs and other adjacent areas and installation shall be protected by taping, drop cloths or other suitable measures.

D. Paint Properties, Mixing and Thinning. All paint, when applied, shall provide a satisfactory film and smooth, even surface. Glossy undercoats shall be lightly sanded to provide a surface suitable for the proper application, adhesion and subsequent coats. Paints shall be thoroughly stirred, strained and kept at a uniform consistency during application. Coatings consisting of two (2) or more components shall be mixed in accordance with manufacturer's instructions. Where necessary to suit conditions of the surface, temperature, weather and method of application, and with the Engineer's approval, the paint may be thinned immediately prior to use by the addition of not more than one pint per gallon of the proper thinner; provided that in no case shall the paint be reduced more than necessary to obtain the proper application characteristics. Where specifically permitted by the Specifications, certain paints may be thinned more than the maximum indicated above. Paint thinner shall be as recommended by the paint manufacturer.

E. Atmospheric Conditions: Except as specified or required for certain water-thinned paints, paints shall be applied only to surfaces that are thoroughly dry and only under such combination of humidity and temperatures of the atmosphere and surfaces to be painted as will cause evaporation rather than condensation. In no case shall any paint be applied during rainy, misty weather, or to surfaces upon which there is frost or moisture

condensation without suitable protection, as accepted by the Engineer. Where painting is permitted during damp weather or when the temperature is at or below 40 degrees F, the surfaces shall be heated to prevent moisture condensation thereof. Bar metal surfaces, except those which may be warped by heat, may be dehydrated by flame-heating devices immediately prior to paint application. While any painting is being done and for a period of at least eight (8) hours after the paint has been applied, the temperature of the surfaces to be painted, the painted surfaces and the atmosphere in contact therewith shall be maintained at or above 40 degrees F and 5 degrees above the dew point. All paint, when applied, shall be approximately the same temperature as that of the surface on which it is applied. The use of fans or heaters shall be required in enclosed areas where conditions causing condensation are severe.

F. Protection of Paint Surfaces: Where protection is provided for painted surfaces, such protection shall be preserved in place until the paint film has properly dried and the removal is authorized. Items which have been painted shall not be handled, worked on, or otherwise disturbed until the paint coat is completely dry and hard. After delivery at the site of materials for permanent erection or installation, all shop-coated metalwork shall be repainted or retouched from time to time, which specified paint, whenever, in the opinion of the engineer, it becomes necessary to maintain the integrity of the film.

G. Method of Paint Application: Where two (2) or more coats are required, alternate coats shall contain sufficient compatible color additive to act as indicator of coverage, or the alternate coats shall be of contrasting colors. Color additives shall not contain lead or any lead compound which may be destroyed or affected by hydrogen sulfide or any gas likely to be found in wastewater treatment plants.

H. Electrical and mechanical equipment, on which the manufacturer's coating is found, shall be touch-up primed and painted with two (2) coats of the specified paint system to match the color scheduled. This does not apply to electrical and instrumental equipment otherwise specified in Division 16.

I. No paint shall be applied to any surface until it has been prepared as specified and approved by the Engineer. Unless otherwise specified, the primer or first coat of paint shall be applied by brush to ferrous surfaces. All subsequent coats for all ferrous surfaces may be either brush or spray applied. Unless stated otherwise, prime and finish coats shall be applied at the rate recommended by the manufacturer for the services involved. After prime coat is dry, all suction spots shall be touched up before succeeding coats are sprayed. All coats for concrete and masonry shall be brushed or rolled unless otherwise specified. Before painting or repainting existing surfaces, the Contractor shall test-paint a small area on the actual surface to show that the color matches the existing surfaces.

J. Unless otherwise specified, do not apply finish coats until all other work in the area is done and until the prime and intermediate coats have been inspected by the Engineer.

K. Film Thickness and Continuity: The actual surface area covered per gallon of oil and varnish vehicle paint for various types of surfaces shall not exceed those recommended by the manufacturer. All paint and coating thickness stated in this specification are dry film thickness. The first coat on metal surfaces refers to the first full paint coat and not to conditioning or other pretreatment applications. All coatings shall be applied to the thickness in accordance with these Specifications. The minimum thickness at any point

shall not deviate more than 25 percent from the required average. Except as specified, no less than two (2) coats shall be applied.

L. In testing for continuity about welds, projections such as bolts, nuts, and crevices, the Engineer will determine the minimum conductivity for smooth areas of like coating where the dry mil thickness has been found adequate. This conductivity shall then be taken as the minimum required for these rough irregular areas. All pinholes and holidays shall be repainted to the required coat coverage. All ferrous metal surfaces shall meet minimum continuity requirements.

M. It is intended that the dry film thickness and the continuity of painted ferrous metal surfaces be subject to continual field check by the Engineer. Dry-film thickness will be measured by an Elcometer or Mikrotest magnetic type dry-film thickness gauge. Continuity will be tested by a low voltage wet sponge transistorized device, as manufactured by Tinker-Rasor (Model M-1), or equal. The Contractor shall furnish the inspection devices in good working condition for detection of holidays and measurement of dry-film thickness. The Contractor shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy of holiday detectors. These inspection devices shall be available for the Engineer's use at all times. Provide safe and suitable ladders or temporary scaffolding and adequate illumination to facilitate inspection.

3.3 CLEANUP

A. Upon completion of all painting, remove all surplus materials, protective coverings and accumulated rubbish and thoroughly clean all surfaces and repair any overspray or other paint-related damage.

END OF SECTION 09 97 13.24

SECTION 26 05 00 – ELECTRICAL, GENERAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to all of Division 26 Specifications. This Specification Section applies to all Division 26 Specifications and Electrical Drawings.

B. Division 26 Contractor shall review all other Division Specifications and drawings for additional requirements.

1.2 QUALITY ASSURANCE

A. Comply with latest NEC, NFPA, UBC, UFC, UL and applicable Local and State Codes. Also comply with Utility Company regulations and industry standards and these Drawings.

B. The Work shall be done by only trained, licensed and experienced workmen familiar with the requirements.

C. All microprocessor based equipment and software with equipment shall utilize 4 digits for the year part of all dates. A two digit date shall be an option for printing at the Owner's preference.

1.3 EXTENT OF DRAWINGS / SPECIFICATION

A. Drawings indicate intent and general layout of electrical systems for the Project. Drawings are partly diagrammatic and do not indicate all fittings and accessories which may be required. Provide such fittings and accessories as required to form a complete and operating system in general conformance with Specifications and Drawings.

1.4 PRIOR APPROVALS

A. Unless directed otherwise by Division 1, all products submitted for prior approval shall be received by the Engineer 10 business days prior to Bid. Supply technical data, photometrics and dimensional Drawings showing that substitutes are equal to product specified. Faxed prior approvals will not be accepted.

1.5 DISCREPANCIES

A. Prior to submitting Bid, Contractor shall refer any apparent discrepancies or omissions to the Engineer for clarification. The more stringent provisions shall take precedence where codes, Specifications and Drawings differ with one another. The Contractor shall Bid the more expensive requirement, unless discrepancy is addressed by Addendum prior to Bid.

1.6 TEMPORARY LIGHTING/POWER

A. Provide temporary electrical power and lighting for all trades that require service during the course of this Project. Provide temporary service and distribution as required. Provide temporary power for all electrical equipment that will need to be installed due to the phased construction of this project. Comply with the NEC and OSHA requirements. Energy Costs by General Contractor.

1.7 SHOP DRAWING SUBMITTALS

A. General: Follow the procedures specified in Section 01 33 00 – Submittal Procedures. Submit for final and official approval through the General Contractor.

B. Provide the number of electrical related Shop Drawings, product data, and samples submitted, to allow for required distribution plus two copies of each submittal required, which will be retained by the Electrical Consulting Engineer.

1. Engineer - 2 copies.

2. General Contractor - 2 copies.

3. Subcontractor - Copies as required.

C. All Shop Drawings shall be bound in Duo-Tang, Mead, or equivalent folders. Provide title sheet for each Specification Section indicating the Specification number and name. Copies of price list sheets not acceptable. Manufacturer’s name and address must appear on each sheet.

1.8 SEQUENCING AND SCHEDULING

A. Coordinate electrical equipment installation with other building components.

B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for electrical installations.

C. Coordinate installing required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

D. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning prior to closing in the building.

E. Coordinate connecting electrical service to components furnished under other Sections.

F. Coordinate connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Coordinate requirements for access panels and doors where electrical items requiring access are concealed by finished surfaces.

1.9 SUBSTANTIAL COMPLETION

A. At Substantial Completion of Project, be ready to demonstrate the following list of items below. If this is not possible, inform the General Contractor and Engineer no less than 1 week prior to the Engineer's visitation of the site for Substantial Completion.

B. Demonstrate the operation and test of the emergency lighting system.

C. Demonstrate the main service ground, bonding to neutral and resistance readings obtained at time of installation. This will involve having some covers removed from the main panels at the time of the Engineer's visitation.

D. All electrical systems and items specified shall be installed and operational.

E. Demonstrate exterior lighting controls.

F. Demonstrate the operation of all emergency power systems including generators, uninterruptible power supplies and inverter systems.

1.10 RECORD DOCUMENTS

A. Prepare Record Documents in accordance with the requirements in Section 01 77 00 – Closeout Procedures. In addition to the requirements specified in Division 1, indicate the following installed conditions:

B. Actual location of all electrical service gear/feeders, panel/motor/special equipment feeders, all major underground or underslab conduits, all conduit stubs for future use, any change in branch circuitry from Drawings, key junction boxes and pull boxes not indicated on Drawings, any control locations or indicator lights not shown on Drawings.

C. Addendum items, Change Order items and all changes made to Drawings from Bidding phase through to Project completion.

D. Actual equipment and materials installed. Where manufacturer and catalog number are indicated on Drawings, generally or in fixture or equipment schedules, change to reflect actual products installed.

E. Change service panel and branch panel breaker locations and schedules to reflect actual installed conditions.

1.11 MAINTENANCE MANUALS

A. Prepare maintenance manuals in accordance with Section 01 78 23 – Operational and Maintenance Data. In addition to the requirements specified in Division 1 assemble O & M Manuals as follows:

1. Compile Operating and Maintenance Manuals for the electrical systems and equipment. The manuals shall be provided to the Engineer for approval complete and at one time, prior to requesting final payment. Partial or separate data will be returned for completion.

2. Manuals shall be assembled in three-ring binders. Binders shall be 3 inch thick or less and have slip sleeve jacket on binder side and front. More than one binder shall be used for each set of data if required to prevent overfilling of one binder. All information shall be arranged in Sections and each Section shall have a blank buff colored, heavy paper divider with a protruding tab clearly labeled. Sections shall be arranged in the same order that the equipment is listed in the Specification and each Specification Section shall have a separate tab. Shop Drawings which are larger than 8-1/2-inch by 11 inch shall be individually folded so they are 8-1/2-inch by 11 inch or less and inserted behind the appropriate tab.

3. Tabs shall be labeled and arranged as follows:

   a. Index: Furnish under the first tab an index of Sections listing name of Section and Specification numbers.

   b. Equipment Manufacturers: Furnish under the second tab a complete typed list of equipment suppliers and manufacturers representative including type of equipment, name, address and phone number. The company listed here should be the one which could furnish replacement parts and offer technical information about the equipment.

   c. Product Literature: Each tab, starting with the third shall contain the name of a Specification Section. Behind each tab shall be the previously submitted and approved Shop Drawing, factory published operation and maintenance instructions and parts lists. Also include description of function, normal operating characteristics and limitations, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions. Servicing instructions and lubrication charts and schedules.

4. Upon completion and approval of the booklets, one copy shall be given to the Architect, and two to the Owner. Using the booklet, the Electrical Contractor shall explain in detail and instruct the Owner's operating personnel in the correct operation and maintenance of the equipment.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

A. Channel and angle support systems, hangers, anchors, sleeves, brackets, fabricated items, and fasteners are designed to provide secure support from the building structure for electrical components.

1. Material: Steel, except as otherwise indicated, protected from corrosion with zinc coating or with treatment of equivalent corrosion resistance using approved alternative finish or inherent material characteristics.

2. Metal Items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel, except as otherwise indicated.

B. Steel channel supports have 9/16-inch diameter holes at a maximum of 8 inches o.c., in at least 1 surface.

1. Fittings and accessories mate and match with channels and are from the same manufacturer.

C. Raceway and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps or "click"- type hangers.

D. Sheet-Metal Sleeves: 0.0276-inch or heavier galvanized sheet steel, round tube, closed with welded longitudinal joint.

E. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

F. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable iron casting with hot-dip galvanized finish.

G. Expansion Anchors: Carbon-steel wedge or sleeve type.

H. Toggle Bolts: All-steel springhead type.

I. Powder-Driven Threaded Studs: Heat-treated steel.

2.2 CONCRETE EQUIPMENT BASES

A. Forms and Reinforcing Materials: As specified in Section 03 30 00 – Cast-In-Place Concrete.

B. Concrete: 3000 psi, 28-day compressive strength as specified in Section 03 33 00 – Cast-In-Place Concrete.

C. RACEWAY AND CABLE LABELS

D. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

1. Color: Black letters on orange field.

2. Legend: Indicates voltage.

E. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating.

F. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

G. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

H. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.

1. Not less than 6 inches wide by 4 mils thick.

2. Compounded for permanent direct-burial service.

3. Embedded continuous metallic strip or core.

4. Printed legend indicating type of underground line.

I. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

2.3 NAMEPLATES

A. Engraved Plastic Nameplates: Engraving stock, melamine plastic laminate, minimum 1/16-inch thick for signs up to 20 sq. in. and 1/8-inch thick for larger sizes.

1. Engraved legend with white letters on black face.

2. Punched or drilled for mechanical fasteners.

2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.

1. Minimum Width: 3/16-inch.

2. Tensile Strength: 50 lb minimum.

3. Temperature Range: Minus 40 to plus 185 deg F.

4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.

1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.

2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.

3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.

4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION REQUIREMENTS

A. Install components and equipment to provide the maximum possible headroom where mounting heights or other location criteria are not indicated.

B. Install items level, plumb, and parallel and perpendicular to other building systems and components, except where otherwise indicated.

C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Give right of way to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING METHODS

A. Damp Locations and Outdoors: Hot-dip galvanized materials, U-channel system components.

B. Dry Locations: Steel materials.

C. Support Clamps for PVC Raceways: Click-type clamp system.

D. Conform to manufacturer's recommendations for selecting supports.

E. Strength of Supports: Adequate to carry all present and future loads, times a safety factor of at least 4; 200 lb minimum design load.

3.3 GENERAL INSTALLATION OF MATERIALS

A. Install wires according to manufacturer's written instructions and NECA's "Standard of Installation."

B. Conductor Splices: Keep to the minimum and comply with the following:

1. Install splices and taps that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

2. Use splice and tap connectors that are compatible with conductor material.

C. Connect outlets and components to wiring systems and to ground as indicated and instructed by manufacturer. Tighten connectors and terminals, including screws and bolts, according to equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals according to tightening requirements specified in UL 486A.

D. Install devices to securely and permanently fasten and support electrical components.

E. Raceway Supports: Comply with NFPA 70 and the following requirements:

1. Conform to manufacturer's recommendations for selecting and installing supports.

2. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

3. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

4. Spare Capacity: Size supports for multiple conduits so capacity can be increased by a 25 percent minimum in the future.

5. Support individual horizontal raceways with separate, malleable iron pipe hangers or clamps.

6. Hanger Rods: 1/4-inch diameter or larger threaded steel, except as otherwise indicated.

7. Spring Steel Fasteners: Specifically designed for supporting single conduits or tubing. May be used in lieu of malleable iron hangers for 1-1/2-inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to channel and slotted angle supports in accordance with NEC.

8. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports, with no weight load on raceway terminals.

F. Vertical Conductor Supports: Install simultaneously with conductors.

G. Miscellaneous Supports: Install metal channel racks for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other devices except where components are mounted directly to structural features of adequate strength.

H. Sleeves: Install for cable and raceway penetrations of concrete slabs and walls, except where core-drilled holes are used. Install for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.

I. Fastening: Unless otherwise indicated, securely fasten electrical items and their supporting hardware to the building structure. Perform fastening according to the following:

1. Fasten by means of wood screws or screw-type nails on wood; toggle bolts on hollow masonry units; concrete inserts or expansion bolts on concrete or solid masonry; and by machine screws, welded threaded studs, or spring-tension clamps on steel.

2. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts, machine screws, or wood screws.

3. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or any other items.

4. In partitions of light steel construction use sheet-metal screws.

5. Drill holes in concrete beams so holes more than 1-1/2 inches deep do not cut main reinforcing bars.

6. Drill holes in concrete so holes more than 3/4-inch deep do not cut main reinforcing bars.

7. Fill and seal holes drilled in concrete and not used.

8. Select fasteners so the load applied to any fastener does not exceed 25 percent of the proof-test load.

J. Install concrete pads and bases where indicated.

K. Install utility-metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by company.

3.4 LABEL INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

E. Install painted identification according to manufacturer's written instructions and as follows:

1. Clean surfaces of dust, loose material, and oily films before painting.

2. Prime surfaces using type of primer specified for surface.

3. Apply one intermediate and one finish coat of enamel.

F. Color Identification of Junction boxes: Identify with spray paint. Apply colors as follows:

1. Emergency lighting and power: Orange.

2. Mechanical/Electrical Supervisory System: Blue

3. Security System: Yellow.

G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

H. Circuit Identification Labels on Boxes: Install labels externally.

1. Exposed Boxes: Permanent black marker indicating panel and circuit designation.

2. Concealed Boxes: Permanent black marker indicating panel and circuit designation.

I. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker. Install line marker for underground wiring, both direct-buried cables and cables in raceway.

J. Color-Coding of Secondary Phase Conductors: Use the following colors for service, feeder and branch-circuit phase conductors:

1. 208/120-V Conductors:

a. Phase A: Black.

b. Phase B: Red.

c. Phase C: Blue.

d. Neutral: White.

e. Ground: Green.

2. 480/277-V Conductors:

a. Phase A: Brown.

b. Phase B: Purple.

c. Phase C: Yellow.

d. Neutral: Gray.

e. Ground: Green.

3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:

a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1 inch wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.

K. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.

1. Legend: 1/4-inch steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.

2. Tag Fasteners: Nylon cable ties.

3. Band Fasteners: Integral ears.

L. Apply identification to conductors as follows:

1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.

2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.

3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

M. Apply warning, caution, and instruction signs as follows:

1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

N. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch high lettering on 1-1/2 inch high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Electrical switchgear and switchboards.
4. Emergency system boxes and enclosures.
5. Disconnect switches.
6. Enclosed circuit breakers.
7. Motor starters.
8. Push-button stations.
9. Power transfer equipment.
10. Contactors.
11. Remote-controlled switches.
12. Control devices.
13. Transformers.
14. Battery racks.
15. Power-generating units.

O. For panelboards, provide framed type circuit schedules with identification of items controlled by each breaker. Indicate room numbers of items controlled or room name where appropriate for the Owners convenience. Final schedules shall be typed or printed for clarity. Handwritten schedules are not acceptable. Schedules shall be posted inside each panel door mounted in transparent card holder upon project completion.

END OF SECTION 26 05 00

SECTION 26 05 19 – LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes wires, cables and connectors for power, lighting, signal, control and related systems rated 600 V and less.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers complying with the Quality Assurance requirements are acceptable.

2.2 WIRES AND CABLES

A. General: Provide wire and cable suitable for the temperature, conditions and location where installed.

B. Conductors: Provide solid conductors for power and lighting circuits No. 10 AWG and smaller. Provide stranded conductors for sizes No. 8 AWG and larger.

C. Conductor Material: Copper for all wires and cables. Aluminum conductors are not acceptable.

D. Insulation: Provide THHN/THWN insulation for all conductors size 500 kcmil and larger, and No. 8 AWG and smaller. For all other sizes provide THW, THHN/THWN or XHHW insulation as appropriate for the locations where installed. Type THHN insulation may be used for branch circuit and feeder sizes for 100 amp under. Adjust conduit size.

E. Color coding for phase identification in accordance with Section 26 05 00 –Electrical, General.

2.3 CONNECTORS FOR CONDUCTORS

A. Provide UL-listed factory-fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types and classes for applications and for services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

PART 3 - EXECUTION

3.1 WIRING METHOD

A. Use the following wiring methods as indicated:

1. Wire: Install all wire in raceway, minimum size for light and power circuits shall be #12 AWG. Minimum size for control wire shall be 14 AWG.

3.2 INSTALLATION OF WIRES AND CABLES

A. General: Install electrical cables, wires, and connectors in compliance with NEC.

B. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant, where necessary.

C. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced. No joints or taps permitted in service or feeder circuits.

D. Tighten electrical connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A.

3.3 FIELD QUALITY CONTROL

A. Prior to energizing, test wires and cables for electrical continuity and for short-circuits.

END OF SECTION 26 05 19

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 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.

1. Comply with UL 467.

B. Comply with NFPA 70; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.

C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products are not limited.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

E. Grounding Electrode Conductors: Stranded cable.

F. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

G. Bare Copper Conductors: Comply with the following:

1. Solid Conductors: ASTM B 3.

2. Assembly of Stranded Conductors: ASTM B 8.

H. Copper Bonding Conductors: As follows:

1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4-inch in diameter.

2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.

3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16-inch thick.

4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

I. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Sectional type; copper-clad steel.

1. Size: 3/4 inch in diameter by 120 inches in length.

PART 3 - EXECUTION

3.1 APPLICATION

A. In raceways, use insulated equipment grounding conductors.

B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.

C. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

D. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.

E. Underground Grounding Conductors: Use copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by NEC:

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.

D. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

E. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.

F. Water Heater: Bond conductor to heater units, piping, connected equipment, and components.

G. Signal and Communication Systems: Provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

H. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.

1. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.3 INSTALLATION

A. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NEC. If concrete foundation is less than 20 feet long, coil excess conductor within the base of the foundation. Bond grounding conductor by cadweld process to reinforce steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

B. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.

1. Drive ground rods until tops are 6 inches below finished floor or final grade, unless otherwise indicated.

2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.

C. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

D. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

E. Metal Water Service Pipe: Provide 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 by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

F. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.

G. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

H. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.

3.4 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.

2. Make connections with clean, bare metal at points of contact.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

F. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

3.5 FIELD QUALITY CONTROL

A. Test ground resistance of entire system and at each building/structure where electrical equipment is installed.

B. Where maximum allowable ground resistance of 5 ohms is exceeded, install additional grounding mats or ground rods until ground resistance is equal to or below maximum allowable ground resistance.

C. Terminate ground and shield for VFD cables per VFD manufacturer requirements. VFD cable shielding must be connected at both the drive and the motor ends unless the drive manufacturer provided different guidelines. The shielding must be connected at a 360° contact. Provide and install cable claps or metal fittings as required for proper connection.

END OF SECTION 26 05 26

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 26 05 29 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers complying with the Quality Assurance requirements are acceptable.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

C. Manufacturers: Subject to compliance with requirements, provide products by the following or equal:

1. Thomas & Betts.

2. Power-Strut.

3. Unistrut.

4. Cooper B-Line.

5. Robroy.

6. Aickinstrut.

2.2 COATINGS

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors shall be hot-dip galvanized.

2.3 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.

B. Fasteners: Types, materials, and construction features as follows:

1. Expansion Anchors: Carbon steel wedge or sleeve type.

2. Toggle Bolts: All steel springhead type.

3. Powder-Driven Threaded Studs: Heat-treated steel, designed specifically for the intended service.

C. U-Channel Systems: 16 gauge steel channels, with 9/16-inch diameter holes, at a minimum of 8 inches on center, in top surface. Provide fittings and accessories that mate and match with U-channel and are of the same manufacturer.

2.4 FABRICATED SUPPORTING DEVICES

A. Pipe Sleeves: Provide pipe sleeves of one of the following:

1. Sheet Metal: Fabricate from galvanized sheet metal; round tube closed with snap lock joint, welded spiral seams, or welded longitudinal joint. Fabricate sleeves from the following gage metal for sleeve diameter noted:

a. 3 inch and smaller: 20 gauge.

b. 4-inch to 6-inch: 16 gauge.

c. Over 6-inch: 14 gauge.

2. Steel Pipe: Fabricate from Schedule 40 galvanized steel pipe.

3. Plastic Pipe: Fabricate from Schedule 80 PVC plastic pipe.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install supporting devices to fasten electrical components securely and permanently in accordance with NEC requirements.

B. Coordinate with the building structural system and with other electrical installation.

C. Raceway Supports: Comply with the NEC and the following requirements:

1. Conform to manufacturer's recommendations for selection and installation of supports.

2. Strength of each support shall be adequate to carry the load plus a minimum of 200 lbs safety allowance.

3. Install individual and multiple (trapeze) raceway hangers and riser clamps as necessary to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

4. Support individual horizontal raceways by separate pipe hangers. Spring steel fasteners may be used in lieu of hangers only for 1-1/2 inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings only. For

hanger rods with spring steel fasteners, use 1/4-inch diameter or larger threaded steel. Use spring steel fasteners that are specifically designed for supporting single conduits or tubing.

5. Space supports for raceways in accordance with with NEC.

6. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports with no weight load on raceway terminals.

D. In open overhead spaces, support sheet metal boxes directly from the building structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type of fastener not more than 24 inches from the box.

E. Sleeves: Install in concrete slabs and walls and all other fire-rated floors and walls for raceways and cable installations. For sleeves through fire rated-wall or floor construction, apply UL-listed firestopping sealant in gaps between sleeves and enclosed conduits and cables in accordance with "Fire Resistant Joint Sealers" requirement of Section 07 92 00 – Joint Sealants.

F. Fastening: Unless otherwise indicated, fasten electrical items and their supporting hardware securely to the building structure, including but not limited to conduits, raceways, cables, cable trays, busways, cabinets, panelboards, transformers, boxes, disconnect switches, and control components in accordance with the following:

1. Fasten by means of wood screws or screw-type nails on wood, toggle bolts on hollow masonry units, concrete inserts or expansion bolts on concrete or solid masonry, and machine screws, welded threaded studs, or spring-tension clamps on steel. Threaded studs driven by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts and machine or wood screws. Do not weld conduit, pipe straps, or items other than threaded studs to steel structures. In partitions of light steel construction, use sheet metal screws.

2. All device boxes in sheetrock walls will be tight before, during and after installation of sheetrock.

G. Cutting and Patching: Obtain Engineer's approval before cutting and patching on structural members of building surfaces.

END OF SECTION 26 05 29

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 26 05 33 – RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways for electrical wiring. Types of raceways in this Section include only the following:

1. Electrical metallic tubing (EMT).
2. Flexible metal conduit.
3. Intermediate metal conduit.
4. Liquidtight flexible metal conduit.
5. Rigid metal conduit.
6. Rigid nonmetallic conduit.
7. Wireway.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers complying with the Quality Assurance requirements are acceptable.

2.2 METAL CONDUIT AND TUBING

A. Rigid Metal Conduit (RMC): ANSI C80.1.

B. Intermediate Metal Conduit (IMC): UL 1242.

C. Electrical Metallic Tubing (EMT) and Fittings: ANSI C80.3.

D. Electrical Nonmetallic Tubing (EMT): Is not allowed.

E. Flexible Metal Conduit: UL 1, zinc-coated steel.

F. Liquidtight Flexible Metal Conduit and Fittings: UL 360. Fittings shall be specifically approved for use with this raceway.

2.3 NONMETALLIC CONDUIT AND DUCTS

A. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, Schedule 80 PVC.

B. PVC Conduit and Tubing Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.

C. Liquidtight Flexible Nonmetallic Conduit and Fittings: UL 1660. Fittings shall be specifically approved for use with this raceway.

D. Conduit, Tubing, and Duct Accessories: Types, sizes, and materials complying with manufacturer's published product information. Mate and match accessories with raceway.

2.4 CONDUIT BODIES

A. General: Types, shapes, and sizes as required to suit individual applications and NEC requirements.

B. Provide matching gasketed covers secured with corrosion-resistant screws.

C. Metallic Conduit and Tubing: Use metallic conduit bodies. Use bodies with threaded hubs for threaded raceways.

2.5 WIREWAYS

A. General: Electrical wireways shall be of types, sizes, and number of channels as indicated. Fittings and accessories including but not limited to couplings, offsets, elbows, expansion joints, adapters, hold-down straps, and end caps shall match and mate with wireway as required for complete system.

B. Where features are not indicated, select to fulfill wiring requirements and comply with applicable provisions of NEC.

2.6 SURFACE RACEWAYS

A. General: Sizes and channels as indicated. Provide fittings that match and mate with raceway.

B. Surface Metal Raceway: Construct of galvanized steel with snap-on covers, with 1/8-inch mounting screw knockouts in base approximately 8 inches o.c. Finish with manufacturer's standard prime coating suitable for painting. Provide raceways of types suitable for each application required.

C. PVC coated rigid shall be provided in the areas that have process equipment, moisture or susceptible to moisture. Conditioned areas such as electrical room, office and restroom where conduit is concealed in the wall. EMT is acceptable.

PART 3 - EXECUTION

3.1 WIRING METHOD

A. Outdoors: Use the following wiring methods:

1. Exposed: Rigid metal conduit, elbows to be PVC coated RMC.

2. Concealed: Rigid metal conduit, elbows to be PVC coated RMC.

3. Underground: Rigid nonmetallic conduit (sched 80), elbows to be PVC coated RMC.

4. Indoors or Outdoors: Connection to vibrating equipment including transformers and hydraulic, pneumatic, or electric solenoid or motor-driven equipment in moist or humid location or corrosive atmosphere, or where subject to water spray or dripping oil, grease, or water: liquid tight flexible metal conduit.

B. Indoors: Use the following wiring methods:

1. Connection to Vibrating Equipment: Including transformers and hydraulic, pneumatic or electric solenoid or motor-operated equipment: flexible metal conduit.

2. Exposed: Electrical metallic tubing, rigid metal conduit.

3. Concealed: Electrical metallic tubing. AC/MC cable NOT ALLOWED.

4. Underslab: Sch 80 PVC.

3.2 INSTALLATION

A. General: Install electrical raceways in accordance with requirements of NEC, and as follows:

B. Conceal Conduit and EMT, unless indicated otherwise, within finished walls, ceilings, and floors. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot water pipes. Install raceways level and square and at proper elevations.

C. Elevation of Raceway: Where possible, install horizontal raceway runs above water and steam piping.

D. Complete installation of electrical raceways before starting installation of conductors within raceways.

E. Provide supports for raceways as specified in Specification Section 26 05 00 – Electrical, General.

F. Prevent foreign matter from entering raceways by using temporary closure protection.

G. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

H. Make bends and offsets so the inside diameter is not effectively reduced. Unless otherwise indicated, keep the legs of a bend in the same plane and the straight legs of offsets parallel.

I. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For rigid metal conduit and intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated. EMT set screw connectors and couplers are to be steel.

J. Run concealed raceways with a minimum of bends in the shortest practical distance considering the type of building construction and obstructions except as otherwise indicated. This does not apply to conduits in crawl spaces.

K. Raceways embedded in slabs: Not allowed without engineering approval.

L. Install exposed raceways parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical.

M. Run exposed, parallel, or banked raceways together.

N. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Make raceway terminations tight. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

O. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminations cannot be made secure with one locknut, use two locknuts, one inside and one outside the box.

P. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box, and tighten the chase nipple so no threads are exposed.

Q. Install pull wires in empty raceways. Use monofilament plastic line having not less than 200 lb tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

R. Communication and Signal System Raceways 2 Inch Trade Size and Smaller: In addition to the above requirements, install raceways 2 inch and smaller trade size in maximum lengths at 150 feet and with a maximum of two, 90 deg bends or equivalent. Install pull or junction boxes where necessary to comply with these requirements.

S. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this contract, install screwdriver operated threaded flush plugs flush with floor.

T. Flexible Connections: Use short length (maximum of 6 ft.) of flexible conduit for recessed and semi-recessed lighting fixtures, for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquid tight flexible conduit in wet locations. Install separate ground conductor across flexible connections.

U. Surface Metal Raceway: Install a separate green ground conductor in raceway from the junction box supplying the raceway to receptacle or fixture ground terminals.

V. Raceway Installed Above Accessible Ceilings: Raceway located above accessible ceilings shall be a minimum of 24 inches above finished ceiling or mounted direct to structure, whichever is less.

3.3 ADJUSTING AND CLEANING

A. Upon completion of installation of raceways, inspect interiors of raceways; clear all blockages and remove burrs, dirt, and construction debris.

END OF SECTION 26 05 33

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 26 05 33.16 – CABINETS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes cabinets, boxes, and fittings for electrical installations and certain types of electrical fittings not covered in other Sections. Types of products specified in this Section include:

1. Outlet and device boxes.

2. Pull and junction boxes.

3. Cabinets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers complying with the Quality Assurance requirements are acceptable.

2.2 CABINETS, BOXES, AND FITTINGS, GENERAL

A. Electrical Cabinets, Boxes, and Fittings: Of indicated types, sizes, and NEMA enclosure classes. Where not indicated, provide units of types, sizes, and classes appropriate for the use and location. Provide all items complete with covers and accessories required for the intended use. Provide gaskets for units in damp or wet locations.

2.3 MATERIALS AND FINISHES

A. Sheet Steel: Flat-rolled, code-gage, galvanized steel.

B. Fasteners for General Use: Corrosion resistant screws and hardware including cadmium and zinc plated items.

C. Fasteners for Damp or Wet Locations: Stainless steel screws and hardware.

D. Exterior Finish: Gray baked enamel for items exposed in finished locations except as otherwise indicated.

E. Painted Interior Finish: Where indicated, white baked enamel.

F. Fittings for Boxes, Cabinets, and Enclosures: Conform to UL 514B. Zinc plated steel for conduit hubs, bushings, box connectors and couplers. Set screw type. Use insulated throat connectors.

2.4 METAL OUTLET, DEVICE, AND SMALL WIRING BOXES

A. General: Conform to UL 514A, "Metallic Outlet Boxes, Electrical," and UL 514B, "Fittings for Conduit and Outlet Boxes." Boxes shall be of type, shape, size, and depth to suit each location and application. Minimum size 4 inch square x 2-1/8 inch deep.

B. Steel Boxes: Conform to NEMA OS 1, "Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports." Boxes shall be sheet steel with stamped knockouts, threaded screw holes and accessories suitable for each location including mounting brackets and straps, cable clamps, exterior rings and fixture studs.

2.5 PULL AND JUNCTION BOXES

A. General: Comply with UL 50, "Electrical Cabinets and Boxes", for boxes over 100 cubic inches volume. Boxes shall have screwed or bolted on covers of material same as box and shall be of size and shape to suit application.

B. Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing.

C. Hot-Dipped Galvanized Steel Boxes: Sheet steel with welded seams. Where necessary to provide a rigid assembly, construct with internal structural steel bracing. Hot-dip galvanized after fabrication. Cover shall be gasketed.

2.6 CABINETS

A. Comply with UL 50, "Electrical Cabinets and Boxes."

B. Construction: Sheet steel, NEMA 12 class except as otherwise indicated. Cabinet shall consist of a box and a front consisting of a one piece frame and a hinged door. Arrange door to close against a rabbet placed all around the inside edge of the frame, with a uniformly close fit between door and frame. Provide concealed fasteners, not over 24 inches apart, to hold fronts to cabinet boxes and provide for adjustment. Provide flush or concealed door hinges not over 24 inches apart and not over 6 inches from top and bottom of door. For flush cabinets, make the front approximately 3/4-inch larger than the box all around. For surface mounted cabinets make front same height and width as box.

C. Doors: Double doors for cabinets wider than 24 inches. Telephone cabinets wider than 48-inches may have sliding or removable doors.

D. Locks: Combination spring catch and key lock, with all locks for cabinets of the same system keyed alike. Locks may be omitted on signal, power, and lighting cabinets located within wire closets and mechanical/electrical rooms. Locks shall be of a type to permit doors to latch closed without locking.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locations: Install items where indicated and where required to suit code requirements and installation conditions.

B. Cap unused knockout holes where blanks have been removed and plug unused conduit hubs.

C. Support and fasten items securely in accordance with Section 26 05 29 – Support Devices.

D. Sizes shall be adequate to meet NEC volume requirements, but in no case smaller than sizes indicated.

E. Remove sharp edges where they may come in contact with wiring or personnel.

3.2 INSTALLATION OF OUTLET BOXES

A. Gasketed Boxes: At the following locations use cast metal, threaded hub type boxes with gasketed weatherproof covers:

1. Exterior locations.

2. Where surface mounted on unfinished walls, columns or pilasters. (Cover gaskets may be omitted in dry locations).

3. Where exposed to moisture laden atmosphere.

4. Where indicated.

B. Mounting: Mount outlet boxes for switches and receptacles with the long axis vertical or as indicated. Three or more gang boxes shall be mounted with the long axis horizontal. Locate box covers or device plates so they will not span different types of building finishes either vertically or horizontally. Locate boxes for switches near doors on the side opposite the hinges and close to door trim, even though electrical floor plans may show them on hinge side.

C. Ceiling Outlets: For fixtures, where wiring is concealed, use outlet boxes 4 inches square by 2-1/8 inches deep minimum.

D. Cover Plates for Surface Boxes: Use plates sized to box front without overlap.

E. Protect outlet boxes to prevent entrance of plaster, and debris. Thoroughly clean foreign material from boxes before conductors are installed.

F. Concrete Boxes: Use extra deep boxes to permit side conduit entrance without interfering with reinforcing, but do not use such boxes with over 6 inch depth.

G. Do not install boxes back-to-back.

H. Provide hazardous location rated boxes where required.

3.3 INSTALLATION OF PULL AND JUNCTION BOXES

A. Mount pull boxes in inaccessible ceilings with the covers flush with the finished ceiling.

B. Size: Provide pull and junction boxes for telephone, signal, and other systems at least 50 percent larger than would be required by Article 370 of NEC, or as indicated. Locate boxes strategically and provide shapes to permit easy pulling of future wires or cables of types normal for such systems.

3.4 INSTALLATION OF CABINETS AND HINGED DOOR ENCLOSURES

A. Mount with fronts straight and plumb.

B. Install with tops 78 inches above floor.

C. Set cabinets in finished spaces flush with walls.

3.5 GROUNDING

A. Electrically ground metallic cabinets, boxes, and enclosures. Where wiring to item includes a grounding conductor, provide a grounding terminal in the interior of the cabinet, box or enclosure.

3.6 CLEANING AND FINISH REPAIR

A. Upon completion of installation, inspect components. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, abrasions and weld marks.

B. Galvanized Finish: Repair damage using a zinc-rich paint recommended by the tray manufacturer.

C. Painted Finish: Repair damage using matching corrosion inhibiting touch-up coating.

END OF SECTION 26 05 33.16

SECTION 26 21 00 - SERVICE ENTRANCE

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Coordinate existing incoming power service with Kootenai Electric Cooperative Utility. Kootenai Electric Cooperative Utility contact is Bob Jacobson (208) 292-3218.

B. Verify exact location of service feeds and transformers with Kootenai Electric Cooperative Utility. Existing service to be maintained. Any and all power shut downs shall be scheduled and coordinated with the owner and related trades.

PART 2 - PRODUCTS NOT USED

PART 3 - EXECUTION

3.1 GENERAL

A. Install, modify or demolish service-entrance equipment as indicated on the plans. New equipment to be installed, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that service-entrance equipment fulfills requirements. Comply with applicable installation requirements of NEC, UL, ANSI, IEEE, and NEMA standards.

B. Tighten electrical connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque-tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Standards 486A and B, and the NEC.

END OF SECTION 26 21 00

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 26 22 00 – LOW VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:

1. Distribution transformers.

2. Control and signal transformers.

1.3 SUBMITTALS

A. Product Data Include rated nameplate data, capacities, weights, dimensions, minimum clearances, installed devices and features, and performance for each type and size of transformer indicated.

B. Shop Drawings: Wiring and connection diagrams.

C. Source quality-control test reports.

D. Output Settings Reports: Record of tap adjustments specified in Part 3.

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 IEEE C 57.12.91.

C. Energy-Efficient Transformers Rated 15 kVA and Larger: Certified as meeting NEMA TP 1, Class 1 efficiency levels when tested according to NEMA TP 2.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Temporary Heating: Apply temporary heat according to manufacturer's written instructions within the enclosure of each ventilated-type unit, throughout periods during which equipment is not energized and when transformer is not in a space that is continuously under normal control of temperature and humidity.

1.6 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified Section 26 05 00 – Electrical, General.

B. Coordinate installation of wall-mounting and structure-hanging supports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton

2. Siemens.

3. GE Electrical Distribution & Control.

4. Square D/Group Schneider NA.

2.2 MATERIALS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices, except for taps.

1. Internal Coil Connections: Brazed or pressure type.

2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Cores: One leg per phase.

C. Enclosure: Ventilated, NEMA 250, Type 2.

D. Indoor Transformer Enclosure Finish: Comply with NEMA 250 for "Indoor Corrosion Protection."

1. Finish Color: Gray.

E. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.

F. Taps for Transformers Smaller Than 3 kVA: None.

G. Taps for Transformers 7.5 to 24 kVA: Two 5 percent taps below rated voltage.

H. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity.

I. Low-Sound-Level Requirements: Minimum of 3 dBA less than NEMA ST 20 standard sound levels when factory tested according to IEEE C57.12.91.

2.4 CONTROL AND SIGNAL TRANSFORMERS

A. Description: Self-cooled, two-winding dry type, rated for continuous duty, complying with NEMA ST 1, and listed and labeled as complying with UL 506.

B. Ratings: Continuous duty. If rating is not indicated, provide at least 50 percent spare capacity above connected peak load.

2.5 SOURCE QUALITY CONTROL

A. Test and inspect transformers according to IEEE C57.12.91.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for each transformer.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's written instructions.

C. Examine walls and floors for suitable mounting conditions where transformers will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install floor-mounting transformers level on concrete bases. Construct concrete bases of dimensions not less than 4 inches larger in both directions than supported unit and 4 inches high.

1. Anchor transformers to concrete bases according to manufacturer's written instructions, seismic codes at Project, and requirements in Section 26 05 00 – General, Electrical.

3.3 CONNECTIONS

A. Ground equipment according to Section 26 05 26 – Grounding and Bonding.

B. Connect wiring according to Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.

C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 ADJUSTING

A. Record transformer secondary voltage at each unit for at least 48 hours of typical occupancy period. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 5 percent. Submit recording and tap settings as test results.

B. Output Settings Report: Prepare a written report recording output voltages and tap settings.

END OF SECTION 26 22 00

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes load centers and panelboards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:

1. Branch-circuit panelboards.

2. Distribution panelboards.

1.3 SUBMITTALS

A. Product Data: For each type of panelboard, overcurrent protective device, TVSS device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:

a. Enclosure types and details for types other than NEMA 250, Type 1.

b. Bus configuration, current, and voltage ratings.

c. Short-circuit current rating of panelboards and overcurrent protective devices.

d. UL listing.

e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

C. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing. Scheduling shall be typewritten indicating loads served by each breaker.

D. Maintenance Data: For panelboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Section 01 78 23 – Operation and Maintenance Data, include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

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 NEMA PB 1.

C. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.6 EXTRA MATERIALS

A. Keys: Six spares of each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:

a. General Electric Co.; Electrical Distribution & Control Div.

b. Siemens Energy & Automation, Inc.

c. Square D Co.

d. Eaton

2.2 FABRICATION AND FEATURES

A. Enclosures: Flush or Surface mounted cabinets as indicated. NEMA PB 1, Type 1, to meet environmental conditions at installed location.

1. Outdoor Locations: NEMA 250, Type 3R.

2. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

B. Front: Secured to box with piano hinged door in door trim. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

D. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

E. Bus: Copper.

F. Main and Neutral Lugs: Compression type suitable for use with conductor material.

G. Equipment Ground Bus: Copper only Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

H. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

I. Gutter Barrier: Arrange to isolate individual panel sections.

J. Feed-through Lugs: Compression type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

2.3 PANELBOARD SHORT-CIRCUIT RATING

A. Fully rated to interrupt symmetrical short-circuit current available at terminals, unless otherwise stated. Series rating not allowed.

2.4 LOAD CENTERS - NOT ALLOWED.

2.5 BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.6 DISTRIBUTION PANELBOARDS

A. Doors: Front mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike.

B. Main Overcurrent Protective Devices: Circuit breaker.

C. Branch overcurrent protective devices shall be one of the following:

1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.

B. Mounting Heights: Top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.

D. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

E. Install filler plates in unused spaces.

F. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 26 05 00 – Electrical, General.

B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

3.3 CONNECTIONS

A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, section 7.5 for switches and section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

B. Balancing loads between phases such that difference is below 20 percent.

3.5 ADJUSTING

A. Set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 24 16

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes receptacles, connectors, switches, and finish plates.

1.3 DEFINITIONS

A. GFCI: Ground-fault circuit interrupter.

B. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Product Data: For each product specified.

B. Shop Drawings: Legends for receptacles and switch plates.

C. Maintenance Data: For materials and products to include in maintenance manuals specified in Division 1.

1.5 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.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for provided by others Equipment: Match plug configurations.

1. Cord and Plug Sets: Match equipment requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Wiring Devices:

    a. Cooper Wiring Devices

    b. Hubbell, Inc.; Wiring Devices Div.

    c. Leviton Manufacturing Co., Inc.

    d. Pass & Seymour/Legrand; Wiring Devices Div.

2.2 RECEPTACLES

A. Straight-Blade and Locking Receptacles: Industrial grade Leviton 5362 or equal.

B. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle. Do not connect downstream receptacles to load side of GFCI. Design units for installation in a 2-3/4-inch-deep outlet box without an adapter.

2.3 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

2.4 SWITCHES

A. Toggle Switches: Commercial-duty, quiet type.

1. Single Pole Switch: 20 A, 120/277-V AC. Leviton CSB 120 or approved equal.

2. 3-Way Switch: 20A 120/277-V AC: Leviton CSB 320 or approved equal.

2.5 WALL PLATES

A. Single and combination types match corresponding wiring devices. Provide the following wall plate types:

1. Finished Spaces: Nylon/Lexan - White (Emergency receptacle and switch plates shall be red in color and be engraved with the label “Emergency” and be labeled with the panel circuit number).

2. Unfinished spaces: Galvanized steel (Emergency receptacle and switch plates shall be red in color and be engraved with the label “Emergency” and be labeled with the panel circuit number).

3. Exterior non-continuous use: Die cast aluminum or impact resistant thermoplastic with spring loaded flip cover and weather-resistant gasket.

4. Exterior continuous use: Die cast aluminum or impact resistant thermoplastic with 3-1/2” deep “in-use” flip cover and weather-resistant gasket.

2.6 FINISHES

A. Color: White, unless otherwise indicated or required by Code.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies plumb and secure.

B. Install wall plates when painting is complete.

C. Install wall dimmers to achieve indicated rating after derating for ganging as instructed by manufacturer.

D. Do not share neutral conductor on load side of dimmers.

E. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

F. Protect devices and assemblies during painting.

G. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

3.2 IDENTIFICATION

A. Comply with Section 26 05 00 – Electrical, General.

3.3 CONNECTIONS

A. Connect wiring device grounding terminal to outlet box with bonding jumper.

B. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

C. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

D. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Check TVSS receptacle indicating lights for normal indication.

B. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

C. Replace damaged or defective components.

END OF SECTION 26 27 26

SECTION 26 28 00 - OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes overcurrent protective devices (OCPDs) rated 600 V and below and switching devices commonly used with them.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Product data for fuses, fusible switches, circuit breakers, and OCPD accessories specified in this Section, including descriptive data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Cartridge Fuses:
    a. Bussmann Div., Cooper Industries, Inc.
    b. Gould Inc.
    c. Littelfuse Inc.
2. Fusible Switches:
    a. General Electric Co.
    b. Square D Co.
    c. Siemens
    d. Eaton
3. Molded-Case Circuit Breakers:
    a. General Electric Co.
    b. Square D Co.
    c. Siemens

d. Eaton

4. Combination Circuit Breaker and Ground Fault Circuit Interrupters:

a. General Electric Co.

b. Square D Co.

c. Siemens

d. Eaton

5. Molded-Case Circuit Breakers With Solid-State Trip Devices:

a. General Electric Co.

b. Square D Co.

c. Siemens

d. Eaton

2.2 OVERCURRENT PROTECTIVE DEVICES (OCPD'S), GENERAL

A. General: Provide OCPD's in indicated types, as integral components of panelboards, switchboards, and also as individually enclosed and mounted single units.

B. Enclosures: NEMA 250 "Enclosures for Electrical Equipment (1,000 Volts Maximum)."

2.3 CARTRIDGE FUSES

A. General: NEMA Standard FU1, "Low-Voltage Cartridge Fuses." Unless indicated otherwise, provide nonrenewable cartridge fuses of indicated types, classes, and current ratings that have voltage ratings consistent with the circuits on which used.

B. Class RK1 and RK5 Dual Element Time-Delay Fuses: UL 198E, "Class R Fuses."

2.4 FUSIBLE SWITCHES

A. General: UL 98 "Enclosed and Dead Front Switches" and NEMA KS 1 "Enclosed Switches," quick-make, quick-break heavy-duty units.

B. Rating: Load-breaking capacity in excess of the normal horsepower rating for the switch.

C. Withstand Capability: In excess of the let-through current permitted by its fuse when subject to faults up to 100,000 RMS symmetrical amperes.

D. Operation: By means of external handle.

E. Interlock: Prevents access to switch interior except when in "off" position.

F. Fuse Clips: Rejection type.

G. Padlocking Provisions: For 2 padlocks, whether open or closed.

H. Enclosure for Independent Mounting: NEMA Type 1 enclosure except as otherwise indicated or required to suit environment where located.

2.5 MOLDED-CASE CIRCUIT BREAKERS

A. General: UL 489, "Molded Case Circuit Breakers and Circuit Breaker Enclosures," and NEMA AB 1, "Molded Case Circuit Breakers."

B. Construction: Bolt-in type, except breakers 225-ampere frame size and larger may be plug-in type if held in place by positive locking device requiring mechanical release for removal.

C. Characteristics: Indicated frame size, trip rating, number of poles, and a short-circuit interrupting capacity rating of 10,000 amperes symmetrical, unless a greater rating as indicated.

D. Tripping Device: Quick-make, quick-break toggle mechanism with inverse-time delay and instantaneous overcurrent trip protection for each pole.

E. Adjustable Instantaneous Trip Devices: Factory adjusted to low-trip-setting current values.

F. Enclosure for Independent Mounting: NEMA Type 1 enclosure, except as otherwise indicated or required to suit environment where located.

G. Combination Circuit Breakers and Ground Fault Circuit Interrupters: UL 943 "Ground Fault Circuit Interrupters," arranged for sensing and tripping for ground fault current in addition to overcurrent and short-circuit current. Provide features as follows:

1. Match features and module size of panelboard breakers and provide clear identification of ground fault trip function.

2. Trip Setting for Ground Fault: 30 milliamperes.

2.6 OCPD ACCESSORIES

A. Shunt-Trip Devices for Circuit Breakers: Where indicated, arrange to trip breaker from an external source of power through a control switch or relay contacts.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Independently Mounted OCPD's: Locate as indicated and install in accordance with manufacturer's written installation instructions.

B. OCPD's in distribution equipment shall be factory installed.

3.2 CONNECTIONS

A. Check connectors, terminals, bus joints, and mountings for tightness. Tighten field-connected connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL 486A and UL 486B.

3.3 GROUNDING

A. Provide equipment grounding connections for individually mounted OCPD units as indicated and as required by NEC. Tighten connectors to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounding.

3.4 FIELD QUALITY CONTROL

A. Visual and mechanical inspection: Include the following inspections and related work.

1. Overcurrent-Protective-Device Ratings and Settings: Verify indicated ratings and settings to be appropriate for final system arrangement and parameters. Where discrepancies are found, test organization shall recommend final protective device ratings and settings. Use accepted revised ratings or settings to make the final system adjustments.

2. Inspect for defects and physical damage, NRTL labeling, and nameplate compliance with current single line diagram.

3. Exercise and perform operational tests of all mechanical components and other operable devices in accordance with manufacturer's instruction manual.

4. Check tightness of electrical connections of OCPD's with calibrated torque wrench. Refer to manufacturer's instructions for proper torque values.

5. Clean OCPD's using manufacturer's approved methods and materials.

B. Retest: Correct deficiencies identified by tests and observations and provide retesting of OCPD's. Verify by the system tests that specified requirements are met.

3.5 CLEANING

A. Upon completion of installation, inspect OCPD's. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION 26 28 00

SECTION 26 32 13 – ENGINE GENERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Extent of engine generator set work is indicated by drawings and is hereby defined to include, but not by way of limitation, engines, electrical generators, engine starting systems including batteries, instrument control panel, transfer switches, annunciator panel, exhaust silencer, and accessories required for a complete generator installation.

B. Generator set required for the project is a diesel engine-driven unit.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on engine-driven generator sets and components. Submit wiring diagrams for engine-driven generator units showing connections to electrical power panels, feeders, automatic transfer switches, and ancillary equipment. Differentiate between portions of wiring that are manufacturer-installed and portions that are field-installed.

B. Maintenance data for materials and products, for inclusion in Operating and Maintenance Manual specified in Section 26 05 00 – Electrical, General. Include complete Operations and Maintenance Manual, Illustrated Parts List and Maintenance Schedule.

C. Certifications: Provide engine-driven generator sets certified test record of the following final production testing:

1. Single-step load pickup.

2. Transient and steady state governing. The generator will serve loads controlled by VFD’s. Manufacturer shall take appropriate measures. Refer to drawings for loads served.

3. Safety shutdown device testing.

4. Voltage regulation.

5. Rated power.

6. Maximum power.

D. Provide certified test record prior to engine-driven generator set being shipped from factory to project location.

E. Unit Responsibility: The complete standby emergency generator systems are to be tested under full load conditions, as a unit, before being shipped to the job site from factory. Installation and hook-up to be under direct supervision of factory trained personnel.

F. The automatic transfer control shall be supplied per Specification Section 26 36 00 – Transfer Switches and integrated with the engine-generator.

G. Generator support shall be a factory authorized service center located within a 200 mile radius of the project site.

1.3 DELIVERY, STORAGE AND HANDLING

A. Deliver engine-driven generator properly packaged and mounted on pallets, or skids to facilitate handling of heavy items. Utilize factory-fabricated type containers or wrappings for engine-generator and components that protect equipment from damage.

B. Store engine-driven generator equipment in original packaging and protect from weather and construction traffic. Wherever possible, store indoors; where necessary to store outdoors, store above grade and enclose with watertight wrapping.

C. Handle engine-driven generator equipment carefully to prevent physical damage to equipment and components. Do not install damaged equipment; remove from site and replace damaged equipment with new.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering diesel generator sets which may be incorporated in the Work include the following:

1. Caterpillar Tractor Co.

2. Cummins Corp.

B. Generator Sets

1. General: Except as otherwise indicated, provide manufacturer's standard engine-driven generator sets and auxiliary equipment as indicated by published product information, and as required for a complete installation.

2. Engine-Driven Generator: Provide packaged electrical power engine-driven generator assembly unit rated as indicated on drawings, at a governed speed of 1800 RPM, and rated 80 percent power factor for continuous operation, 480/277 volt, 3-phase, 4-wire, 60 Hz, at installed altitude (verify altitude), at 110 deg. F. Equip generator with a turbo-charged, 1800 RPM, engine, and fueled as noted; liquid cooled. Engine shall meet all EPA Tier level requirements at time engine is manufactured. Provide unit-mounted radiator, blower fan, water pump, and thermostat. Connect engine drive directly to 4-pole revolving-field type single, maintenance-free, bearing generator through semi-flexible steel disk coupling; equip set with associated control equipment to automatically start engine, transfer load to standby power upon failure of normal power source, transfer load back to normal power upon its restoration, and stop engine. Actual temperature rise measured by resistance method at full load shall not exceed 125 degrees Centigrade. Cushion-mount engine-generator on heavy steel base with spring type vibration isolators to reduce possibility of torsional vibration. Provide water-cooled type engine with unit-mounted radiator. Equip engine with low-oil pressure, high-water temperature, and automatic overspeed safety shutdown devices. Equip generator with exciter and voltage regulator to maintain voltage within 2 percent of rated value. Direct-connect generator to fly wheel by semi-flexible steel disk coupling. Provide unit capable of voltage recovery, within regulated range, of 7 seconds following sudden load increase from 0 to 100 percent of rated load, and with voltage dip not to exceed 35 percent upon application of rated load at rated power factor. Construct unit in compliance with applicable standards; and with additional construction features as indicated:

   a. Motor Starting Accessories: The generator will be used to feed motor loads that are controlled via variable frequency drives. Provide items for improved motor starting and generator regulation such as permanent magnet generator end, electronic governor, voltage regulators, etc..

   b. Starting System: Provide engine-generator units with 24-volt, 3-wire, negative ground, starting systems including 24-volt positive engagement solenoid shift-starting motors, batteries and 35-ampere, or greater, automatic battery charging alternators with solid-state voltage regulation.

   c. Instrument Control Panel: Provide engine-generator units with engine oil-pressure and water-temperature indicators, battery charge-rate ammeter, START - STOP switch for manual operation of unit, reset circuit breaker, static voltage regulator, voltage-adjusting rheostat, voltmeter, ammeter with phase selector switch with an OFF position, and with running time indicator and frequency meters. Select type circuitry of plug-in design capable of quick replacement, and of accepting a plug-in device that allows maintenance to test control panel performance without operating the engine.

   d. Controller: Provide a set mounted controller that complies with applicable NFPA standards. Controller shall provide all indicators, alarms, and monitoring functions that a Cummins Power Command Control 2100 provides per NFPA 110 level one requirement. Controller shall be accessible without the use of ladders, steps, etc.

2.2 ENGINE-GENERATOR SET ACCESSORIES

A. Provide factory-fabricated automatic load-transfer switch control, mated to generator to automatically start generator unit when line voltage drops to 70 percent normal value, transfer load to generator, and transfer load back to normal source when voltage is restored to 90 percent normal, and when line voltage reaches 115% rated voltage, restoring at 100% rated voltage. Equip electrically operated, mechanically held, and electrically and mechanically interlocked, transfer switch with limiter that opens starting circuit after 45 seconds when engine fails to start. Also provide time-delay features to prevent excessive transfer and retransfer operation during momentary line voltage dips, load retransfer, and engine shutdown. Equip unit with indicator for starting, test switch for manual simulation of power outages including standby unit operation and load transfer, and time-clock exerciser circuit for automatic periodic exercise under load of engine-generator unit. Provide 120V control circuit for control of louvers. Provide service rated main circuit breaker mated to generator. Breaker shall be accessible without the use of ladders, steps, etc.

B. Provide battery rack, battery warmers, battery cables, 12-volt battery(ies) capable of delivering the minimum cold-cranking amps required at zero degrees Fahrenheit per SAE Standard J-537.

C. Provide gas proof, seamless, stainless steel, flexible exhaust connector.

D. Provide flexible fuel line(s) rated 300 degrees F and 100 PSI ending in pipe thread.

E. Provide engine exhaust silencer, coated to be temperature and rust resistant, rated for critical applications 35dB reduction. Exhaust silencer to be housed inside of weatherproof enclosure.

F. Provide block heater of proper wattage and voltage, thermostatically controlled to maintain engine coolant at 90 degrees Fahrenheit (32 degrees Celsius). The block heater shall be installed with shut-off valves for maintenance. Valves to be field installed.

G. Provide 10-ampere automatic float and equalize battery charger with +/- 1% constant voltage regulation from no load to full load over +/- 10% AC input line variation, current limited during engine cranking and short circuit conditions, temperature compensated for ambients from -40 degrees C to +60 degrees C, 5% accurate voltmeter and ammeter, fused, reverse polarity and transient protected.

H. Provide a U.L. 142 label double wall sub base fuel tank of adequate capacity to operate generator 24 hours at full load. Tank shall be of steel construction and installed under the generator. Provide Sub Base Tank to include C Channel or I beam welded beneath the tank spaced 40 inches apart to accept neoprene pads between support beams and concrete floor. Tank shall be equipped with normal and emergency venting. Provide all necessary piping for a complete venting system. Venting shall comply with applicable requirements of IFC. Tank openings and overflow protection shall comply with IFC. Tank to be equipped with supply/return lines installed to engine, low fuel level switch, leak detection, and tank heater. Install tank and accessories per applicable codes, standards, and manufacturers requirements.

I. Provide U.L listed weatherproof sound attenuated (79dB at 23 feet) housing. Housing to be finished inside and out with a rust-inhibiting primer, and then a top coat paint. Side panels to be removable for maintenance and lockable. Provide necessary louvers and exhaust silencer connections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions under which diesel engine-driven generator units are to be installed and notify Contractor in writing of conditions detrimental to proper completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 INSTALLATION OF DIESEL ENGINE-DRIVEN GENERATOR SETS

A. Install engine-driven generator unit as indicated, in accordance with the equipment manufacturer's written instructions, and with recognized industry practices, to ensure that engine-generator unit fulfills requirements. Comply with NFPA and NEMA standards pertaining to installation of engine-generator sets and accessories.

B. Coordinate with other work, including raceways, electrical boxes and fittings, fuel tanks, piping and accessories, as necessary to interface installation of engine-generator equipment work with other work.

C. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminals to comply with tightening torques specified in UL Stds 486A, B and the National Electrical Code.

D. Align shafts of engine and generator within tolerances recommended by engine-generator unit manufacturer.

E. Contractor to fill tank prior to testing.

3.3 GROUNDING

A. Provide equipment grounding connections for diesel engine-driven generator units as indicated. Tighten connections to comply with tightening torques specified in UL Std 486A to assure permanent and effective grounding.

3.4 FIELD QUALITY CONTROL

A. Start-up Testing

1. Engage local equipment manufacturer's representative to perform start-up and load tests upon completion of installation, with the Engineer in attendance; provide certified test record. Tests are to include the following:

a. Check fuel, lubricating oil, and antifreeze in liquid cooled models for conformity to the manufacturer's recommendations under environmental conditions present.

b. Test, prior to cranking engine for proper operation, accessories that normally function while the set is in a standby mode.

c. Check, during start-up test mode, for normal and emergency line-to-line voltage and phase rotation.

d. Test, by means of simulated power outage, automatic start-up by remote-automatic starting, transfer of load, and automatic shutdown. Prior to this test adjust, for proper system coordination, transfer switch timers. Monitor throughout the test, engine temperature, oil pressure, battery charge level, generator voltage, amperes, and frequency. All tests shall be conducted with generator under full (100%) load. Full load test shall be minimum 4 hours under full load.

2. Upon completion of installation demonstrate capability and compliance of system with requirements. Where possible, correct malfunctioning unit at site, then retest to demonstrate compliance; otherwise, remove and replace with new unit, and proceed with retesting. Initial testing and retesting to be at no cost to the Owner.

3. Upon completion of all tests and Owner acceptance, Contractor to top off fuel tank.

3.5 PERSONNEL TRAINING

A. Building Operating Personnel Training: Train the Owner's building personnel in procedures for starting-up, testing and operating diesel engine-driven generator sets. In addition, train the Owner's personnel in periodic maintenance of batteries.

END OF SECTION 26 32 13

SECTION 26 36 00 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces for the area/location installed.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1, Section 01 78 23 - Operation and Maintenance Data, include the following:

1. Features and operating sequences, both automatic and manual.

2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a 200 mile radius of project location.

B. Source Limitations: Obtain automatic transfer switches through one source from a single manufacturer.

C. 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.

D. Comply with NEMA ICS 1.

E. Comply with NFPA 70.

F. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Contactor Transfer Switches:

a. Caterpillar; Engine Div.

b. Emerson; ASCO Power Technologies, LP.

c. Onan/Cummins Power Generation; Industrial Business Group.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

B. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

C. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

D. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

E. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switch Action: Double throw; mechanically held in both directions.

2. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

F. Neutral Terminal: Solid and fully rated, unless otherwise indicated.

G. Heater: Equip switches exposed to outdoor temperatures and humidity, and other units indicated, with an internal heater. Provide thermostat within enclosure to control heater.

H. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable tape markers are specified in Division 16050 "Electrical Identification."

I. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated/required.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

B. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

C. Manual Switch Operation: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.

D. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.

E. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.

F. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase. Relay compares phase relationship and frequency difference between normal and emergency sources and initiates transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer is initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.

G. Motor Disconnect and Timing Relay: Controls designate starters so they disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters is through wiring external to automatic transfer switch. Time delay for reconnecting individual motor loads is adjustable between 1 and 60 seconds, and settings are as indicated. Relay contacts handling motor-control circuit inrush and seal currents are rated for actual currents to be encountered.

H. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.

2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.

3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.

5. Test Switch: Simulate normal-source failure.

6. Switch-Position Pilot Lights: Indicate source to which load is connected.

7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."

    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.

10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.

11. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.

    b. Push-button programming control with digital display of settings.

    c. Integral battery operation of time switch when normal control power is not available.

2.4 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details.

B. Identify components according to Division 26 05 00 "Electrical Identification."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to the Owner if necessary to accommodate required wiring.

B. Ground equipment according to Division 26 05 26 "Grounding and Bonding."

C. Connect wiring according to Division 26 05 19 "Low Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.

2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.

3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.

    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

    c. Verify that manual transfer warnings are properly placed.

    d. Perform manual transfer operation.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.

    b. Simulate loss of phase-to-ground voltage for each phase of normal source.

    c. Verify time-delay settings.

    d. Verify pickup and dropout voltages by data readout or inspection of control settings.

    e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.

    f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Remove and replace malfunctioning units and retest as specified above.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train the Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below.

B. Coordinate this training with that for generator equipment.

END OF SECTION 26 36 00

SECTION 26 51 19 – LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, LED light engines, LED drives, emergency lighting units, and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:

1. Dimensions of fixtures.

2. LED drivers.

3. LED light engine.

B. Maintenance Data: For lighting fixtures to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NFPA 70.

C. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Special Warranty for Batteries: Written warranty, executed by manufacturer agreeing to replace rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Special Warranty Period for Batteries: Manufacturer's standard, but not less than 5 years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for last nine years.

C. Special Warranties for LED Drivers: Written warranty, executed by manufacturer agreeing to replace LED drivers that fail in materials or workmanship within specified warranty period.

1. Special Warranty Period for LED Drivers: Five years form date of manufacture, but not less than four years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products indicated for each designation:

1. Light Fixtures: As indicated on Drawing fixture schedule.

2. LED Drivers: Compatible with LED light engine.

3. LED Light Engine: Per manufacturer on Drawing fixture schedule.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during maintenance and when secured in operating position.

D. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:

1. White Surfaces: 85 percent.

2. Specular Surfaces: 83 percent.

3. Diffusing Specular Surfaces: 75 percent.

4. Laminated Silver Metallized Film: 90 percent.

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.

2. Lens Thickness: 0.125-inch minimum, unless greater thickness is indicated.

2.3 LED DRIVERS

A. General Requirements: Unless otherwise indicated, features include the following:

1. Shall be electronic-type, labeled as compliant with radio frequency interference (RFI) requirements of FCC Title 47, Part 15.

2. Total Harmonic Distortion Rating: Less than 20 percent at all input voltages.

3. Sound Rating: A.

4. Minimum efficiency of 85%.

B. LED Drivers: Unless otherwise indicated, features include the following, besides those in "General Requirements" Paragraph above:

1. Dimmable drivers shall be 0-10V type.

2. Dimmable drivers shall be capable of dimming without LED flicker or strobing across their full dimming range.

2.4 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:

1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.

B. Internally Lighted Signs: As follows:

1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.

2.5 EMERGENCY LED POWER SUPPLY UNITS

A. Internal Type: Self-contained, modular, battery-inverter unit factory mounted within fixture body. Comply with UL 924.

1. Test Switch and Light-Emitting Diode Indicator Light: Visible and accessible without opening fixture or entering ceiling space. Test switch shall illuminate LEDs for minimum of 3 minutes when pushed momentarily.

2. Battery: Sealed, maintenance-free, nickel-cadmium type with minimum 5-year nominal life.

3. Charger: Fully automatic, solid-state, constant-current type.

4. Operation: Relay automatically energizes LEDs from unit when normal supply circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects LEDs, and battery is automatically recharged and floated on charger.

5. Lumen output: Minimum 700 lumens (LED).

2.6 LED LIGHT ENGINES

A. LED Color Temperature: 4000 K, unless otherwise indicated.

B. CCT tolerances are to be kept within a 3-step MacAdam ellipse and are to maintain a Min CRI of 80.

2.7 FIXTURE SUPPORT COMPONENTS

A. Comply with Section 26 05 00 –Electrical, General for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

F. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

2.8 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.

2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set units plumb, square, and level with ceiling and walls, and secure according to manufacturer’s written instructions and approved Shop Drawings. Support fixtures according to requirements of Section 26 05 00 –Electrical, General.

B. Support for Recessed and Semi-recessed Grid-type Fixtures:

1. Pendant-hung lighting fixtures shall be supported directly from the structure above using No. 9-gauge wire or an approved alternate support without using the ceiling suspension system for direct support.

2. Lighting fixtures weighing less than 56 pound shall have, in addition to the requirements outlined above, two No. 12 gauge hangers connected from the fixture housing to the structure above. These wires may be slack.

3. Lighting fixtures weighing 56 pound or more shall be supported directly from the structure above by approved hangers.

C. Support for Suspended Fixtures: Brace pendants and rods over 48 inches long to limit swinging. Support stem-mounted, single-unit, suspended fixtures with twin-stem hangers. For continuous rows, use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of chassis, including one at each end.

D. Surface-mounted lighting fixtures shall be attached to the ceiling system with positive clamping devices that completely surround the supporting members. Safety wires shall be attached between the clamping device and the adjacent ceiling hanger or to the structure above. In no case shall the fixture exceed the design carrying capacity of the supporting members.

3.2 CONNECTIONS

A. Ground equipment.

1. 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 467, UL 486A, and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Tests: As follows:

1. Verify normal operation of each fixture after installation.

2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.

3. Verify normal transfer to battery source and retransfer to normal.

C. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

D. Corrosive Fixtures: Replace during warranty period.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

B. Adjust amiable fixtures to provide required light intensities.

END OF SECTION 26 51 19

SECTION 26 56 19 – LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior lighting fixtures, LED light engines, LED drivers, emergency lighting units, poles standards, and accessories.

1.3 SUBMITTALS

A. General: Submit the following according to Conditions of Contract and Division 1 Specification Sections.

B. Product data describing fixtures, LED light engines, LED drivers, poles, and accessories. Arrange product data for fixtures in order of fixture designation. Include data on features, poles, accessories, and the following:

1. Outline Drawings of fixtures and poles indicating dimensions and principal features.

2. Electrical ratings and photometric data with certified results of laboratory tests.

C. Maintenance data for materials and products, for inclusion in Operating and Maintenance Manual specified in Division 1 and in Section 01 78 23 Include service bulletin(s).

1. Submit maintenance data and parts list for each roadway and parking area lighting fixture and accessory; including "trouble-shooting" maintenance guide. Include that data, product data, service bulletin(s), and illustrated parts list in a maintenance manual; in accordance with requirements of Division 1.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of exterior lighting units, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firms with at least 3 years of successful installation experience on projects with exterior lighting installation work similar to that required for this Project.

PART 2 - PRODUCTS

2.1 FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs and sharp edges and corners.

B. Sheet Metal Components: Corrosion-resistant aluminum, except as indicated. Form and support to prevent warping and sagging.

C. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed fixtures.

D. Doors, Frames, and Other Internal Access Provisions: Smooth operating, free from light leakage under operating conditions. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during maintenance and when secured in the operating position. Provide for door removal for cleaning or replacing lens. Arrange for door opening to disconnect driver or ballast.

E. Exposed Hardware Material: Stainless steel.

F. Reflecting Surfaces: Minimum reflectances as follows, except as otherwise indicated:

1. White Surfaces: 85 percent.

2. Specular Surfaces: 83 percent.

3. Diffusing Specular Surfaces: 75 percent.

G. Plastic Parts: Resistant to yellowing and other changes due to aging and exposure to heat and UV radiation.

H. Lenses and Refractors: Materials as indicated. Use heat-and aging-resistant, resilient gaskets to seal and cushion lens and refractor mounting in fixture doors.

I. Photoelectric Relay: UL 773.

1. Contact Relays: Single-throw, arranged to fail in the "on" position and factory set to turn light unit on at 1.5 to 3 footcandles and off at 4.5 to 10 footcandles with 15 seconds minimum time delay.

2. Relay Mounting: In fixture housing.

2.2 FIXTURE SUPPORT COMPONENTS

A. Mountings, Fastenings, and Appurtenances: Provide mountings that will correctly position the luminaire to provide the indicated light distribution.

2.3 LED LIGHT ENGINES

A. LED Color Temperature: 3500K, unless otherwise indicated.

B. CCT tolerances are to be kept within a 3-step MacAdam ellipse and are to maintain a Min CRI of 80.

2.4 FINISH

A. Metal Parts: Manufacturer's standard finish except as otherwise indicated. Finish applied over corrosion-resistant primer after fabrication, free of streaks, runs, holidays, stains, blisters, and similar defects. Remove poles, fixtures, and accessories showing evidence of corrosion or finish failure during Project warranty period and replace with new items.

B. Other Parts: Manufacturer's standard finish except as otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set units plumb, square, level, and secure according to manufacturer's written instructions and shop drawings.

B. Fixture Attachment: Fasten to indicated structural supports.

C. Fixture Attachment with Adjustable Features or Aiming: Attach fixtures and supports to allow aiming for indicated light distribution.

3.2 FIELD QUALITY CONTROL

A. Inspect installed units for damage.

B. Provide advance notice of dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: Verify normal operation of lighting units after installing fixtures and energizing circuits with normal power source. Include the following:

1. Check for flickering or strobing LED drivers.

2. Check for uniformity of illuminations.

E. Replace or repair damaged and malfunctioning units and retest.

3.3 ADJUSTING AND CLEANING

A. Clean components on completion of installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 26 56 19

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 28 31 11 – BUILDING INTRUSION DETECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Contractor shall provide intrusion detection devices, complete and operable, in accordance with the Contract Documents. The intrusion switch shall be magnetic or mechanical single point switch type mounted as recommended by the manufacturer's installation instructions for optimum accuracy.

B. This Section describes the requirements for intrusion switches.

1.2 REFERENCE STANDARDS

A. Commercial Standards

1. ISA – S 5.1 Instrumentation Symbols and Identification

1.3 SUBMITTALS

A. General: Follow the procedures specified in Section 01 33 00 – Submittal Procedures.

B. Each switch shall be identified with its equipment number as indicated. The following shall be included in the submittal for this Section:

1. Data Sheets and Catalog literature for the intrusion switches.

2. Connection diagrams for equipment wiring.

3. Material of construction, cable lengths and dimensional data.

C. Technical Manual: Furnish 5 identical copies of complete operation and maintenance instruction of all the intrusion switches including instrumentation and controls.

D. Spare Parts List: The Contractor shall furnish a list of manufacturer's recommended spare parts

1.4 SUBSTANTIAL COMPLETION

A. At Substantial Completion of Project, be ready to demonstrate that all intrusion switches are installed and operational.

1.5 QUALITY ASSURANCE

A. Accuracy Requirements: n/a

B. Warranties: After completion, the Contractor shall furnish to the Owner the manufacturer's written guarantees, that the switch will operate within the published accuracies and ranges and meet these specifications. The Contractor shall also furnish the manufacturer's warranties as published in its literature.

PART 2 - PRODUCTS

2.1 SCHEDULE

Tagname	Location
YS-A-107	ELEVATED TANK HATCH #1 INTRUSION
YS-A-108	ACCESS GATE INTRUSION
YS-A-109	ELEVATED TANK HATCH #2 INTRUSION
YS-B-107	ACCESS GATE INTRUSION
YS-B-108	STANDPIPE HATCH #1 INTRUSION
YS-B-109	STANDPIPE HATCH #2 INTRUSION
YS-C-109	ACCESS DOOR INTRUSION
YS-D-109	ACCESS DOOR INTRUSION
YS-H-109	ACCESS DOOR INTRUSION

2.2 GENERAL

A. Field adjustable mounting options shall be included.

2.3 INTRUSION SWITCH

A. The intrusion switch shall be magnetically activated.

B. Exterior applications will be NEMA 6P.

C. Miniature Size 1.5-inch x 5/8-inch, Heavy Duty extruded aluminum, Wide Gap 1-inch standard, 18-inch armored cable and lead. SPDT Type C Contact.

D. Contact shall open on door/hatch/gate open.

E. The intrusion switch shall be GRI 446X series, GE 2500 series or approved equal.

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall assemble and install all equipment specified herein, in strict accordance with the manufacturer's published instructions. All installations shall be accomplished by competent craftsman in a workmanlike manner.

3.2 INSTALLATION

A. Intrusion switches shall be mounted in such a way that it is free to operate without obstruction.

B. The intrusion switches shall be installed to prevent false alarms from door/hatch/gate vibrations due to wind when the door/hatch/gate is closed.

C. Wiring between intrusion switch and SCADA RTU shall use cable type and procedures as per the manufacturer's recommendations.

D. Final acceptance of the equipment is contingent on satisfactory operation after installation.

3.3 SPARE PARTS

A. One spare intrusion switch shall be provided to the Owner.

END OF SECTION 28 46 11.23

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 33 11 36 - SUBMERSIBLE CENTRIFUGAL WELL PUMPS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install one submersible centrifugal well pump, with column pipe, submersible electric motor, submersible pump cable, and appurtenant work, including controls and accessories necessary to provide a complete and operable well, as specified herein and as shown on the drawings.

B. Provide factory representative to certify installation and aid in start-up.

C. Provide testing and disinfection of well and pump assembly as specified below.

1.2 QUALITY ASSURANCE

A. Pump, motor and controls shall be coordinated by the Contractor to provide operable pumping systems as indicated by the drawings and specifications.

B. The motor horsepower shall not be exceeded when the pump is operating anywhere on its curve.

C. Manufacturers: Firms regularly engaged in manufacture of pumping equipment of types required, whose equipment has been in satisfactory use in similar service for not less than 10 years.

D. Warranty: The Contractor shall correct all defects in the pumping system upon notification from the Owner within one (1) year from the date of Substantial Completion. Corrections shall be completed within five (5) days after notification.

E. To ensure a properly integrated and compatible system, all equipment described in this Section shall be furnished by the Pump Manufacturer, who shall assume full responsibility for the proper operation of the pumps and associated equipment.

1. All of the pump components shall be by a single pump manufacturer. The pump assembly shall be assembled by the pump manufacturer at the manufacturer’s facility. Pump bowl and coating shall be NSF 61 & NSF 372 certified. Compliant pumps are not acceptable.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data, performance curves, materials of construction, pump outline drawing and installation instructions for the pump.

B. A Factory Non-Witnessed Certified Performance Test will be conducted at the factory. The results will be stamped by a factory licensed engineer and sent to engineers for approval. The pumping equipment will not ship from factory without the Engineer's approval. Performance Tests that are conducted outside of Manufacturer's factory facility will not be considered as equal and will not be accepted. The manufacturer shall have the ability to perform live witness testing via internet. Three sets of test results shall be provided to project engineer for approval prior to shipping of pump unit. The following characteristics shall be provided with test results referring to the following test items:

1. Pump Test to include:

   a. Minimum of 7 points to include: design, shut-off, and five points on curve

   b. Head capacity characteristics

   c. Flow in gallons per minute

   d. Velocity head and pipe friction losses

   e. Power input requirements throughout entire operating range of the pump

   f. Pump efficiency over entire operating range of pump

   g. Net positive suction head required (NPSHr)- (typical)

   h. Overall efficiency of the pumping unit, over a range from zero to 120 per cent of the rated pump

   i. Pump speed, size or type, impeller diameter

   j. All points resulting from the test and through which the curves are drawn shall be plainly indicated

Specific performance point should be considered approximate. Any "or-equal" pumps must be submitted to design engineer two weeks before bid date for pre-approval. Any submission after the two-week time period will be considered non-responsive.

C. Operation and Maintenance Manual: Submit operation and maintenance manual for the equipment. Manual shall include the following:

1. Operational procedures, troubleshooting, disassembly, reassembly, etc. Manufacturer-recommended procedures on the following shall be included:

2. Preventive maintenance procedures and recommended frequency.

3. Parts list accompanied with cross-sectional or exploded view drawings.

4. Wiring diagrams.

5. Approved shop drawings, including performance curves for pumps furnished.

6. Safety precautions for working on equipment.

7. Equipment warranties.

8. If manufacturer's standard brochures and manuals are used to describe operating and maintenance procedures, modify such brochures and manuals to reflect only the model or series of equipment used on this project and features provided. Cross out neatly or remove extraneous material, or otherwise annotate or eliminate.

1.4 DELIVERY AND STORAGE

A. All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt or dust, or other contaminants.

PART 2 - PRODUCTS

2.1 OPERATING CONDITIONS AND PERFORMANCE REQUIREMENTS

A. The pump will be installed in a well with a 12-inch steel casing and shall be capable of continuous or intermittent duty.

B. The well pump shall meet the following operational and dimensional requirements:

1. | | |
|---|---|
| Pump capacity | 400 gpm |
| Total Dynamic Head | 510 feet |
| Minimum bowl efficiency at design point | 75% |
| Maximum motor horsepower | 100HP |
| Maximum motor and pump speed | 3600 rpm |

(Values are for pump curve selection not specific operating data.)

2. Length of pump column shall be appropriate to set the centerline of the pump's impeller at a depth of approximately 400 feet.

2.2 PUMP CONSTRUCTION

A. General: Pump shall be multi-stage, submersible type pump. Pump and motor to be installed inside existing 12-inch casing.

B. Bowl: Bowl assembly shall include pump bowls, impellers, shaft and bearings. Bowls shall be constructed from closed grained cast iron conforming to ASTM A48 with water passages glassed for maximum efficiency and abrasion resistance. Bowls shall have integrally-cast vanes. Bowls shall have replaceable bronze or zero nominal lead content brass wear rings at the impeller/bowl seal. The pump shall be fitted with bronze bismuth alloy B584 or bronze alloy C89835 sleeve type bearings at each bowl. A discharge bowl shall connect the pump to the discharge pipe. A bronze bearing packed with non-soluble grease shall be located at the top bowl and extend into the discharge bowl. The discharge bearing shall be protected by a threaded cast iron cap. Upthrust from the impeller shall be resisted by a thrust ring above the top impeller. Bowls exterior shall be coated with min. 8 mils Tnemec or carboline CARBOGUARD 891 VOC.

C. Impellers: Impellers shall be AISI 316 stainless steel NSF certified. Impellers shall have replaceable bronze or zero nominal lead content brass wear rings. Impellers shall be both statically and dynamically balanced. Impellers shall be fastened to the pump shaft with C1018 or A108 carbon steel taper locks or keys.

D. Shaft: Shaft shall be stainless steel made of A582M grade 416 AISI alloy NSF certified. The shaft construction shall not use keyways nor stepped diameters within the bowl assembly. The horsepower rating, machining and straightness of the shaft shall conform to ANSI B58.1 standards.

E. Motor Adapter: The motor adapter shall be ASTM A536 Gr. 65-45-12 or Gr. 60-40-18 ductile iron with a bronze bearing. The inlet shall have a 304 stainless steel screen.

F. Coupling: The shaft coupling to the motor shall be 316 or 416 stainless steel capable of withstanding the total thrust and torque of the pump assembly.

G. Submersible Cable: The cable to the motor shall have three separate conductors and a ground and be enclosed in a single continuous jacket assembly. The size of the conductors shall be copper #2 AWG. The cable shall be a full-length cable without splices from the motor to the electric splice box above ground.

H. Cooling Shroud: Provide a PVC or 316SS shroud over the motor to direct water being pumped from below the motor and over the motor to the suction of the pump. The inside diameter of the shroud shall be of adequate size to provide proper cooling for the motor. Flow calculations will be provided to the design engineer for review. Calculations will show velocity of water moving past the motor. Velocity must be greater than .5 ft/sec and lower than 10 ft/sec. Calculations will be reviewed and approved by design engineer before pump and motor are placed on order.

2.3 MOTOR

A. The motor shall be a canned submersible motor capable of continuous operation under water. The motor shall have thrust bearings in the lower end of the motor to receive the hydraulic thrust plus the weight of the rotating parts. The motor electric leads shall be plug in type. Motor shall have internal cooling using a mixture of water and antirust additives. Housing and stator shall be stainless steel. Shaft bearing shall be sleeve type water lubricated carbon bearings. The motor shall have the following properties:

B. The motor shall be an inverter rated submersible electric motor conforming to the following requirements:

Type	Submersible
Horsepower	100 HP Maximum
Synchronous Speed	3600 RPM Maximum
Service Factor	1.00
Voltage	460
Phase	3
Frequency	60 Hz

C. The motor furnished shall be compatible with the pump.

D. The motor shall be designed for continuous underwater operation and shall have built-in surge arrestor. Motor leads shall be of sufficient length so that they may be spliced above the bowl assembly, and the leads shall be protected by a galvanized steel cable guard for the entire bowl length.

E. Motor shall incorporate a mechanical seal to prevent intrusion of contaminants. Pump shall be multi-stage, submersible type pump. Pump and motor to be installed inside existing 12-inch steel casing.

F. The pump to motor coupling shall be stainless steel.

2.4 PUMP DROP PIPE

A. The drop pipe shall be constructed of 6-inch nominal Schedule 40 ASTM grade B standard weight steel pipe with a minimum wall thickness of 0.237 inch and connected by threaded sleeve type alloy steel couplings. The ends of the pipe sections shall have standard tapered pipe threads conforming to ANSI B1.20.1.

B. Drop pipe check valves shall be located above the pump and at every 200 feet spacing. The check valves shall have epoxy coated ductile iron body, nitrite seal, stainless steel spring fasteners, and ductile iron poppet. The valve body shall be annealed ductile iron of sufficient tensile strength to support the full weight of the riser pipe and submersible pump and motor below. The check valve shall be designed for vertical applications and be equipped with break-off plugs.

2.5 ACCESSORIES

A. Well Vent: Provide well vent of 1-inch galvanized steel through the well surface plate extended up to 18 inches above the bottom plate of the pump discharge head with a 180 degree bend made of two steel elbows. The outlet end of the vent pipe will be covered with N0. 22-24 stainless steel wire mesh securely fastened by a stainless-steel band. The low end of the vent pipe will be threaded into the well surface plate and provide a water tight seal.

B. Well Monitoring Tubes (sounder tubes): The pump column will be provided with two nominal 1 ½ inch diameter HDPE pipe of sufficient length to extend from the Discharge Head unit to the top of the bowl assembly to serve as a water level sounding tube. The conduit shall be securely fastened with Type 316 stainless steel straps to the column pipe and care shall be exercised in lowering the pump assembly so that the conduit is not damaged.

C. Spare Parts: Provide the manufacturer's recommended spare parts package for the pump.

2.6 MANUFACTURERS, OR PRE-APPROVED EQUAL

A. Pumps

1. Weir Floway

2. Goulds

B. Motors

1. Xylem Centripro/Toshiba

2. Franklin

3. Grainger

PART 3 - EXECUTION

3.1 VIDEO INSPECTION

A. General Requirements:

1. After removing the existing well pump, but prior to installing the new well pump, conduct a video inspection by lowering a camera specifically designed for well inspection, with both side-looking and down-looking modes.

2. Leave the well undisturbed for a minimum duration of 24 hours prior to conducting the video inspection.

3. Lower the camera slowly, stopping to inspect important features, including, but not limited to, casing welds, screens, casing size changes, and packers.

B. Provide two (2) DVD copies of the inspection to Owner and Engineer within 1 day of conducting the inspection and prior to installing the new well pump. Do not install new well pump before receiving Owner and Engineer approval.

3.2 INSTALLATION

A. Pumping equipment shall be installed in accordance with approved procedures submitted with the shop drawings and O&M and as shown, unless otherwise approved by the Engineer.

3.3 WELL DISINFECTION

A. Well shall be disinfected prior to operation in accordance with AWWA Standard A100

B. Provide a disinfecting solution containing a minimum of 50 ppm residual chlorine.

C. Sample and test well for bacteriological quality per AWWA A100 and furnish passing results to the Engineer prior to operation.

D. Dispose of disinfecting solution in a manner approved by the Engineer.

3.4 PUMP ASSEMBLY DISINFECTION

A. The pump, motor, and drop pipe assembly shall be disinfected by the Contractor before being installed in the well. The disinfection agent shall be prepared by dissolving sodium hypochlorite or calcium hypochlorite compound in water in a proportion to obtain a chlorine concentration of 500 ppm in the solution. Disinfect the pump assembly by swabbing the parts with the chlorine before installing the pump well.

3.5 TESTING

A. Check pump rotation and record amps drawn on each leg.

B. All installation procedures and adjustments are to be checked by a qualified factory technician. Technician is to certify that installation is correct and equipment is running properly.

C. Field testing of the pump shall be performed to verify specified performance and to establish acceptance of the unit.

D. Pump manufacturer’s field technician shall be on-site during initial testing and remain on-site until vibration testing is complete.

E. Before start of tests:

1. Complete disinfection and testing of piping and pump per Section 3.3

2. Verify rotation and set bowl clearances.

3. Resistance and continuity testing of motor and leads.

F. Initial testing will be done while pumping to waste. During this phase of testing, check for excessive vibration and noise, operate the pump briefly over the entire design speed range, and check operation of the air release valve.

G. Startup testing will be done while pumping into the system.

1. Measurements to be taken during startup testing will include discharge flow, pumping water level, discharge pressure, and electrical input power.

2. The pumping equipment shall be considered acceptable if:

a. The field pump performance point at the design capacity deviates no more than ±1 percent from the total dynamic head and pump efficiency as given on the manufacturer's certified performance curve.

H. After initial and startup testing, the Owner will operate the pump for a period of 14 days under normal operating conditions. This test shall be completed before the end of the Contract. Any problems that arise shall be remedied by the Contractor before the Contract closeout activities will start.

I. Results of testing shall be documented by the Contractor and submitted to the Owner in a written report format.

END OF SECTION 33 11 36

SECTION 33 16 23 GROUND LEVEL STEEL WATER STORAGE TANKS

PART 1 - GENERAL

1.1 SCOPE OF WORK

Design, furnish and erect a polyester coated, glass lined bolted-steel water storage tank, including foundation, tank structure and tank appurtenances specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Section	Item
01 33 00	Contractor Submittals
03 30 00	Cast-in-Place Concrete

1.3 REFERENCE STANDARDS

AWWA D103	Factory-Coated Bolted Steel Tanks for Water Storage
ASTM A36	Specification for Carbon Structural Steel
ASTM A325	Specification for Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength
ASTM A386	Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
ASTM A490	Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
AWWA Manual M42	Steel Water-Storage Tanks

1.4 QUALITY ASSURANCE

A. The Contractor shall construct a reservoir as supplied from a manufacturer specializing in the design, fabrication and erection of factory applied coatings and bolted tank systems. The manufacturer shall have at least five years experience in design, fabrication and erection of bolted steel tanks.

B. Erection of the structure shall be by a contractor licensed in the State of Idaho. The Contractor shall be fully responsible for the entire installation including piping, backfill, concrete, erection, and water tightness of the complete installation.

C. The tank and all interior coatings shall be certified and listed by the NSF International to meet ANSI/NSF Standard No. 61.

1.5 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 – Contractor Submittals.

B. Submit complete specifications and construction drawings for all work not shown in complete detail on the contract drawings. A complete set of structural calculations shall be provided for the tank structure and foundation. All submittals shall be stamped both by a Licensed Professional Engineer licensed in the State of Idaho.

1.6 TANK DESIGN STANDARDS

A. The materials, design, fabrication and erection of the bolt together tank shall conform to the AWWA Standard for "Factory-Coated Bolted Steel Tanks for Water Storage" AWWA D103.

B. The tank coating system shall conform to ANSI/AWWA D103. The bolted tank shall be designed and fabricated using field bolted lap joints between plates.

C. All materials furnished by the tank manufacturer which are in contact with stored water shall be certified and listed by the National Sanitation Foundation (NSF) to meet ANSI/NSF Additives Standard No. 61.

1.7 DESIGN REQUIREMENTS

A.	Wind Velocity:	110 MPH, Exposure C
B.	Allowable Soil Bearing Capacity:	3,500 psf
C.	Snow Load on Flat Roof:	Pf = 33 psf
D.	Roof Live Load:	20 psf
E.	Site Class:	D
F.	Spectral Response Coefficients:	Sds = 0.2912, Sd1 = 0.117
G.	Importance Factors:	Wind Iw = 1.15 Snow Is = 1.20 Seismic Ic = 1.50

PART 2 - MATERIALS

2.1 GENERAL

A. The water storage tank shall be a shop fabricated, field erected, welded steel tank with a steel floor conforming to the following requirements:

1. Storage Capacity (Nominal) – 300,000 gallons

2. Diameter (Outside) - 30 feet

3. Height of Shell - 61 feet

4. Roof - Center Column

2.2 PLATES AND SHEETS

A. Plates and sheets used in the construction of the tank shell, tank floor (when supplied), and tank roof shall comply with the minimum standards of AWWA D103.

B. Design requirements for mild strength steel shall be ASTM A570 Grade 30 with a maximum allowable tensile stress 18,000 psi.

C. Design requirements for high strength steel shall be ASTM A607 Grade 60 with a maximum allowable tensile stress of 36,000 psi.

2.3 ROLLED STRUCTURAL SHAPES

A. Material shall conform to minimum standards of ASTM A36.

2.4 HORIZONTAL WIND STIFFENERS

A. Design requirements for intermediate horizontal wind stiffeners shall be of the "web truss" design with extended tail to create multiple layers of stiffener, permitting wind loads to distribute around tank.

B. Web truss stiffeners shall be of steel with hot dipped galvanized coating.

C. Rolled steel angle stiffeners are not permitted for intermediate stiffeners.

2.5 BOLT FASTENERS

A. Bolts used in tank lap joints shall be ½-inch – 13 UNC-2A rolled thread, and shall meet the minimum requirements of AWWA D103.

B. Bolt Material:

1. SAE Grade 2 (1" bolt length)
   Tensile strength - 74,000 psi Min.
   Proof load - 55,000 psi Min.
   Allowable shear stress - 18,163 psi (AWWA D 103).

2. SAE GRADE 8/ASTM A490 (1.5" – 2.25" bolt length) heat treated to:
   Tensile Strength – 150,000 psi Min.
   Proof Load – 120,000 psi Min.
   Allowable shear stress – 36,818 psi (AWWA D103).

3. SAE grade 5/ASTM A325 (1.25" bolt length) heat treated to:
   Tensile Strength – 120,000 psi Min.
   Proof Load – 85,000 psi Min.
   Allowable shear stress – 29,454 psi Min.

C. Bolt Finish – Zinc, Mechanically Deposited. 2.0 Mils Minimum – under bolt head, on shank and threads.

D. Bolt Head Encapsulation

1. High impact polypropylene copolymer encapsulation of entire bolt head up to the splines on the shank.

2. Resin shall be stabilized with an ultraviolet light resistant material such that the color shall appear black. The bolt head encapsulation shall be certified to meet the NSI/SNF Standard 61 for indirect additives.

3. All bolts on the vertical tank wall shall be installed such that the head portion is located inside the tank, and the washer and nut are on the exterior.

4. All lap joint bolts shall be properly selected such that threaded portions will not be exposed to the "shear plane" between tank sheets.

5. All lap joint bolts shall include a minimum of four (4) splines on the underside of the bolt head at the shank in order to resist rotation during torquing.

2.6 SEALANTS

A. The lap joint sealant shall be a one component, moisture cured, polyurethane compound. The sealant shall be suitable for contact with potable water and shall be certified to meet ANSI/NSF Additives Standard 61 for indirect additives.

B. The sealant shall be used to seal lap joints and bolt connections and edge fillets for sheet notches and starter sheets. The sealant shall cure to a rubber like consistency, have excellent adhesion to the epoxy coating, low shrinkage, and be suitable for interior and exterior use.

C. Neoprene gaskets and tape type sealer shall not be used.

2.7 SHELL PENETRATIONS

A. When piping penetrates the tank shall, the penetrations shall be made by saw cutting through the wall and installing an interior flange and an exterior flange assembly on the tank shell to reinforce the shell in accordance with AWWA D103. Use a suitable sealer shall be applied to the edges of cut panels.

2.8 TANK ACCESSORIES

A. General: Furnish and install all tank accessories shown on the Contract Drawings and as specified below.

1. One 30-inch diameter circular steel manway and one 24-inch diameter circular steel manway in the shell with access at ground level as shown on the Contract Drawings and as specified in AWWA D 100. The manway shall have davits or hinges. Furnish the 24-inch manway with a bolting flange for an exhaust fan for ventilation.

2. Inlet pipe as shown on the drawing. The inlet pipe is supported against the tank wall. The thrust from the flow of water out of the inlet pipe is 1,500 lbs. The tank wall must be designed for that thrust in addition to other loads.

3. Outlet pipe as shown on the drawings.

4. Drain pipe as shown on the drawing.

5. A screened overflow with #24 mesh stainless steel mesh shall extend through the steel shell as shown on the Contract Drawings. Extend the overflow down the outside of the tank as shown on the Contract Drawings.

6. Two roof hatches providing a 36-inch clear opening as specified in the AWWA D 100. Each hatch shall consist of a thimble through the roof and a cover. The thimble shall be continuous welded to the roof and shall extend above the roof at least 6-inches. Hatch cover shall be a solid, hinged cover with a 2-inch return down the hatchway thimble. The cover shall be lockable.

7. One fixed ladder with safe-climbing rail and cage on the exterior of the tank with intermediate landings. The ladder shall conform to AWWA D 100 and to the latest OSHA requirements. Ladder shall also have a security cover.

8. One ladder with safe-climbing rail and intermediate landings on the interior of the tank extending from the roof hatch to the floor. The ladder shall conform to the latest OSHA requirements.

9. A suitable screened roof vent of sufficient size to protect the reservoir from excessive internal or external pressure when water is leaving or entering the tank at the rate of 2,000 GPM. The roof vent shall be screened with a 24 mesh stainless steel screen and capped to exclude rain, snow, birds, and insects. The roof vent opening shall be at least 24-inches above the roof surface.

10. Roof guardrail along the edge of the roof and conform to the latest OSHA requirements.

11. Provide grounding wire bonded to the tank shell and bonded to ground rods driven to provide adequate grounding.

2.9 COATING SYSTEMS

A. The bolted steel reservoir shall be coated with polyester coating on the outside and fired on glass lining on the inside.

B. Polyester Coating System

1. Surface Preparation:

a. Following the decoiling and shearing process, sheets shall be steel grit-blasted on both sides to the equivalent of SSPC-SP10. Sand blasting and chemical pickling of steel sheets is not acceptable.

b. The surface anchor pattern shall be not less than 1.0 mil.

c. These sheets shall be evenly oiled on both sides to protect them from corrosion during fabrication.

2. Preparation of Sheet Edges

a. After initial sheet preparation, all full height vertical wall sheets and all rectangular shaped floor sheets shall be machined and a thermal spray coating of a corrosion resistant alloy shall be applied to the exposed sheet.

b. The same epoxy coating as applied to the sheet surfaces shall be applied to the exposed edges.

3. Cleaning

a. After fabrication and prior to application of the coating system, all sheets shall be thoroughly cleaned by a caustic wash and hot rinse process followed immediately by hot air drying.

b. Inspection of the sheets shall be made for traces of foreign matter or rust. Any such sheets shall be recleaned or grit-blasted to an acceptable level of quality.

4. Coating Application

a. All parts shall be coated at the factory within 30 minutes after blasting and no fabrication of plates or structural shall be done after blasting and before coating.

b. The coating systems used shall be as follows:

Pretreatment – Zinc Phosphate Coating

Finish – 3.5 mils (dry film thickness) Polyester TGIC Powder Coating Tiger Drylac Series 38 or equal with semi gloss finish.

5. Factory Inspection

a. The manufacturer’s quality system shall be ISO 9001 certified.

b. Coated sheets shall be inspected for mil thickness (Mikrotest or equal).

c. An electrical leak detection test shall be performed on the inside surface after fabrication of the sheet. Sheets with excessive electrical leakers shall be rejected so as to minimize field touch up.

6. Shipment

a. Heavy paper or plastic form sheets shall be placed between each panel to eliminate sheet-to-sheet abrasion during shipment.

C. Fired on Glass Coating System

1. All metal plates and miscellaneous parts shall be steel grit-blasted to the equivalent of SSPC-10. The surface anchor pattern shall be not less than 1.0 mils. These parts shall be oiled to protect from corrosion during fabrication.

2. After fabrication and prior to application of the coating system, all metal plates, member and miscellaneous parts, except bolts, shall be thoroughly cleaned by a hot wash-rinse process followed immediately by hot air drying.

3. All steel sheets and plates shall receive one coat of glass precoat and one coat of glass frit on both sides and shall be fired at a minimum temperature of 1500ºF in strict accordance with manufacturer's recommendations. The glass material shall be NSF approved for potable water systems. Minimum dry film thickness shall be 7.0 mils.

4. All coated parts shall be randomly inspected prior to shipment. Factory inspection shall include a mil thickness test (Mikrotest or equal) and a holiday detection test (Tinker Rasor or equivalent).

5. All coated parts shall be protected from damage prior to packing for shipment.

6. All small parts and appurtenances shall be hot dip galvanized in accordance with ASTM A123.

PART 3 - EXECUTION

3.1 FOUNDATION

A. The tank foundation shall be either a concrete ring wall with a steel plate floor or a concrete slab as determined by the tank manufactured. If a concrete floor is used the tank shall be constructed with an epoxy coated starter course embedded in the concrete floor in accordance with AWWA D103. The starter course shall be installed with a rubber elastomer waterstop seal on the inside of the starter ring below the top of the floor.

3.2 ERECTION

A. The tank shall be erected by factory trained and certified erectors authorized by the tank manufacturer for the field erection of bolted steel tanks. The Contractor shall submit a copy of the tank manufacturer's authorization for the proposed erection crews before starting field assembly of the tank. An electrical leak detection test shall be made during erection of the tank using a wet sponge low voltage leak detector. Repair any leaks found during the erection leak detection before the tank is hydrostatic tested.

3.3 HYDROSTATIC TESTING

A. The tank shall be hydrostatic tested after erection. The tank shall be tested by filling the tank with water and allow it to set for a period of 96 hours. During the test period, the tank shall be observed for damp spots or other evidence of leakage. Any leaks disclosed during the test shall be repaired by the Contractor and the tank retested until no leakage is detected over a 96 hour test period. The Owner will provide the water for hydrostatic testing. The Contractor shall provide all labor and temporary equipment and supplies to convey the test water to the new reservoir. The Contractor shall dispose of the test water after the testing is complete. After the tank has successfully been hydrostatic tested, the Contractor shall disinfect the tank in accordance with AWWA C652.

END OF SECTION 33 16 23

SECTION 40 05 00 – PIPING, GENERAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide the piping systems indicated, complete and operable, in accordance with the Contract Documents.

B. The mechanical drawings define the general layout, configuration, routing, method of support, pipe size, and pipe type. The mechanical drawings are not pipe construction or fabrication drawings. Where pipe supports and spacings are indicated on the drawings and referenced to a standard detail, the Contractor shall use that detail. Where pipe supports are not indicated on the drawings, it is the Contractor's responsibility to develop the details necessary to design and construct all mechanical piping systems, to accommodate the specified equipment, and to provide all spacers, adapters, and connectors for a complete and functional system.

C. Piping system drawings are diagrammatic and are intended to show approximate location of equipment and piping. Dimensions given on the plans in figures take precedence over scaled dimensions. Verify dimensions, whether in figures or scaled, in the field. The Contractor shall be responsible for the installation of complete and workable systems whether completely detailed on the plans or not.

D. The Contractor shall ascertain locations of apparatus, fixtures, equipment, and piping in the field, and layout work accordingly. The Owner reserves the right to have minor changes in location of piping and equipment made up to the time of installation without additional cost.

1.2 REFERENCE STANDARDS

A. All mechanical work shall conform to latest edition of the International Mechanical Code.

B. Commercial Standards

1.	ASTM B 88	Hard Copper Tube
2.	ASME B 16.22	Copper Fittings
3.	ANSI/ASME B 1.20.1	Pipe Threads, General Purpose (inch)
4.	ANSI B 16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and other Special Alloys
5.	ANSI/AWWA C 207	Steel Pipe Flanges for Water Works Service; Sizes 4 in through 144 in.
6.	ANSI/AWWA C 606	Grooved and Shouldered Joints
7.	ANS/AWS D1.1	Structural Welding Code

8.	ASTM A 307	Specification for Carbon Steel Bolts and Studs, 6,000 psi Tensile
9.	ASTM A 325	Specification for High-Strength Bolts for Structural Steel Joints
10.	ASTM D 792	Test Methods for Specific Gravity and Density of Plastics by Displacement
11.	ASTM D 2000	Classification System for Rubber Products in Automotive Applications

1.3 CONTRACTOR SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 - Submittal Procedures.

B. At a minimum, the following information shall be submitted for review and approval prior to ordering piping materials.

1. Manufacturer specifications for each pipe type, including all references to acceptable standards as referenced in each individual pipe section.

2. Indicate fittings and manufacturer recommended connections.

3. Pressure ratings.

4. Lining and coating type, thickness, and application procedures.

5. Fitting types and manufacturer recommended applications and acceptable installation procedures and tolerances.

C. Fabrication Drawings: The Contractor shall submit piping fabrication drawings show in all fittings, pipe material, supports, and all dimensions for proper installation of piping system as illustrated on mechanical drawings.

1.4 QUALITY CONTROL

A. Certifications: Necessary certificates, test reports, and affidavits of compliance shall be obtained by the Contractor. A certification from the pipe fabricator that each pipe will be manufactured subject to the fabricator's or a recognized quality control program. An outline of the program shall be submitted to the Engineer for review prior to the manufacture of any pipe.

B. Where the assistance of a manufacturer's service representative is advisable, in order to obtain recommended pipe joints, supports, or special connections, the Contractor shall furnish such assistance at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL

A. Extent of Work: Pipes, fittings, and appurtenances shall be provided in accordance with the requirements of the applicable Sections of Divisions 9 and 40 and as indicated. Materials in contact with potable water shall be NSF Standard 61 certified.

B. Pipe Supports: Pipes shall be adequately supported, restrained, and anchored in accordance with Section 40 05 07 – Hangers and Supports for Process Piping, and as indicated.

C. Lining: Application, thickness, and curing of pipe lining shall be in accordance with the applicable Sections of Division 9 unless otherwise indicated. Fittings and couplings shall be lined with the same material required for the pipeline in which the fittings and couplings are installed.

D. Coating: Application, thickness, and curing of pipe coating shall be in accordance with the applicable Sections of Division 9 unless otherwise indicated. Pipes above ground or in structures shall be field-coated in accordance with Section 09 90 00 – Painting and Coating.

E. Pressure Rating: Piping systems shall be designed for the maximum expected pressure as indicated on the drawings and individual pipe specifications.

F. Grooved Piping Systems: Piping systems with grooved joints and fittings may be provided in lieu of flanged, joint systems for exposed ductile iron piping. To assure uniform and compatible piping components, all grooved fittings, couplings, and valves shall be from the same manufacturer. The Contractor shall make the coupling manufacturer responsible for the selection of the correct style of coupling and gasket for each individual location.

G. Tests: Except where otherwise indicated, materials used in the manufacture of the pipe shall be tested in accordance with the applicable specifications and standards. Welds shall be tested as indicated. The Contractor shall be responsible for performing material tests.

H. Welding Requirements: Qualification of welding procedures used to fabricate pipe shall be in accordance with the provisions of ANSI/AWS D1.1 - Structural Welding Code. Welding procedures shall be submitted for the Engineer's review.

I. Welder Qualifications: Welding shall be done by skilled welders and welding operators who have adequate experience in the methods and materials to be used. Welders shall be qualified under the provisions of ANSI/AWS D1.1 or the ASME Boiler and Pressure Vessel Code, Section 9, by an independent local, approved testing agency not more than six (6) months prior to commencing work on the pipeline. Machines and electrodes similar to those used in the Work shall be used in qualification tests. Qualification testing of welders and materials used during testing is part of the Work.

J. Joining Dissimilar Materials: Di-electric unions shall be used at the junction of two dissimilar metallic pipes as required by the local adopted plumbing code. It shall be the responsibility of the Contractor to identify any such conditions whether indicated in the Project Drawings or not. Di-electric unions shall be lead free, appropriate for the two dissimilar metals and be stamped with an approved UPC seal.

2.2 PIPE FLANGES

A. Flanges shall have flat faces and shall be attached with bolt holes straddling the vertical axis of the pipe unless otherwise indicated. Attachment of the flanges to the pipe shall conform to the applicable requirements of AWWA C207. Flange faces shall be perpendicular to the axis of the adjoining pipe. Flanges for miscellaneous small diameter pipes shall be in accordance with the standards indicated for these pipes. Flanges shall have pressure ranges corresponding to the following:

1. 150 PSI or less: Flanges shall conform to either AWWA C207 - Steel Pipe Flanges for Waterworks Service-Sizes 4 In. Through 144 In., Class D, or ASME B16.5 - Pipe Flanges and Flanged Fittings, 150 lb class.

2. 150 to 275 PSI: Flanges shall conform to either AWWA C207 Class E or Class F, or ASME B16.5 150 lb class.

3. 275 to 700 PSI: Flanges shall conform to ASME B16.5, 300 lb class.

4. AWWA flanges shall not be exposed to test pressures greater than 125 percent of rated capacity. For higher test pressures, the next higher rated AWWA flange or an ANSI-rated flange shall be selected.

B. Blind Flanges: Blind flanges shall be in accordance with AWWA C207, or as indicated for miscellaneous small pipes. Blind flanges for pipe sizes 12-inches and greater shall be provided with lifting eyes in the form of welded or screwed eye bolts.

C. Flange Coating: Machined faces of metal blind flanges and pipe flanges shall be coated with a temporary rust-inhibitive coating to protect the metal until the installation is completed.

D. Flange Bolts: Bolts and nuts shall conform to Section 05 50 00 – Metal Fabrications. All-thread studs shall be used on all valve flange connections, where space restrictions preclude the use of regular bolts.

E. Insulating Flanges: Insulated flanges shall have bolt holes 1/4-inch diameter greater than the bolt diameter.

2.3 INSULATING CONNECTIONS

A. Insulating Flange Sets: Unless otherwise specified, insulating flange sets shall be provided at all locations where dissimilar metals are connected. Each insulating flange set shall consist of an insulating gasket, insulating sleeves and washers, and a steel washer. Insulating sleeves and washers shall be one piece when flange bolt diameter is 1-1/2 inch or smaller and shall be made of acetal resin. For bolt diameters larger than 1-1/2 inch, insulating sleeves and washers shall be two (2) pieces and shall be made of polyethylene or phenolic material. Steel washers shall be in accordance with ASTM A 325 - Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength. Insulating gaskets shall be full-face.

1. Insulating Flange Manufacturers, or equal

    a. JM Red Devil, Type E

    b. Maloney Pipeline Products Co., Houston

    c. PSI Products, Inc., (Frost Engineering Service Co., Costa Mesa, California).

B. Threaded insulating bushings, unions, or couplings, as appropriate, shall be used for joining threaded pipes of dissimilar metals and for piping systems where corrosion control and cathodic protection are involved. Threaded insulating connections shall be of nylon, teflon, polycarbonate, polyethylene, or other non-conductive materials, and shall have ratings and properties to suit the service and loading conditions.

C. Insulating Sleeve Couplings: Where insulating couplings are required, both ends of the coupling shall have a wedge-shaped gasket which assembles over a sleeve of an insulating compound material compatible with the fluid service in order to obtain insulation of all coupling metal parts from the pipe

2.4 MECHANICAL-TYPE COUPLINGS (GROOVED OR BANDED PIPE)

A. Cast mechanical-type couplings shall be provided where indicated. The couplings shall conform to the requirements of AWWA C606 - Grooved and Shouldered Joints. Bolts and nuts shall conform to the requirements of Section 05 50 00 – Metal Fabrications. Mechanical-type couplings shall be bonded. The Contractor shall have the coupling manufacturer's service representative verify the correct choice and application of couplings and gaskets, and the workmanship, to assure a correct installation. To assure uniform and compatible piping components, grooved fittings, couplings, and valves shall be furnished by the same manufacturer as the coupling. Grooving tools shall be of the same manufacturer as the grooved components.

B. Gaskets for mechanical-type couplings shall be compatible with the piping service and fluid utilized, in accordance with the coupling manufacturer's recommendations.

C. The wall thickness of grooved piping shall conform to the coupling manufacturer’s recommendations to suit the highest expected pressure.

D. To avoid stress on equipment; equipment connections with mechanical-type couplings shall have rigid-grooved couplings or flexible type coupling with harness in sizes where rigid couplings are not available, unless thrust restraint is provided by other means.

E. Manufacturers of couplings for steel pipe, or equal

1. Gustin-Bacon (Aeroquip Corp.) (banded or grooved)

2. Victaulic Style 41 or 44 (banded, flexible)

3. Victaulic Style 77 (grooved, flexible)

4. Victaulic Style 07 or HP-70 (grooved, rigid)

F. Manufacturers of ductile iron pipe couplings, or equal

1. Gustin-Bacon, (Aeroquip Corp.)

2. Victaulic Style 31 (flexible or rigid grooving)

Note: Ductile iron pipe couplings shall be furnished with flush seal gaskets.

2.5 SLEEVE-TYPE COUPLINGS

A. Sleeve-type couplings shall be provided where indicated. The Contractor will not be allowed to substitute a sleeve-split coupling for the sleeve coupling unless approved by the Engineer.

B. Construction: Sleeve couplings shall be in accordance with AWWA C219 - Standard for Bolted Sleeve- Type Couplings for Plain-End Pipe. Couplings shall be steel with steel bolts, without pipe stop. Couplings shall be of sizes to fit the pipe and fittings indicated.

1. The middle ring shall be not less than 1/4-inch thick or at least the same wall thickness as the pipe to which the coupling is connected. If the strength of the middle ring material is less than the strength of the pipe material, the thickness of the middle ring shall be increased to have the same strength as the pipe. Buried sleeve-type couplings shall be epoxy-coated at the factory as indicated.

2. The coupling shall be either 5- or 7- inches long for sizes up to and including 30-inches and 10-inches long for sizes greater than 30-inches, for standard steel couplings, and 16-inches long for long-sleeve couplings.

3. The followers shall be single-piece contoured mill sections welded and cold-expanded as required for the middle rings, and of sufficient strength to accommodate the number of bolts necessary to obtain adequate gasket pressures without excessive rolling. The shape of the follower shall be of such design as to provide positive confinement of the gasket.

4. Bolts and nuts shall conform to the requirements of Section 05 50 00 – Metal Fabrications.

C. Pipe Preparation: Where indicated, the ends of the pipe shall be prepared for flexible steel couplings. Plain ends for use with couplings shall be smooth and round for a distance of 12-inches from the ends of the pipe, with outside diameter not more than 1/64-inch smaller than the nominal outside diameter of the pipe. The middle ring shall be tested by cold-expanding a minimum of one percent beyond the yield point, to proof- test the weld to the strength of the parent metal. The weld of the middle ring shall be subjected to air test for porosity.

2.6 GASKETS

A. Gaskets for wastewater and sewerage applications shall be Buna N, Grade 60, or equivalent suitable elastomer.

B. Gaskets shall be full-faced type, with material and thickness in accordance with AWWA C207. Blind flanges shall have gaskets covering the entire inside face of the blind flange and shall be cemented to the blind flange. Ring gaskets shall not be permitted, unless otherwise indicated. The rubber in the gasket shall meet the following specifications:

Color	Jet Black
Surface	Non-Blooming
Durometer Hardness	74 plus and minus 5
Tensile Strength	1000 psi Minimum
Elongation	175 percent Minimum
Temperature	700 Deg. F
pH	1 - 11

C. The gaskets shall be immune to attack by impurities normally found in water or wastewater. All gaskets shall meet the requirements of ASTM D 2000 - Classification System for Rubber Products in Automotive Applications, AA709Z, meeting Suffix B13 Grade 3, except as noted above. Where sleeve couplings are used in water containing chloramines or other fluids which attack rubber materials, gasket material shall be compatible with the piping service and fluid utilized.

D. Gaskets for flanged joints used in chemicals, air, solvents, hydrocarbons, steam, chlorine and other fluids shall be made of materials compatible with the service, pressure, and temperature.

2.7 FLANGE COUPLING ADAPTERS

A. Flange coupling adapters shall only be used where shown on the drawings or accepted by the Engineer. Otherwise, the Contractor shall only use dismantling joints if additional flexibility is required for the pipe installation.

B. Flange coupling adapters shall be designed for a water working pressure not less than the design pressure of the pipe on which they are to be installed and shall be equipped with suitable rubber gaskets.

C. Couplings shall be Romac RFCA, or equal. Thrust ties shall be provided for all flexible couplings to sustain the force developed by the test pressure. Anchor studs will not be acceptable.

2.8 FLEXIBLE CONNECTORS

A. Flexible connectors shall be installed in all piping connections to engines, blowers, compressors, pumps and other vibrating equipment, and where indicated. Flexible

connectors for service temperatures up to 180 degrees F shall be flanged reinforced neoprene or butyl single-arched spools, rated for a working pressure of 40 to 150 psi, or reinforced flanged duck and rubber, as best suited for the application. Flexible connectors for service temperatures above 180 degrees F shall be flanged, braided stainless steel spools with inner, annular, corrugated stainless steel hose, rated for minimum 150 psi working pressure, unless otherwise indicated. The connectors shall be a minimum of 9-inches long, face-to-face flanges, unless otherwise indicated. The final material selection shall be approved by the manufacturer. The Contractor shall submit manufacturer's shop drawings and calculations.

B. Grooved pipe flexible mechanical couplings may be used in lieu of the above paragraph on pumps only. The Contractor shall submit manufacturer's shop drawings and calculations.

2.9 MISCELLANEOUS

A. Expansion Joints: Piping subject to expansion and contraction shall be provided with sufficient means to compensate for such movement without exertion of undue forces to equipment or structures. This may be accomplished with expansion loops, bellow-type expansion joints, or sliding-type expansion joints. Expansion joints shall be flanged end, stainless steel, Monel, rubber, or other materials best suited for each individual service. The Contractor shall submit detailed calculations and manufacturer's Shop Drawings of all proposed expansion joints, piping layouts, and anchors and guides, including information on materials, temperature, and pressure ratings.

B. Piping Connection to Equipment: Where piping connects to mechanical equipment such as pumps, compressors, and blowers, the piping shall be brought to the equipment connection aligned and perpendicular to the axis of the flange or fitting for which the piping is to be connected to the equipment. The piping shall not impose excessive stress to the equipment connection so much to cause misalignment of the equipment. The Contractor shall assign the responsibility to the equipment manufacturer to review the piping connection to the equipment and submit any modifications to the Engineer for review.

C. Restrained Joints: Sleeve-type couplings on pressure lines shall be harnessed unless thrust restraint is provided by other means. Harnesses shall be designed by the pipe manufacturer in accordance with Manual M11, or as indicated. Harness sets shall be designed for the maximum test pressure of the pipe in which they are installed. Where harness sets are installed near the suction and discharge of the pump. Harness bolts shall have zero elongation to prevent misalignment of the pump imparted by the thrust within the piping system. Thrust restraints systems shall be manufactured by Victaulic, “Depend-O-Lok”; Dresser, “Style 38”; Ford Meter Box Co., Inc., “Style FC1 or FC3”; and Smith-Blair, “Style 411.”

D. Pipe Threads: Pipe threads shall be in accordance with ANSI/ASME B1.20.1 - Pipe Threads, General Purpose (inch), and be made up with Teflon tape unless otherwise indicated.

E. Air and Gas Traps: Air and gas pipes shall slope to low points and be provided with drip legs, shut-off valves, strainers, and traps. The traps shall be piped to the nearest drain. Air and gas traps shall be not less than 150 lb iron body float type with copper or stainless steel float. Bracket, lever, and pins shall be of stainless steel. Drain traps shall have threaded

connections acceptable manufacturers include Armstrong International, Inc. and Spirax Sarco, Inc.

2.10 COUPLINGS

A. Flexible Pipe Couplings – Smith Blair OMNI 441 coupling system, or approved equal. Couplings shall be lined and coated with a minimum thickness of 0.012" fusion-bonded epoxy or approved equal. Coating must comply with ASTM C213 and AWWA C550.

2.11 DISMANTLING JOINTS

A. Dismantling joints shall be Romac Style DJ400, Smith Blair Model 975 or approved equal. Dismantling joints shall be coated with fusion bonded epoxy per AWWA C213. Provide high strength stainless steel bolts, nuts and tie rods. Use anti seize lubricant when assembling all stainless steel hardware.

2.12 TAPPING SADDLES

A. Tapping saddles shall have a ductile iron body meeting ASTM A536, Grade 65-45-12. Gasket shall be Nitrile Butadiene Rubber (NBR) for water and sewer service. Saddles shall have two, 2" straps constructed of Type 304 stainless steel with GMAW and GTAW welds. Stainless steel shall be passivated for corrosion resistance. Casting shall be coated with fusion bonded black nylon, 10 – 12 mils thick, with a dielectric strength of 1,000 v/mil. Threads as required for installation of instrumentation.

B. Bolts, nuts and washers shall be Type 304 (18-8) heavy gauge stainless steel.

C. Saddles shall comply with AWWA C800 and shall have a pressure rating of 350 psi for pipe sizes up to 24 inch.

D. Provide Romac 202 service saddles or equivalent.

2.13 THRUST BLOCKS

A. Concrete to have a minimum compressive strength of 2,500 psi at 7 days. Place in accordance with plan details.

2.14 MECHANICAL RESTRAINT

A. Type: Standard mechanical joint restraint gland, restraint devices for MJ fittings and appurtenances to conform to ANSI/AWWA C111 or ANSI/AWWA C153.

B. Product: EBAA Iron Series 2000 PV (for PVC Pipe) or EBAA Iron Series 1100 Megalug (for DIP) or approved equal, and to meet requirements of ASTM F1674.

C. Application: Approved for above ground installation and below ground where specifically specified on the Plans. Also, mechanical restraint shall be installed in locations where the pipeline must be used immediately as a temporary restraint while thrust blocks cure.

D. Pipe joints shall be restrained 30 ft. or a minimum of two pipe joints (whichever is longer) upstream and downstream of a mechanically restrained fitting.

2.15 INTERNALLY RESTRAINED PRESSURE PIPE

A. Internally restrained PVC Pressure Pipe shall conform to ANSI/AWWA C900, FM 1612 for 4" to 12" inside diameter pipe and ANSI/AWWA C905 for 14" to 24" inside diameter pipe. Pipe Compound shall conform to ASTM D1784 Cells Class 12454. Integral bell joints shall conform to ASTM D3139. All internally restrained pipe shall be ANSI/NSFF Standard 61 FM approved and certified and shall be provided in full pipe lengths..

B. Pipe shall be rated for pressures indicated or required within the Contract Documents.

C. Internally reinforced pipe shall consist of a molded metal casing within the bell end of the pipe. The casing will be equipped with uni-directional serrated grip rings. The casing and grip rings will be constructed of ductile iron and coated with a corrosion protection system.

D. Internally reinforced pipe lengths shall be labeled to identify that it is equipped with an internal restraining system.

E. Approved products include PVC pipe manufacturers who integrate the BullDog™ Integral Joint Restraint System, including Diamond Plastics Diamond Lok-21®, JM Eagle Eagle LOC 900™.

F. Application or use of the internally restrained pipe is approved for below ground installation where specifically specified on the Plans or in applications where pipelines must be used immediately or where use of alternative restraining methods or prohibitive.

G. Pipe joints shall be restrained 30 ft. or a minimum of two pipe joints (whichever is longer) upstream and downstream of a mechanically restrained fitting.

2.16 BOLTS AND ANCHORS

A. Bolts and anchors for fittings, pipe couplings, valves, piping and accessories shall comply with Section 05 50 00 – Metal Fabrications.

PART 3 - EXECUTION

3.1 GENERAL

A. Piping, fittings, and appurtenances shall be installed in accordance with the requirements of applicable Sections of Division 40. Proprietary manufactured couplings shall be installed in accordance with the coupling manufacturer's recommendation.

B. Care shall be taken to ensure that piping flanges, mechanical-type couplings, sleeve-type couplings, flexible connectors, and expansion joints are property installed as follows:

1. Gasket surfaces shall be carefully cleaned and inspected prior to making up the connection. Each gasket shall be centered properly on the contact surfaces.

2. Connections shall be installed to prevent inducing stress to the piping system or the equipment to which the piping is connected. Contact surfaces for flanges,

couplings, and piping ends shall be aligned parallel, concentric, and square to each axis at the piping connections.

3. Bolts shall be initially hand-tightened with the piping connections properly aligned. Bolts shall be tightened with a torque wrench in a staggered sequence to the AISC recommended torque for the bolt material.

4. Groove ends shall be clean and free from indentations, projections, and roll marks in the area from the pipe end to the groove.

5. After installation, joints shall meet the indicated leakage rate. Flanges shall not be deformed nor cracked.

C. Soldered Pipe Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook", using lead-free solder alloy complying with ASTM B 32.

D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS ASB.

E. Lined Piping Systems: The lining manufacturer shall take full responsibility for the complete, final product and its application. Pipe ends and joints of lined pipes at screwed flanges shall be epoxy-coated to assure continuous protection.

F. Core Drilling: Where core drilling is required for pipes passing through existing concrete, core drilling locations shall be determined by radiograph of concrete construction to avoid damage to embedded raceways and reinforcing bars.

G. Cleanup: After completion of the Work, cuttings, joining and wrapping materials, and other scattered debris shall be removed from the Site. The entire piping system shall be handed over in a clean and functional condition.

H. Protective Coating: All pipes shall be coated in accordance with Section 09 90 00- Painting and Coating.

3.2 MATERIAL DELIVERY, STORAGE, AND PROTECTION

A. Piping materials, fittings, valves, and accessories shall be delivered in a clean and undamaged condition and stored off the ground for protection against oxidation caused by ground contact Defective or damaged materials shall be replaced with new materials.

3.3 PIPING INSTALLATION

A. Cut piping accurately for fabrication to measurements established at the construction site and work into place without springing and/or forcing.

B. Remove burrs and cutting slag from pipe by reaming or other approved cleaning methods.

C. Make changes in direction with proper fittings.

D. Arrange piping so as not to interfere with the removal of other equipment, ducts, or devices. Do not block access doors, windows, or access openings. Provide unions in the piping at connections to all equipment. Unions must be accessible.

E. Make connections of dissimilar metals (such as copper and steel) with insulating couplings suitable for at least 175 psi working pressure at 250 degrees F.

F. Cap or plug open ends of pipes and equipment with PVC caps or expanding neoprene plugs to keep dirt and other foreign materials out of the system. Plugs of rags, wool, cotton, waste, or similar materials are not acceptable.

G. Install all piping systems so they can easily be drained. Provide hose bibs at low point of water lines.

H. Slope all soil and waste lines within the building at 1/4-inch fall per foot in the direction of flow unless otherwise noted on drawings.

3.4 WORKMANSHIP

A. Care shall be taken at all times to protect floors, stairways, and walls during the make-up, erection of piping, and placing of equipment. The Contractor shall remove all stains and repair all damage before final acceptance of the work.

3.5 TESTING

A. Test all pressure piping according to the requirements of Section 01 74 30 – Site Pressure Pipe Testing and Disinfection.

B. Repair defects which develop under tests promptly and repeat tests. No caulking of screwed joints, cracks, or holes will be permitted. Repair leaks in screwed joints by replacing pipe or fitting or both with new material.

C. Repair leaks in copper tubing by melting out joint, thoroughly cleaning both tubing and fitting, and resoldering.

3.6 CLEANUP

A. After completion of the Work, all remaining pipe cuttings, joining and wrapping materials, and other scattered debris, shall be removed from the site. The entire piping system shall be handed over in a clean and functional condition.

END OF SECTION 40 05 00

SECTION 40 05 07- HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required for the installation of all piping and all related work required for complete pipe installations. Coordinate work with other trades.

B. Furnish and install all pipe hangers, sleeves, supports, brackets, and other related items required to support the piping systems as required whether shown on the plans or not.

C. Test all piping systems and correct any problems found to exist.

1.2 REFERENCE STANDARDS

A. All mechanical piping systems shall conform to requirements under the latest revision of International Mechanical Code, ASA Code for Pressure Piping and 2012 International Building Code.

1. ASA Codes as sponsored by ASME
2. ASME B31.1 Power Piping (2001)
3. ASME B31.2 Fuel Gas Piping (1968)
4. ASME B31.3 Process Piping (2002)
5. ASTM A 123 Zinc (Hot-Dip Galvanized) Coatings on Iron & Steel Products
6. Piping Handbook Nayyar, Mohinder L. (2000). Piping Handbook (7th Edition). McGraw-Hill.

B. Install work in accordance with applicable provisions of codes, rules, regulations, statutes, and ordinances of governing bodies having jurisdiction. Such codes, rules, regulations, statutes, and ordinances are hereby incorporated into these Specifications. Comply with Specification requirements which are in excess of code requirements and not in conflict therewith.

1.3 SUBMITTALS

A. Submit shop drawings shall be in accordance with Section 01 33 00 – Submittal Procedures. Shop Drawings shall include the following information:

1. Drawings of pipe supports, hangers, anchors, and guides
2. Calculations for special supports and anchors.

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Pipe hangers shall be capable of supporting the pipe in all conditions of operation, allowing free expansion and contraction of the piping, and preventing excessive stress on equipment. All hangers shall have a means of vertical adjustment after erection. Hangers shall be designed to prevent becoming disengaged by any movement of the supported pipe. Hangers subject to shock, seismic disturbances, or thrust imposed by the actuation of safety valves, shall include hydraulic shock suppressors. All hanger rods shall be subject to tensile loading only.

B. Unless shown otherwise, provide vertical piping supports for all pipe except copper:

1. Support vertical piping with wrought steel riser clamps. Make adequate provision for expansion, contraction, and lateral stability.

2. Use steel extension pipe clamps for vertical pipe supports similar to Anvil Figure 261, refer to manufacturer's rated maximum loading for each size pipe. Bolt clamp securely to pipe rest, clamp end extension on building structure.

3. Where pipe sleeves extend above floor, place pipe clamps at ceiling below, support clamp end extension from inserts.

4. Use beam clamps that are of malleable iron, Anvil Figure 86 for 3/8 inch hanger rods; forged steel beam clamp, Anvil Figure 228 for hanger rod up to 1-1/2 inch.

C. Supports for piping with the longitudinal axis in approximately a horizontal position shall be spaced to prevent excessive sag, bending, and shear stresses in the piping, with special consideration given where components such as flanges and valves impose concentrated loads. For temperatures other than ambient temperatures, or those listed, and for other piping materials or wall thicknesses, the pipe support spacing shall be modified in accordance with the pipe manufacturer’s recommendations. Vertical supports shall be provided to prevent the pipe from being overstressed from the combination of all loading effects. Use one of the following means of supporting horizontal piping from a wall.

1. Steel J-Hook for pipe located close to wall, up to three-inch pipe, Fee and Mason Figure 146.

2. For hanger suspension with 750 lbs. maximum loading, use light welded steel bracket with hole for one rod, 3/4-inch diameter, Fee and Mason Figure 153.

3. For pipe-roll stand support use welded-steel bracket, light for 700 lbs. maximum loading, Fee and Mason Figure 150; medium for 1,500 lbs. maximum loading, Figure 151; and heavy for 3,000 lbs. maximum loading, Figure 155.

D. Unless otherwise specified, support spacing for Steel and Copper shall conform to the following:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1 - 1/4" and smaller	6' - 0" on center
1 - 1/2" thru 3"	8' - 0" on center
4" thru 8”	12' - 0" on center
10” and larger	20’ - 0” on center

E. Unless otherwise specified, support spacing for Ductile-Iron Pipe shall conform to the following:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
All Diameters	Two supports per pipe length or 10 feet (one of the 2 supports located at joint)

F. Unless otherwise specified, support spacing for PVC, CVC, and ABS shall conform to the following:

Nominal Pipe Diameter (inches)	Maximum Span (feet)
1" and smaller	4' - 0" on center
1 - 1/4" thru 2"	5' - 0" on center
2 - /2" thru 4"	6' - 0" on center
5" and larger	7' - 6" on center

G. Thermal Expansion: Wherever expansion and contraction of piping is expected, a sufficient number of expansion loops or expansion joints shall be provided, together with the necessary rolling or sliding supports, anchors, guides, pivots, and restraints permitting the piping to expand and contract freely in directions away from the anchored points. All components shall be structurally suitable to withstand all loads imposed.

H. Heat Transmission: Supports, hangers, anchors, and guides shall be so designed and insulated, that excessive heat will not be transmitted to the structure or to other equipment. Support insulated piping with pipe saddles and hangers that fit on the outside of the insulation. Do not compress or damage pipe insulation with hangers or supports.

I. Point Loads: Any meters, valves, heavy equipment, and other point loads on PVC, FRP, and other plastic pipes, shall be supported on both sides, according to manufacturer's recommendations to avoid undue pipe stresses and failures. To avoid point loads, all supports on PVC, FRP, and other plastic piping shall be equipped with extra wide pipe saddles or galvanized steel shields.

J. Materials of Construction: All pipe support assemblies, including framing, hardware, and anchors, shall be steel construction, galvanized after fabrication, unless otherwise indicated.

1. All submerged piping and top of tank walls, as well as piping, conduits, and equipment in hydraulic structures within 24-inches of the water level, shall be supported with support, assemblies, including framing, hardware, and anchors, constructed of Type 316 stainless steel, unless otherwise indicated.

2. All piping in chemical and corrosive areas shall be supported with support assemblies, including framing, hardware, and anchors, constructed of Type 316 stainless steel or FRP, unless otherwise indicated.

K. Manufactured Supports

1. Stock Parts: Where not specifically indicated, designs which are generally accepted as exemplifying good engineering practice and use stock or production parts, shall be utilized wherever possible. Such parts shall be locally available, new, of best commercial quality, designed and rated for the intended purpose.

2. Manufacturers, or equal:

a. Cooper B-Line;

b. Anvil International, Inc.;

c. Bergen-Paterson Pipesupport Corp.;

d. Fee & Mason Mfg., Co.;

e. Tolco Incorporated.

L. Galvanizing: Unless otherwise indicated, all fabricated pipe supports other than stainless steel or non-ferrous supports shall be blast-cleaned after fabrication and hot-dip galvanized in accordance with ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

2.2 INSERTS

A. Furnish and set inserts in concrete forms; provide reinforcing rods for pipe sizes over three inches or equivalent.

B. Furnish concrete inserts as follows: Black, malleable iron, Universal type for threaded connections with lateral adjustment, Anvil Figure 279 for pipe sizes up to 3 - 1/2 inches; Anvil Figure 282 for pipe sizes up to eight inches.

2.3 SHIELDS

A. Provide shields to protect insulation in all areas. Provide approved galvanized form shields to protect insulation at areas of contact with hangers and supports. Size in accordance with shield manufacturer's recommendations.

2.4 SLEEVES

A. Where pipes pass through floors, footings, foundations, walls, or ceilings, furnish and install pipe sleeves. Sleeves for concealed piping shall be of galvanized iron, and I.P.S. black steel pipe for exposed piping installed so as to be completely covered by escutcheons, hereinafter specified. Extend sleeves through floors 1/2 inch above finish floor.

2.5 ESCUTCHEONS

A. Fit pipe passing through walls, floors, or ceilings with escutcheons with set screws as shown on the plans. Use prime painted escutcheons where surface is to receive a paint finish; otherwise, use escutcheons that are nickel or chromium plated. Where piping is insulated, use escutcheon outside the insulation.

2.6 JOINTS

A. For screwed pipe make ends with sharp, clean tapered threads using pipe compound on male thread only. Do not use mill cut threads. Ream cut pipe to full inside diameter.

B. Welding may be done by either the arc or acetylene process conforming to the requirements of the ASME B31.1 – Power Piping.

C. For solder joints use fittings specifically made for soldering. Clean all burrs and roughen pipe to clean; solder complete around joint.

D. For grooved pipe jointing systems use Victaulic couplers or equal.

E. For no-hub cast iron pipe use double screw joint neoprene coupler.

2.7 UNIONS

A. Furnish and install unions necessary for installation and necessary to permit removal of equipment.

B. For unions in steel pipe 1-1/2 inch and smaller use malleable iron ground joint unions with brass to iron seat, galvanized or black as required.

C. For larger unions in steel pipe, use standard weight cast iron flange unions with 1/16 inch thick gaskets, galvanized or black as required.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to installation of piping, verify that it will not interfere with clearances required for the erection and finish of structural members, architectural members, electrical, or mechanical items.

B. Code Compliance: All piping systems and pipe connections to equipment shall be properly anchored and supported to prevent undue deflection, vibration, dislocation due to seismic events and line pressures, and stresses on piping, equipment, and structures. All supports

and parts thereof shall conform to the requirements of ANSI/ASME 831.1 - Power Piping, except as supplemented or modified below. Supports for plumbing piping shall be in accordance with the latest edition of the applicable plumbing code or local administration requirements.

C. Structural Members: Wherever possible, pipes shall be supported from structural members. Where it is necessary to frame structural members between existing members, such supplementary members shall be provided by the Contractor. All supplementary members shall be in accordance with the requirements of the building code and the American Institute of Steel Construction and shall be acceptable to the Engineer.

D. Do not cut any structural members for installation of piping.

E. All pipe supports, hangers, brackets, anchors, guides, and inserts shall be fabricated and installed in accordance with the manufacturer's printed instructions and ASME B31.1 - Power Piping. All concrete inserts for pipe hangers and supports shall be coordinated with the formwork.

3.2 INSERTS

A. Use inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams wherever practicable.

B. Set inserts in position in advance of concrete work. Provide reinforcement rod in concrete for inserts carrying pipe over 12-inches in diameter.

C. Where concrete slabs form finished ceiling, finish inserts flush with slab surface.

D. Where inserts are omitted, drill through concrete slab from below and provide rod with recessed square steel plate and nut above slab.

3.3 SLEEVES

A. Set sleeves in position in advance of concrete work. Provide suitable reinforcing around sleeves.

B. Extend sleeves through potentially wet floors one inch above finished floor level. Caulk sleeves full depth and provide floor plate.

C. Where piping passes through floor, ceiling, or wall, close-off space between pipe and construction with noncombustible insulation. Provide tight-fitting metal caps on both sides and caulk.

3.4 PIPE HANGERS AND SUPPORTS

A. Appearance: Pipe supports and hangers shall be positioned to produce an orderly, neat piping system. All hanger rods shall be vertical, without offsets. Hangers shall be adjusted to line up groups of pipes at the proper grade for drainage and venting, as close to ceilings or roofs as possible, without interference with other work.

B. Support all piping and make adequate provisions for expansion, contraction, slope, and anchorage.

C. The use of pipe hooks, chains, or perforated metal for pipe support will not be permitted.

D. Suspend all piping in the building as shown on the plans.

1. Install hangers to provide minimum ½-inch clear space between finished covering and adjacent work.

E. Place a hanger within one foot of each horizontal elbow.

F. Use hangers which are vertically adjustable 1-1/2 inch minimum after piping is erected.

G. Support horizontal soil pipe near each hub, with five feet maximum spacing between hangers.

H. Support vertical piping at every other floor. Support vertical soil pipe at each floor at hub.

I. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

J. Where practical, support riser piping independently of connected horizontal piping.

3.5 FINISHING

A. Paint exposed piping and supports in accordance with Section 09 90 00 – Painting and Coating.

END OF SECTION 40 05 07

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 05 19 - DUCTILE IRON PIPE AND FITTINGS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials and equipment as required for the installation of all ductile iron pipe, couplings, fittings, and jointing materials where shown on the Plans, including all piping installed under buildings that is connected to PVC yard piping.

B. Coordinate work with all other trades.

1.2 REFERENCE STANDARDS

A.	AWWA C104	Cement-Mortar Lining for Ductile-Iron and Grey-Iron Pipe and Fittings for Water
B.	AWWA C105	Polyethylene Encasement for Ductile-Iron Pipe Systems
C.	AWWA C110	Ductile-Iron and Gray-Fittings, 3 in through 48 in for water
D.	AWWA C111	Rubber Gasket Joints for Ductile-Iron and Grey-Iron Pressure Pipe and Fittings
E.	AWWA C115	Flanged Cast-Iron and Ductile-Iron Pipe with Threaded Flanges
F.	AWWA C151	Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds, for Water or Other Liquids
G.	AWWA C153	Grey-Iron and Ductile-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
H.	AWWA C600	Installation of Ductile-Iron Water Mains and Their Appurtenances

I. State Plumbing Code, as applicable.

1.3 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures and Section 40 05 00 – Piping, General and include, but not limited to the following information:

1. Pipe Manufacturer information, including pipe class and pressure rating and joint design.

2. Pipe Manufacturer information regarding epoxy, glass, and cement-mortar lining, including lining thickness and descriptions of material properties.

3. Certifications: The Contractor shall furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section and as specified in the referenced standard and the following supplemental requirements:

   a. Physical and chemical properties.

   b. Hydrostatic test reports.

4. Submit manufacturer's certification that pipe and fittings meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.

1. The Contractor shall perform said material tests at no additional cost to the Owner. The Engineer shall have the right to witness all testing conducted by the Contractor; provided, that the Contractor's schedule is not delayed for the convenience of the Engineer.

B. Reject any pipe which does not conform to Specifications or is cracked, chipped, or otherwise unacceptable.

C. Use the type, size, and strength rating of the pipe as specified in the proposal or as shown on the Plans.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Use ductile iron pipe conforming to AWWA C151 pressure class 250 minimum unless otherwise required by the plans. The pipe and associated fittings shall be of the diameter and class indicated. The interior lining shall be as indicated in the Pipe Schedule and as described below. Exterior coatings are described in 2.1.I.

B. Use Class 150 grey-iron or ductile iron fittings conforming to AWWA C153 unless otherwise required by the Plans.

C. Use flanged fittings, spools and flanged couplings for <u>all above grade</u> piping whether shown or not and for buried locations if indicated on the Plans to provide a complete functional pipe system. Fittings shall conform to AWWA C110, C111, and C115. All valve and equipment connections shall be flanged.

D. Use mechanical joint fittings, spools, and couplings for <u>all below grade</u> piping whether shown or not and for above grade locations if mechanically restrained and shown on the Plans to provide a complete functional pipe system. Pipe and fittings shall conform to AWWA C110, C111, and C153. The pipe manufacturer shall provide gasket bolt sets for each pipe and spool provided. All buried valve connections shall be mechanical joint.

E. Joint Design: Ductile iron pipe and fittings shall be furnished with mechanical joints, push-on joints, flanged joints, or restrained joints as required.

1. Mechanical and push-on joint shall conform to AWWA C111. Mechanical joints shall be installed with little or no deflection. Following complete assembly, the joint can be deflected as necessary.

2. Flanged joints shall conform to AWWA C115. Where threaded flanges are provided, the pipe wall thickness under the cut threads shall not be less than the calculated net thickness required for the pressure class of the pipe.

3. Restrained joints shall be "Flex-Ring" restrained joint by American Ductile Iron Pipe, "TR Flex" restrained joint by U.S. Pipe, Griffen BOLT-LOK or MECH-LOK or equal.

4. When ductile iron fittings are called out to be mechanically restrained on the Plans, mechanical restraint shall comply with Section 40 05 00 – Piping, General, 2.14. In addition, the pipe joints shall be restrained 30 ft. or a minimum of two pipe joints (whichever is longer) upstream and downstream of a mechanically restrained fitting.

F. Cement-Mortar Lining: Except as otherwise provided herein, interior surfaces of all ductile iron pipe, fittings, and specials used for potable water and non-potable water service (i.e. tertiary effluent) shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with AWWA C104. During the lining operation and thereafter, the pipe shall be maintained in a round condition by suitable bracing or strutting. The lining machines shall be a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found fault at the Site, the damaged or unsatisfactory portions shall be replaced with lining conforming to these Specifications.

1. Cement: Cement for mortar lining shall conform to the requirements of AWWA C104; provided, that cement for mortar lining shall be Type II or V. Cement shall not originate from kilns that burn metal-rich hazardous waste fuel, nor shall a fly ash or pozzolan be used as a cement replacement.

2. The minimum lining thickness shall be double the thickness defined by AWWA C104.

3. Protection of Pipe Lining/Interior: Shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with AWWA C104.

G. Exterior Coating:

1. The exterior surfaces of the pipe which will be exposed to the atmosphere inside structures or above ground shall be thoroughly cleaned and then given a shop coat of rust-inhibitive primer and finish coat conforming to the requirements of Section 09 90 00 – Painting and Coating.

2. All buried mechanical joints, piping and fittings shall be wrapped with a polyethylene 8-mil thick liner low-density film. All buried ductile iron piping shall be provided with a bituminous tar coating on the pipe exterior.

H. Bolts and Nuts: The flange and MJ bolts shall comply with the material specified in Section 05 50 00 – Metal Fabrications.

I. Gaskets shall be as specified in Section 40 05 00 – Piping, General.

PART 3 - EXECUTION

3.1 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect pipe and components against dirt and damage during shipment and storage.

B. The pipe shall be handled according to the manufacturer's specifications to prevent damage to the pipe coating/exterior. The use of chains, hooks, or other equipment that might damage the pipe coating/exterior is prohibited. Stockpiled pipe shall be supported on padded skids, sand or earth berms free of rock exceeding 3 inches in diameter, sandbags, or suitable means so the coating will not be damaged. The pipe shall not be rolled and shall be secured to prevent accidental rolling.

C. Keep jointing material sealed when not in use.

D. Unload and string out pipe in accordance with manufacturer's recommendations and in a manner approved by the Engineer.

3.2 INSTALLATION

A. The pipe shall be installed in accordance with AWWA C600 and per manufacturer's specific instructions. Do not install pipe without continuous support under the barrel or where a dry joint connection cannot be made.

B. Coat all mechanical joints with low density polyethylene film sleeve as per AWWA C105, except where concrete encased as shown.

C. Where necessary to raise or lower the pipe due to unforeseen obstruction or other causes, the Engineer may change the alignment and/or the grades. Such change shall be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 75 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misfit any amount that will be detrimental to the strength and water tightness of the finished joint.

3.3 RUBBER GASKETED JOINTS

A. Rubber Gasketed Joints.

1. For bell end pipe, the bell end of the pipe shall be thoroughly cleaned immediately before joining the pipe, and a clean rubber gasket shall be placed in the bell groove. The spigot end of the pipe and the inside surface of the gasket shall be carefully cleaned and lubricated. The lubricant shall be suitable for lubricating the parts of the joint for assembly.

    a. For potable water pipe the lubricant shall be a compound listed as in compliance with NSF Standard 61. The lubricant shall be nontoxic, shall

not support the growth of bacteria, and shall have no deleterious effects on the gasket material. The lubricant shall not impart taste or odor of water in the pipe. Tilting of the pipe to insert the spigot into the bell will not be permitted.

2. For mechanical joint pipe, once the gasket is placed over the plain end of the pipe and prior to assembly, the gasket shall be thoroughly lubricated so the gasket will "flow" into the wedge-shaped gasket seat during tightening of the bolts.

3.4 INSTALLATION OF PIPE APPURTENANCES

A. Protection of Appurtenances: When the joining pipe is dielectric-coated, buried appurtenances shall be coated in kind. Where pipe is encased in polyethylene sleeves, buried appurtenances shall also be encased in polyethylene.

B. Installation of Valves: Valves shall be handled in a manner to prevent any injury or damage to any part of the valve. Joints shall be thoroughly cleaned and prepared prior to installation. The Contractor shall adjust all stem packing and operate each valve prior to installation to insure proper operation.

C. Valves shall be installed so that the valve stems are plumb in the location indicated.

3.5 PIPELINE TESTING

A. All pipes shall be tested in accordance with Section 1 74 30 – Site Pressure Pipe Testing and Disinfection. The Contractor shall furnish all test equipment, labor, material, and devices at no extra cost to the Owner. Leaks shall be repaired to the satisfaction of the Engineer, and the system shall be re-tested until no leaks are found at no extra cost to the Owner.

END OF SECTION 40 05 19

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 05 51 - VALVES, GENERAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide valves, actuators, and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section shall apply to all valves and valve actuators pertaining to this Work as outlined in Contract Documents. Valves and actuators in particular locations may require a combination of units, sensors, and controls indicated in other Sections of the Specifications.

C. Where a valve is to be supported by means other than the piping to which it is attached, the Contractor shall obtain from the valve manufacturer a design for support and foundation. The design, including drawings and calculations sealed by an engineer, shall be submitted with the Shop Drawings. When the design is approved, the support shall be provided.

D. Unit Responsibility: A single manufacturer shall be made responsible for coordination of design, assembly, testing, and furnishing of each valve; however, the Contractor shall be responsible to the Owner for compliance with the requirements of each valve section. Unless indicated otherwise, the responsible manufacturer shall be the manufacturer of the valve.

E. Single Manufacturer: Where two or more valves of the same type and size are required, the valves shall be furnished by the same manufacturer.

1.2 REFERENCE STANDARDS

A.	ANSI B1.20.1	Pipe Threads, General Purpose
B.	ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings
C.	ANSI B16.5	Pipe Flanges and Flanged Fittings
D.	ANSI B16.18	Cast Copper Alloy Solder Joint Pressure Fittings Class 25, 125, 250 and 800
E.	AWWA C111	Rubber-Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings
F.	AWWA C207	Steel Pipe Flanges for Waterworks Service - Sizes 4 through 144 IN
G.	NEMA	Motors and Generators

1.3 SUBMITTALS

A. Furnish submittals in accordance with Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: Shop Drawings shall contain the following information:

1. Valve name, size, Cv factor, pressure rating, identification number (if any), and Specification Section number.

2. Complete information on valve actuator, including size, manufacturer, number, limit switches, and mounting.

3. Cavitation limits for control valves.

4. Assembly drawings showing part nomenclature, materials, dimensions, weights, and relationships of valve handles, handwheels, position indicators, limit switches, integral control systems, needle valves, and control systems.

5. Complete wiring diagrams and control system schematics.

6. Valve Labeling: A schedule of valves to be furnished with stainless steel tags, indicating in each case the valve location and the proposed wording for the label.

7. Certification that products being used under meet requirements of standards referenced.

C. Operation and Maintenance Data: Provide in accordance with Section 01 78 23 – Operation Maintenance Data.

D. Spare Parts List: A Spare Parts List shall contain the required information for each valve assembly, where indicated.

E. Factory Test Data: Where indicated, signed, dated, and certified factory test data for each valve requiring certification shall be submitted before shipment of the valve. The data shall also include certification of quality and test results for factory-applied coatings.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Valve manufacturers shall have a successful record of not less than five (5) years in the manufacture of the valves indicated.

B. Valve Testing: As a minimum, unless otherwise indicated or recommended by the reference Standards, valves 3-inches in diameter and smaller shall be tested in accordance with manufacturer's standard. Larger valves shall be factory tested as follows:

1. Hydrostatic Testing: Valve bodies shall be subjected to internal hydrostatic pressure equivalent to twice the water rated pressure of the valve. Metallic valves rating pressures shall be at 100 degrees F and plastic valves shall be at 73-degrees, higher temperature according to type of material. During the hydrostatic test, there shall be no leakage through the valve body, end joints, or shaft seals, nor shall any part of the valve be permanently deformed. The duration shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes.

2. Seat Testing: Valves shall be tested for leaks in the closed position with the pressure differential across the seat equal to the water rated pressure of the valve.

The duration of test shall be sufficient time to allow visual examination for leakage. Test duration shall be at least 10 minutes. Leakage past the closed valve shall not exceed 1 fluid ounce per hour per inch diameter for metal seated valves and drop-tight for resilient seated valves.

3. Performance Testing: Valves shall be shop operated from fully closed to fully open position and reverse under no-flow conditions in order to demonstrate the valve assembly operates properly.

C. Certification: Prior to shipment, the Contractor shall submit for valves over 12- inches in size, certified, notarized copies of the hydrostatic factory tests, showing compliance with the applicable standards of AWWA, ANSI, or ASTM.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Valves and gates shall be new and of current manufacture. Shut-off valves 6-inches and larger shall have actuators with position indicators. Gate valves 18-inches and larger or where chain wheel is required, shall be furnished with spur gear and hand wheel. Buried valves shall be provided with valve boxes and covers containing position indicators and valve extensions. Manual shut-off valves mounted higher than 7-feet above working level shall be provided with chain actuators.

B. Valve Actuators: Unless otherwise indicated, valve actuators shall be in accordance with Section 40 05 57 – Actuators for Process Valves and Gates.

C. Protective Coating: The exterior surfaces of all valves and the wet interior surfaces of ferrous valves of sizes 4-inches and larger shall be coated in accordance with manufacturer’s written instructions. The valve manufacturer shall certify in writing that the required coating has been applied and tested in the manufacturing plant prior to shipment. Flange faces of valves shall not be epoxy coated.

D. Valve Labeling: Except when such requirement is waived by the Engineer in writing, a label shall be provided on shut-off valves and control valves except for hose bibbs. The label shall be of 1/16-inch plastic or stainless steel, minimum 2-inches by 4-inches in size and shall be permanently attached to the valve or on the wall adjacent to the valve as directed by the Engineer.

2.2 MATERIALS

A. Materials shall be suitable for the intended application. Materials in contact with potable water shall be listed as compliant with NSF Standard 61. Materials not indicated shall be high-grade standard commercial quality, free from defects and imperfections that might affect the serviceability of the product for the purpose for which it is intended. Unless otherwise indicated, valve and actuator bodies shall conform to the following requirements:

1. Cast Iron: Close-grained gray cast iron, conforming to ASTM A 48 - Gray Iron Castings, Class 30, or to ASTM A 126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.

2. Ductile Iron: ASTM A 536 - Ductile Iron Castings, or to ASTM A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.

3. Steel: ASTM A 216 - Steel Castings, Carbon Suitable for Fusion Welding for High- Temperature Service, or to ASTM A 515 - Pressure Vessel Plates, Carbon Steel, for Intermediate- and Higher-Temperature Service.

4. Bronze: ASTM B 62 - Composition Bronze or Ounce Metal Castings, and valve stems not subject to dezincification shall conform to ASTM B 584 - Copper Alloy Sand Castings for General Applications.

5. Stainless Steel: Stainless steel valve and operator bodies and trim shall conform to ASTM A 351 - Steel Castings, Austenitic, for High-Temperature Service, Grade CF8M, or shall be Type 316 stainless steel.

6. PVC: Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 12454.

7. CPVC: Chlorinated Poly Vinyl Chloride materials for valve body, flanges, and cover shall conform to Cell Classification 23447.

2.3 VALVE CONSTRUCTION

A. Bodies: Valve bodies shall be cast, molded (in the case of plastic valves), forged, or welded of the materials indicated, with smooth interior passages. Wall thicknesses shall be uniform in agreement with the applicable standards for each type of valve, without casting defects, pinholes, or other defects that could weaken the body. Welds on welded bodies shall be done by certified welders and shall be ground smooth. Valve ends shall be as indicated, and be rated for the maximum temperature and pressure to which the valve will be subjected.

B. Valve End Connections: Unless otherwise indicated, valves 2-1/2 inches diameter and smaller may be provided with threaded end connections. Valves 3-inches and larger shall have flanged end connections.

C. Bonnets: Valve bonnets shall be clamped, screwed, or flanged to the body and shall be of the same material, temperature, and pressure rating as the body. The bonnets shall have provision for the stem seal with the necessary glands, packing nuts, or yokes.

D. Stems: Valve stems shall be of the materials indicated, or, if not indicated, of the best commercial material for the specific service, with adjustable stem packing, O-rings, Chevron V-type packing, or other suitable seal. Where subject to dezincification, bronze valve stems shall conform to ASTM B 62, containing not more than 5 percent of zinc or more than 2 percent of aluminum, with a minimum tensile strength of 30,000 psi, a minimum yield strength of 14,000 psi, and an elongation of at least 10 percent in 2 inches.

E. Stem Guides: Stem guides shall be provided per the manufacturer’s recommendations. Submerged stem guides shall be 304 stainless steel.

F. Internal Parts: Internal parts and valve trim shall be as indicated for each individual valve. Where not indicated, valve trim shall be of Type 316 stainless steel or other best suited material.

G. Nuts and Bolts: The Contractor shall be responsible in providing anchor bolts for all owner–furnished and other equipment supplied to this project. For all bolts, nuts, and washers requirements see Section 05500 – Miscellaneous Metalwork.

1. Anchor bolt holes in equipment support frames shall not exceed the bolt diameters by more than 25 percent, up to a limiting maximum oversizing of 1/4 inch. Minimum anchor bolt diameter shall be 1/2 inch. Anchor bolts shall be furnished with leveling nuts, the faces of which shall be tightened against flat surfaces as shown to not less than 10 percent of the bolt's safe tensile stress.

2. Tapered washers shall be provided where mating surface is not square with the nut.

3. Adhesive anchors shall comply with requirements listed in Section 05500 – Miscellaneous Metalwork.

2.4 VALVE ACCESSORIES

A. Valves shall be furnished complete with the accessories required to provide a functional system.

2.5 SPARE PARTS

A. The Contractor shall furnish the required spare parts suitably packaged and labeled with the valve name, location, and identification number. The Contractor shall also furnish the name, address, and telephone number of the nearest distributor for the spare parts of each valve. Spare parts are intended for use by the Owner, after expiration of the correction of defects period.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation, inspect interconnecting piping and end connections to assure compatibility.

B. Prior to installation, inspect and verify condition of valve and appurtenances. Installation constitutes installer's acceptance of product condition for satisfactory installation.

C. Assure exposed piping is sufficiently supported to bear weight of valve when it is installed.

3.2 PREPARATION

A. Correct defects or conditions, which may interfere with or prevent a satisfactory installation.

3.3 VALVE INSTALLATION

A. Valves, actuating units, stem extensions, valve boxes, and accessories shall be installed in accordance with the manufacturer's written instructions and as indicated. Gates shall be adequately braced to prevent warpage and bending under the intended use. Valves shall be firmly supported to avoid undue stresses on the pipe.

B. Access: Valves shall be installed with easy access for actuation, removal, and maintenance and to avoid interference between valve actuators and structural members, handrails, or other equipment.

C. Valve Accessories: Where combinations of valves, sensors, switches, and controls are indicated, the Contractor shall properly assemble and install such items so that systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on Shop Drawing submittals.

END OF SECTION 40 05 51

SECTION 40 05 57 – ACTUATORS FOR PROCESS VALVES AND GATES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide all valve actuators and appurtenances, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section shall apply to all valves and gates, except where otherwise indicated in the Contract Documents.

C. Unit Responsibility: A single manufacturer shall be responsible for furnishing and coordinating design, assembly, testing, and installation of each type of valve and gate; however, the Contractor shall be responsible to the Owner for compliance with the requirements of each valve and gate section.

D. Single Manufacturer: Where two or more valve or gate actuators of the same type or size are required, the actuators shall all be produced by the same Manufacturer.

1.2 REFERENCE STANDARDS

A. Unless otherwise indicated and where applicable, all actuators shall be in accordance with ANSI/AWWA C540 - AWWA Standard for Power-Actuating Devices for Valves and Sluice Gates.

B. National Electrical Manufacturer’s Association (NEMA).

1.3 SUBMITTALS

A. Submittals shall be furnished in accordance with Section 01 33 00 – Submittal Procedures and Section 40 05 51 - Valves, General.

B. Shop Drawings: Shop Drawings of all actuators shall be submitted together with the valve and gate submittals as a complete package.

C. Motorized valve submittals shall include the following:

1. Installation list of similar municipal applications with contacts and phone numbers to verify experience.

2. Shop drawings and product data.

3. Motor, gear type and design information.

4. Design Data shall include:

a. Operating calculations for max break and max dynamic torques and minimum safety factor at which degree of valve opening and at break.

b. Submit data and calculations to substantiate operating time.

c. Submit proposed operator configuration and dimensions for each valve.

5. Wiring Schematics.

6. Manufacturer's published installation instructions.

7. Submit Operation and Maintenance Manuals in accordance with Section 01 78 23 – Operation and Maintenance Data.

8. Warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. The motorized operators offered for this project shall have a minimum of 5 years of commercial use in municipal wastewater installations of a similar scope and use. New and prototype hardware/software will not be accepted.

2. Submit evidence of satisfactory operation of the proposed product in at least five separate facilities in accordance with the following requirements. Include contact names and phone numbers.

PART 2 - PRODUCTS

2.1 GENERAL

A. All valve and gate actuators shall comply with the requirements of Section 40 05 51 – Valves, General.

B. Unless otherwise indicated, all shut-off and throttling valves, and externally actuated valves and gates, shall be provided with manual actuators. The Contractor shall furnish all actuators complete and operable with mounting hardware, motors, gears, controls, wiring, solenoids, handwheels, levers, chains, and extensions, as applicable. All actuators shall be capable of holding the valve in any intermediate position between fully-open and fully-closed without creeping or fluttering. All wires of motor-driven actuators shall be identified by unique numbers.

C. Where indicated, certain valves and gates may be provided with actuators manufactured by the valve or gate Manufacturer. Where actuators are furnished by different manufacturers, the Contractor shall coordinate selection to have the fewest number of manufacturers possible.

D. Materials: All actuators shall be current models of the best commercial quality materials and liberally sized for the maximum expected torque. All materials shall be suitable for the environment in which the valve or gate is to be installed.

E. Mounting: All actuators shall be securely mounted by means of brackets or hardware specially designed and sized for this purpose and of ample strength. The word "open" shall be cast on each valve or actuator with an arrow indicating the direction to open in the counterclockwise direction. Where possible, manual actuators shall be located between 48 and 60 inches above the floor or the permanent working platform.

F. Functionality: Electric and pneumatic actuators shall be coordinated with power and instrumentation equipment indicated elsewhere in the Contract Documents.

2.2 MANUAL ACTUATORS

A. Unless otherwise indicated, all valves and gates shall be furnished with manual actuators as specified below:

1. Valves up to and including 4 inches in diameter shall have direct acting lever or handwheel actuators of the manufacturer's best standard design.

2. Larger valves and gates shall have gear-assisted manual actuators, with a maximum operating pull of 60 pounds on the rim of the handwheel.

a. Above ground valves 6-inches to 24-inches in diameter may have traveling nut actuators, worm-gear actuators, spur- or bevel-gear actuators, as appropriate for each valve.

b. Above ground valves 30-inches in diameter and greater and valves for pressures higher than 250 psi shall have totally enclosed worm-gear actuators.

c. Buried and submerged valves, gates, and other valves as indicated shall have totally enclosed worm-gear actuators, hermetically sealed water-tight and grease-packed.

B. Buried Valves: Unless otherwise indicated, buried valves shall have extension stems to grade, with square nuts or floor stands, position indicators, and cast-iron or steel pipe extensions with valve boxes, covers, and operating keys. Where so indicated, buried valves shall be in cast-iron, concrete, or similar valve boxes with covers of ample size to allow operation of the valve actuators. Covers of valve boxes shall be permanently labeled as required by the local Utility Company or the Engineer. Wrench-nuts shall comply with AWWA C500 – Metal-Seated Gate Valves for Water Supply Service.

C. Chain Actuator: Manually activated valves with the stem located more than 7-feet above the floor or operating level shall be furnished with chain drives consisting of sprocket-rim chain wheels, chain guides, and operating chains, and be provided by the valve Manufacturer. The wheel and guide shall be of ductile-iron, cast-iron, or steel, and furnish heavy-duty, Type 304 stainless steel operating chain looped to extend within 3-feet of the operating floor level. The valve stem of chain-actuated valves shall be extra strong to allow for the extra weight and chain pull. Hooks shall be provided for chain storage where chains interfere with pedestrian traffic.

D. Floor Boxes: Hot dip galvanized cast-iron or steel floor boxes and covers to fit the slab thickness shall be provided for all operating nuts in or below concrete slabs. For operating nuts in the concrete slab, the cover shall be bronze-bushed.

E. Manual Worm-Gear Actuator: The actuator shall consist of a single or double reduction gear unit contained in a weather-proof cast-iron or steel body with cover and minimum 12-inch diameter handwheel. The actuator shall be capable of 90-degree rotation and shall be equipped with travel stops capable of limiting the valve opening and closing. The actuator shall consist of spur or helical gears and worm-gearing. The spur or helical gears shall be of hardened alloy steel and the worm-gear shall be alloy bronze. The worm-gear shaft and the handwheel shaft shall be of stainless steel. All gearing shall be accurately cut with hobbing machines. Ball or roller bearings shall be used throughout. Actuator output gear changes shall be mechanically possible by simply changing the exposed or helical gear set ratio without further disassembly of the actuator. All gearing shall be designed for a 100 percent overload.

2.3 ELECTRIC MOTOR ACTUATORS

A. Where electric motor actuators are indicated, an electric motor-actuated valve control unit shall be attached to the actuating mechanism housing by means of a flanged motor adaptor piece.

B. Design:

1. The actuators shall be suitable for use on a nominal 230 VAC, single phase, 60Hz power supply and are to incorporate motor, integral reversing starter, local control facilities and terminals for remote control and indication connections housed within a self-contained, sealed enclosure.

2. Meet applicable AWWA requirements and meet the requirements set out in EN15714-2 and ISA SP96.02.

3. The actuator shall be sized to guarantee valve closure. The safety margin of motor power available for seating and unseating the valve shall be sufficient to ensure torque switch trip at maximum valve torque with the supply voltage 10% below nominal. For linear operating valves, the operating speed shall be such as to give valve closing and opening at approximately 10-12 inches per minute unless otherwise stated in the data sheet. For quarter turn valve types, the operating time will be a maximum of 60 seconds.

4. Handwheels for Manual Operation:

   a. Metallic with arrows to indicate "open" rotation; incapable of rotation during motor operation; unaffected by fused motor, being mechanically independent of the motor drive; maximum 80 pound pull on rim for manual operation. Actuators shall be fitted with 2-inch AWWA nut for portable operator. When in the manual operating mode, actuator to remain in this mode until motor is energized, at which time the actuator shall automatically return to electric operation.

5. Declutch Lever: Padlockable, capable of mechanically disengaging motor and related gearing positively when motor is de-energized and freeing handwheel for manual operation.

a. Do not share any gearing between motor operation and handwheel operation.

b. Design so that simultaneous manual and motor operation is impossible.

6. Motorized operators shall be provided with an integrally mounted communication module within the actuators, to allow non-intrusive set up, double sealed electrical housing and shall not require access after factory fitting. In order to maintain the integrity of the enclosure, setting of the torque levels, position limits and configuration of the indication contacts etc. shall be carried out without the removal of any actuator covers and without mains power over an Infra-red or *Bluetooth*® wireless interface. Sufficient commissioning tools shall be provided with the actuators and must meet the enclosure protection and certification levels of the actuators. Commissioning tools shall not form an integral part of the actuator and must be removable for secure storage. In addition, provision shall be made for the protection of configured actuator settings by a means independent of access to the commissioning tool. Provision shall be made to disable *Bluetooth*® communications or only allow a *Bluetooth*® connection initiated by an Infra-Red command for maximum security.

a. Each operator shall have independent HAND-OFF-AUTO selector switch and OPEN-CLOSE control devices that are wired to the motor starter circuit and completely isolated and independent of the valve actuator remote control network.

b. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel irrespective of the connection sequence of the power supply.

7. The complete motorized operator enclosure shall be:

a. NEMA 4 and NEMA 6 submersible to IP68 (20 feet of head for 72 hours). Actuators shall be suitable for indoor and outdoor use. The actuator shall be capable of functioning in an ambient temperature ranging from -15°F to 140°F, up to 100% relative humidity.

b. Actuators for hazardous area applications shall meet the area classification, gas group and surface temperature requirements specified in data sheet.

c. Equipped with a separately sealed (double “O” ring) terminal area, such that with the terminal cover removed the actuator’s internal components are protected from environmental moisture and dust during storage and “no-power” conditions, start-up and working life. Enclosure must allow for temporary site storage without the need for electrical supply connection.

d. All external fasteners shall be stainless steel.

C. Actuator Gearing:

1. Meet applicable AWWA requirements.

2. Single reduction type with hardened alloy steel worm gear, and aluminum bronze worm gear set; self-locking to maintain gate position.

3. Power Gearing: Accurately cut to assure minimum backlash; anti-friction bearing with caged balls or rollers throughout.

4. Stem Nuts: High tensile aluminum bronze; accurately machined and mounted in heavy ball or roller bearings.

5. Actuator Gear Housing: Aluminum housing with a separate cast iron thrust base.

6. Lubrication: Rotating power train components immersed in oil with provisions for inspection and re-lubrication without disassembly.

    a. Lubricants: Suitable for ambient conditions of -20 degrees F to +150 degrees F.

    b. Provide seals on shafting. All seals, feed throughs, and bearings shall provide sealing such that the actuator can be mounted in any position with no leakage of oil. Secondary gearboxes shall be externally attached to the actuator to accommodate variations in output speeds, torques or operating times and for use with quarter-turn valves. These multi-turn and quarter-turn gearboxes are to use accurately cut gears suitable for motor drive.

D. Motors:

1. The motor shall an integral part of the actuator, designed specifically for valve actuator applications. It shall be a low inertia high torque design, class F insulated with a class B temperature rise giving a time rating of 15 minutes at 40°C (104°F) at an average load of at least 33% of maximum valve torque. Where the total cycle time (two complete strokes) is longer than 15 minutes then NEMA Class H motor for 30 minute duty rating is to be used, with a maximum continuous temperature rating of 125 degrees C rise over ambient Temperature shall be limited by 2 thermostats embedded in the motor end windings and integrated into its control. Type: Specifically designed for gate actuator service with high starting torque, low inertia, totally enclosed, non-ventilated construction.

2. Protection shall be provided for the motor as follows:

    a. Stall - the motor shall be de-energized within 8 seconds in the event of a stall when attempting to unseat a jammed valve.

    b. Over temperature - thermostat will cause tripping of the motor. Auto-reset on cooling.

    c. Single phasing - lost phase protection

    d. Direction – phase rotation correction

3. Motor Windings: Epoxy treated.

4. Size: Sufficient to provide the maximum torque required for valve opening/closing operation, with a safety factor of 1.5. Torque shall be based on the valve manufacture's calculated torque required for opening/closing at full differential and maximum valve dynamic torque.

5. Voltage Tolerance: Capable of operating at within 10 percent of specified voltage.

6. Motor Starters:

   a. For Open-Close Service: Self-contained electromechanical reversing starter suitable for 60 starts/hr.

   b. For Modulating Service: Self-contained solid-state reversing starter suitable for 1,200 starts per hour. The hammer action will be replaced by a direct drive.

7. Accessories: Internal thermal contacts embedded in the motor windings for detecting motor overload and a ground lug.

8. Power Supply: As scheduled or as indicated on the Drawings.

9. Enclosures for Motors, Switches, and Other Electrical Compartments shall be:

   a. In Class 1, Division 1 or Division 2, classified areas or where indicated in the Motorized Operator Schedule: NEMA 7 and NEMA 6 submersible to IP68.

   b. In other locations: NEMA 4 and NEMA 6 submersible to IP68.

   c. Terminal compartment shall have three threaded cable entries as a minimum. Provide additional threaded entries if required or indicated on the Drawings.

E. Controls:

1. Coordinate requirements with P&IDs and electrical schematics.

2. Voltage Transformer:

   a. As required to step down power supply to control voltage.

   b. Size voltage transformer to provide 24VDC or 120 VAC control power, for customer signals, indication and interlock relays as needed with 25 percent spare capacity or 15 VA, whichever is greater, for the multi-turn actuator.

3. Control Station:

   a. Integral with operator. Enclosures shall be:

1) In Class 1, Division 1 or Division 2 classified areas: NEMA 7 and NEMA 6 submersible to IP68.

2) In other locations: NEMA 4 and NEMA 6 submersible to IP68.

b. Provided with Following Devices:

1) HAND-OFF-AUTO selector switch, lockable in the OFF position.

2) OPEN and CLOSE pushbuttons.

3) OPEN and CLOSE indicating lights.

4. Torque Sensing:

a. Torque and thrust loads in both closing and opening directions shall be limited by a torque sensing device.

b. Torque setting: 40 percent to 100 percent rated torque, adjustable in 1% increments and indicated locally.

5. Electric Circuit Diagrams:

a. Identical regardless of whether gates are to open or close on torque or position limit.

b. Non-intrusive calibration-adjustment and interrogation of the actuator shall be accomplished without the removal of any of the actuator's covers. Non-intrusive calibration, adjustment & interrogation will be by means of a setting tool to provide speedy interrogation capabilities as well as security. The setting tool shall be in a non-intrusive intrinsically safe watertight casing. In addition it shall be possible to use a PDA or laptop.

6. Valve Position/Actuator Status Indication:

a. The actuator shall provide a local display of the position of the valve, even when the power supply is not present.

b. In the event of a (main) power (supply) loss or failure, the position contacts shall continue to be able to supply remote position feedback and maintain interlock capabilities.

c. Absolute position measurement should be incorporated within the actuator. The technology must be capable of reliably measuring position even in the case of a single fault. The design must be simple with the minimum amount of moving parts (no more than 5). Technologies such as LEDs or potentiometers for position measurement are considered unreliable and therefore not preferred. The position of the actuator and valve shall be updated contemporaneously, even when the power supply is not present.

d. Four contacts shall be provided which can be selected to indicate any position of the valve; Provision shall be made for the selection of a normally closed or open contact form. Contacts shall maintain and update position indication during handwheel operation when all external power to the actuator is isolated. The contacts shall be rated at 5 Amps, 250 VAC, 30 VDC. Provision shall be made in the design for an additional eight contacts having the same functionality. A configurable monitor relay shall be provided as standard, which can be used to indicate either Availability or Fault. The relay should be a spring return type with a Normally Open / Normally Closed contact pre-wired to the terminal bung.

e. As an alternative to providing valve position, any of the above contacts shall be selectable to signal one of the following:

1) Valve Opening or Closing.

2) Motor Tripped on Torque in Mid Travel.

3) Motor Stalled.

4) Actuator Being Operated by Handwheel.

f. For actuators in modulating service, provide a controller that will accept a 4-20 mA analog signal. Additionally, a 4-20 mA position transmitter shall be included to provide a valve position feedback. The controller shall compare the input signal with the feedback signal to produce an error signal. The controller shall cause the motor to move the valve or gate in a direction so as to reduce the magnitude of the error signal. The controller positioning accuracy shall be plus or minus 1.0 percent of travel or better. It shall be possible to adjust Dead Band (0 to 9.9 percent of travel) and a Motion Inhibit Timer (2 to 99 seconds), and select action upon loss of signal, open/close/stay put.

7. Integral Starter and Transformer

a. The reversing starter, control transformer and local controls shall be integral with the valve actuator, suitably housed to prevent breathing and condensation. The starter shall be suitable for 60 starts per hour and of rating appropriate to motor size. The controls supply transformer shall be fed from two of the incoming three phases and incorporate overload protection. It shall have the necessary tapping and be adequately rated to provide power for the following functions:

1) Energizing of the contactor Coils

2) 24VDC or 110V AC output for remote controls (maximum 5W/VA)

3) Supply for all internal electrical circuits

8. Local Position Indication:

a. The actuator display shall include a dedicated numeric/symbol digital position indicator displaying valve position from fully open to fully close in 0.1% increments. Valve closed and open positions shall be indicated by symbols showing valve position in relation to the pipework to ensure that valve status is clearly interpreted. With mains power connected, the display shall be backlit to enhance contrast at all ambient light levels and shall be legible from a distance of at least 5m (16ft).

b. Red, green, and yellow LEDs corresponding to open, closed and intermediate valve positions shall be included on the actuator display when power is switched on. The yellow LED should also be fully programmable for on/off, blinker and fault indication. The digital display shall be maintained and updated during handwheel operation when mains power to the actuator is isolated.

c. The actuator display shall include a fully configurable dot-matrix display element with a minimum pixel resolution of 168 x 132 to display operational, alarm, configuration and graphical datalogger information. The text display shall be selectable between English and other languages such as: Spanish, German, French, and Italian. Provision shall be made to upload a different language without removal of any covers or using specialized tools not provided as standard with the actuator Local Display: Large enough to be readable from a distance of six feet when the actuator is powered up. It shall be possible to rotate the display in 90 degree increments to compensate for the actuators installed position.

d. Each actuator shall include a Data Logger to provide diagnostic information for maintenance & preventative maintenance purposes, including torque curves for both open & close strokes. This information is to be accessed by means of a) the setting tool, b) PDA or c) laptop, and in a format that can be saved electronically or on paper and then viewed at a later date. The software to achieve this and any updates to the software are to be supplied at no extra cost to the end user. Datalogger graphical displays should as a minimum be able to display log and trend graphs on the local LCD for the following:

    1) Torque versus Position

    2) Number of Starts versus Position

    3) Number of starts per hour

    4) Dwell Time

    5) Average temperature.

e. The main display shall be capable of indicating 4 different home-screens of the following configuration:

    1) Isolation and status

2) Position and torque (analogue)

3) Position and torque (digital)

4) Position and demand (positioning).

F. Operation:

1. Controller System: Rated as follows:

a. Open-Close Service - 60 starts per hour (minimum).

b. Modulating Service - 1,200 starts per hour (minimum).

G. Manufacturers:

1. Intelligent electric actuators with torque output requirements of 750 ft-lbs and less for butterfly valves and eccentric plug valves shall be quarter turn type. Acceptable manufactures include:

a. Rotork “IQT Series”

b. Limitorque “QX”

c. EIM “HQ Series”

2. Intelligent electric actuators for open-close service shall be multi-turn type. Acceptable manufacturers include:

a. Rotork “IQ Series”

b. Limitorque “MX”

c. EIM “TEC 2000”

3. Intelligent electric actuators for modulating service shall be as follows:

a. Rotork “IQ Series”

b. Limitorque “MX”

c. EIM “TEC 2000”

4. Intelligent actuators for explosion proof service shall be as follows:

a. Rotork “IQ Series”

b. Limitorque “MX”

c. EIM “TEC 2000”

PART 3 - EXECUTION

3.1 GENERAL

A. Field representatives of manufacturers of valves or gates with electric actuators shall adjust actuator controls and limit switches in the field for the required function.

B. All valve and gate actuators and accessories shall be installed in accordance with Section 40 05 51 - Valves, General. Actuators shall be located to be readily accessible for operation and maintenance, without obstructing walkways. Actuators shall not be mounted where shock or vibrations will impair their operation, nor shall the support systems be attached to handrails, process piping, or mechanical equipment.

3.2 SOURCE QUALITY CONTROL

A. Record details of specification, such as gear ratios, closing direction, and serial number on the test certificates.

3.3 INSTALLATION

A. Install operators in accordance with manufacturer's instructions.

3.4 COMMISSIONING KIT

A. Each actuator shall be supplied with a start-up kit comprising installation instruction manual and cover seals to make good any site losses during the commissioning period. In addition, sufficient actuator commissioning tools shall be supplied to enable actuator set up and adjustment during valve/actuator testing and site installation commissioning.

END OF SECTION 40 05 57

SECTION 40 05 61 - GATE VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide gate valves and appurtenances, complete and operable, in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Provide shop drawings per Section 01 33 00 – Submittal Procedures and Section 40 05 51 – Valves, General.

PART 2 - PRODUCTS

2.1 RESILIENT-SEATED GATE VALVES (2-INCH AND LARGER)

A. Construction: Resilient-seated gate valves for water and sewage service shall conform to ANSI/AWWA C515 – Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service. The valve bodies shall be of cast iron conforming to ASTM A 126 - Specifications for Gray Iron Castings for Valves, Flanges, and Pipe Fittings, or ductile iron conforming either to ASTM A 395 - Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures, or to ASTM A 536 - Specification for Ductile Iron Castings, with flanged, bell and spigot, or mechanical joint-ends as indicated.

1. The wedge shall be ductile iron or bronze encapsulated with EDPM rubber.

B. Body and bonnett wall thickness shall be equal to or greater than the minimum wall thickness as listed in Table 2 of ANSI/AWWA C500. The design working water pressure shall be 250 psig. For sewage or fluids containing solids, an outside thread shall be used.

C. The gate valve stem and wedge nut shall be copper alloy in accordance with Section 4.4.5.1 of the AWWA C515 Standard. The stem shall have an integral thrust collar.

D. Valves shall be certified NSF to Standard 61.

E. The operating nut shall be constructed of ductile iron and shall have four flats at stem connection.

F. Stem shall be sealed by three O-Rings.

G. All internal and external surfaces of the valve body and bonnet shall have a fusion-bonded epoxy coating, complying with ANSI/AWWA C550, applied electrostatically prior to assembly.

2.2 VALVE SCHEDULE

A. In addition to providing all necessary valves 4-inch diameter and smaller, the Contractor shall provide the following valves:

Valve TAG No.	Dia (in)	Service	Location
GV-D101	6	Water	Grove Well

2.3 ACTUATORS

A. Unless otherwise indicated, all gate valves shall have manual actuators in accordance with Section 40 05 57 – Actuators for Process Valves and Gates.

2.4 MANUFACTURERS, OR EQUAL

A. American Flow Control;

B. Clow Valve Co.;

C. Crane Valves;

D. Kennedy Valve;

E. M & H Valve Company.

PART 3 - EXECUTION

3.1 GENERAL

A. All gate valves shall be installed in accordance with the provisions of Section 40 05 51 – Valves, General. Care shall be taken that all valves in plastic lines are well supported at each end of the valve.

END OF SECTION 40 05 61

SECTION 40 05 64 - BUTTERFLY VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required to furnish and install butterfly valves with manual, electric or pneumatic actuators as indicated on the Plans and in accordance with these specifications.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

1.	ANSI/AWWA C504	Rubber-Seated Butterfly Valves.
2.	ANSI/AWWA C540	Power Actuating Devices for Valves and Sluice Gates
3.	ANSI/AWWA C550	Protective Epoxy Interior Coatings for Valves and Hydrants
4.	ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800
5.	ANSI B16.5	Pipe Flanges and Flanged Fittings
6.	ASTM A48	Specifications for Gray Iron Castings
7.	ASTM A126	Gray Iron Castings for Valves, Flanges and Pipe Fittings
8.	ASTM A276	Specifications for Stainless and Heat-Resisting Steel Bars and Shapes
9.	ASTM A436	Austenitic, Gray Iron Castings
10.	ASTM A536	Ductile Iron Castings
11.	MSS SP67	Butterfly Valves

1.3 SUBMITTALS

A. Provide shop drawings per Section 01 33 00 – Submittal Procedures and Section 40 05 51 – Valves, General including:

1. Complete Shop Drawings of butterfly valves and actuators.

2. Drawings showing valve port diameter complete with dimensions, part numbers and materials of construction

3. Certification of proof-of-design test form the valve manufacturer.

4. If automatically actuated, provide actuator information in accordance with Section 40 05 57 – Actuators for Process Valves and Gates.

5. For above grade installations, provide literature regarding valve position indicators and installation information to indicate if valves must be installed in the upright position. If valve must be installed in upright position, provide modified valve position indicator that can be seen from the floor when opening or closing the valve.

1.4 QUALITY ASSURANCE

A. Valves shall be subjected to performance, leakage, and hydrostatic test in accordance with procedures and acceptance criteria established by AWWA C504.

PART 2 - PRODUCTS

2.1 GENERAL

A. Butterfly valves shall comply with the requirements of Section 40 05 51 – Valves, General.

2.2 BUTTERFLY VALVES FOR GENERAL PURPOSE SERVICE

A. Butterfly valves shall be rubber seated butterfly valves that conform to AWWA C504, rated for water working pressures up to 150 psig, subject to the following requirements. Butterfly valves for general purpose service shall be rubber seated butterfly valves that conform to AWWA C504, rated for water working pressures up to 150 psig, subject to the following requirements. Valves shall be of the size and class indicated, suitable for bubble tight shut-off service as well as throttling service at rated pressure at ambient temperatures of 33 to 125 degrees F. Lug or wafer style valves shall have ANSI 125 lb flange bolt hole patterns.

B. Body: The valve body shall be of cast iron conforming to ASTM A126 - Specifications for Gray Iron Castings for Valves, Flanges and Pipe Fittings, Class B, with either wafer, lug, or flanged design as indicated in drawings, drilled to ANSI B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 125. The entire body shall be factory coated with an epoxy coating system in accordance with AWWA C550.

C. Disc: The disc shall be a ductile iron conforming to ASTM A536, with factory applied epoxy coating in accordance with AWWA C550. The disc shall have no holes drilled into it for securing the disc to the stem with pins, screws, or any other such hardware. If the disc design is such that securing hardware is required then the disc and securing hardware shall both be type 316 stainless steel.

D. Seat: The valve seat shall be Ethylene-Propylene-Diene Monomer (EPDM) or Buna N and shall be bonded or vulcanized to the valve body.

E. Stem: The valve stem shall be a Type 316 stainless steel ASTM A276, with keyed slots on the stem to make with receiving slots on the inner part of the disc requiring no disc

screws or pins for connection of the tem to the disc. If connecting pins or screws are required for a particular manufacturer's design, then the disc as well as the connecting hardware shall be type 316 stainless steel.

F. Stem Bushing: The stem bushing shall be a non-corrosive, heavy duty acetal bushing.

G. Stem Seal: The stem shall be a double "U" cup seal or O-ring designed which is self adjusting and provides positive sealing in both directions, and is suitable for the service condition.

H. Flange / Style: Unless otherwise specified or noted on the drawings, the style of each butterfly valve shall be lug style. The Contractor shall not use any type of raised face type PVC flange on either side of any butterfly valve. Contractor shall be responsible to ensure that the selected butterfly valve will fully open and close without any physical interference at all.

I. Testing: Valves shall be factory leak tested in accordance with AWWA C504.

J. Manufacturers or equal:

1. DeZurik Water Controls

2. Henry Pratt Company

3. Bray

4. Val-matic

2.3 BUTTERFLY VALVES FOR AIR SERVICE

A. General: Butterfly valves for air service shall be specifically designed for this service and meet or exceed the design, strength, performance, and testing standards of AWWA C504. They shall be suitable for pressures from vacuum to 125 psi and temperatures from minus 40 degrees F to 300 degrees F.

B. Body: The valve body shall be of cast iron conforming to ASTM A126, Class B, with lug or flanged design as indicated, drilled to ANSI B16.1, Class 25, 125, 250, and 800, Class 125.

C. Disc: The disc shall be cast iron conforming to ASTM A126 with a nylon coating, bronze, or Type 316 stainless steel. The disc shall be designed with the air- profile or other suitable shape. Sprayed or plated disc edges are not acceptable.

D. Seat: The elastomer seat shall be in the body. It shall be field-replaceable without special tools. The seat material shall be EPDM to provide a tight shut-off at the temperatures above.

E. Shaft: The valve shaft shall be of Type 316 or 304 stainless steel, with sufficient strength to allow for the increased torque for air service.

F. Bearings: Shaft bearings shall be of the self-lubricating corrosion resistant sleeve type.

G. Packing: The packing shall be of the adjustable or self adjustable (a-ring) type, suitable for the temperature and service conditions.

H. Manufacturers, or Equal:

1. DeZurik water Controls

2. Henry Pratt Company

3. Bray

2.4 VALVE SCHEDULE

A. In addition to providing all necessary valves 3-inch diameter and smaller, the Contractor shall provide the butterfly valves as shown on the valve schedule in the Contract Drawings.

2.5 ACTUATORS

A. Manual Actuators: Actuators shall conform to Section 40 05 57 – Actuators for Process Valves and Gates and to ANSI / AWWA C540 - Power Actuating Devices for Valves and Sluice Gates, subject to the following requirements. Unless otherwise indicated, all manually-actuated butterfly valves of 6 inch diameter and larger shall be equipped with a handwheel and 2-inch square actuating nut and position indicator. Manual lever type actuators shall allow for positive throttling and have at minimum 10 stop positions from open to close for positive locking of the valve. The manual lever type actuators as well as handwheel actuators shall have an epoxy coating per Section 09 90 00 – Painting and Coating.

B. Electric Actuators: Where indicated on Plans, provide electric actuators that meet the requirements of AWWA C 540 and are in accordance with Section 15201 – Valve and Gate Actuators. The maximum torque for the valve shall be input into the actuator program to be the maximum torque applied by the actuator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation, inspect interconnecting piping and end connections to ensure compatibility.

B. Prior to installation, inspect and verify condition of valve and appurtenances.

C. Ensure exposed piping is sufficiently supported to bear weight of valve when it is installed.

3.2 PRODUCT HANDLING

A. Protect valves and components against dirt and damage during shipment and storage.

B. Handle valves to prevent damage or contamination.

3.3 INSTALLATION

A. Install all valves in accordance with manufacturer's recommendations and with Section 40 05 51 – Valves, General.

END OF SECTION 40 05 64

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 05 97 - PIPING IDENTIFICATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide identification for exposed piping and valves, complete and in place, in accordance with the Contract Documents.

B. All mechanical pipe systems shall have protective coatings applied in accordance with Section 09 90 00 – Painting and Coating.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

1. ANSI A13.1 Scheme for the Identification of Piping Systems

1.3 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 00 – Submittal Procedures.

B. Shop Drawings: A list of suggested labels for each valve tag and pipe system prior to fabrication.

C. The Contractor shall submit one sample of all types of identification devices to be used in the Work.

PART 2 - PRODUCTS

2.1 IDENTIFICATION OF PIPING

A. Except as indicated below for very short pipe lengths, identify exposed piping larger than 2-inches nominal size (except that all chemical pipes shall be identified) for the pipe contents and direction of flow. Pipe identification shall be as manufactured by Brady, Seton, or equal.

B. Marker Type: Adhesive – Vinyl or polyester sheet with UV–resistant ink, shaped similar to pipe curvature and coated with pressure sensitive adhesive.

C. Marker Area: Sized per pipe size according to ANSI A13.1; color from the table below.

D. Lettering: Sized per pipe size according to ANSI A13.1; color from the table below.

E. Arrows: At least 2 arrows at each marker area, showing direction of flow.

F. Pipe 2-inches and smaller shall be identified by plastic plates made from laminated 3-layer plastic with engraved black letters on white background.

G. Standard Piping Colors: Paint piping to be in accordance with Table 1 - Color Schedule and in accordance with the requirements of the Specifications for type and quality of paint as hereafter specified. This schedule is to be used only for color and identification purposes.

H. In installations where existing piping identification systems have been established, the Contractor shall follow the existing system. Where existing identification systems are incomplete, utilize the existing system as far as practical and supplement with the indicated system.

Mechanical Piping Color Schedule Piping Color Code			
ANSI Classification	Typical Project Piping	Pipe Color	Letter Color
Flammable or Explosive Liquid (Dangerous)	Chlorine	Safety Yellow	Black
Flammable or Explosive Gas (Dangerous)	Chlorine Natural Gas Hydrogen Dilution Vent	Safety Green Safety Orange	Black White
Liquid or Liquid Mixture	Utility Water Potable Water, Cold Potable Water Hot Raw Waste Water Drains Vents Finish Water Backwash Water RAS/WAS Overflow Alum Sample Polymer Solution	Light Blue Dark Blue Med. Blue Dark Green Gray Gray Light Blue Gray Brown Gray Gray Gray Gray	Black Black Black Black Black Black Black Black Black Black Black Black Black

Mechanical Piping Color Schedule Piping Color Code			
ANSI Classification	Typical Project Piping	Pipe Color	Letter Color
	Citric Acid Permanganate Sodium Hydroxide Tertiary Effluent (Re-use)	Red Yellow Dark Grey Purple	Black Black White Black
Wastes	Residual Analyzed Residual Control	Gray Gray	Black Black

2.2 IDENTIFICATION OF VALVES AND SHORT PIPE LENGTHS

A. Identifying devices for valves and the sections of pipe that are too short to be identified with markers and arrows shall be identified with metal or plastic tags.

B. Metal tags shall be stainless steel with embossed lettering. Plastic tags shall be solid black plastic laminate with white embossed letters. Tags shall be designed to be firmly attached to the valves or short pipes or to the structure immediately adjacent to such valves or short pipes.

PART 3 - EXECUTION

3.1 GENERAL

A. All markers and identification tags shall be installed in accordance with the manufacturer's printed instructions, and shall be neat and uniform in appearance. Tags and markers shall be readily visible from all normal working locations.

3.2 VALVE TAGS

A. Valve tags shall be permanently attached to the valve or structure by means of two (2) stainless steel bolts or screws.

B. Wording on the valve tags shall describe the exact function of each valve, e.g., “HWR-BALANCING,” “CLS THROTTLING”, “PUMP SHUT-OFF,” etc.

3.3 MARKER LOCATIONS

A. Each pipe shall be marked at:

1. Intervals of 20-feet in straight runs.

2. At least one in every room.

3. Within 2-feet of turns, elbows, and valves.

4. On the upstream side of tees, branches, and other distribution points.

5. On both sides of walls and floors through which the piping passes.

END OF SECTION 40 05 97

Structure	Equip ID	PLC-	Type	Description	AnaSigLvl	AnaSigPwr	DigSigLvl	ON/20 mA	OFF/4 mA	Remarks1
A	LIT-A-150	PLC-A-100	AI	ELEVATED TANK LEVEL	4-20 mADC	FIELD		15 FT	0 FT	PRESSURE TRANSDUCER
A	YS-A-107	PLC-A-100	DI	ELEVATED TANK HATCH #1 INTRUSION			120 VAC	ALARM		
A	YS-A-108	PLC-A-100	DI	ELEVATED TANK GATE INTRUSION			120 VAC	ALARM		
A	YS-A-109	PLC-A-100	DI	ELEVATED TANK HATCH #2 INTRUSION			120 VAC	ALARM		
B	LCV-B-150	PLC-B-100	AO	STANDPIPE LEVEL CONTROL VALVE	4-20 mADC	FIELD		100%	0%	BUTTERFLY VALVE
B	LT-B-150	PLC-B-100	AI	STANDPIPE LEVEL	4-20 mADC	FIELD		XX FT	0 FT	PRESSURE TRANSDUCER
B	YS-B-107	PLC-B-100	DI	STANDPIPE GATE INTRUSION			120 VAC	ALARM		
B	YS-B-108	PLC-B-100	DI	STANDPIPE HATCH #1 INTRUSION			120 VAC	ALARM		
B	YS-B-109	PLC-B-100	DI	STANDPIPE HATCH #2 INTRUSION			120 VAC	ALARM		
C	ATS-A101-UTIL	PLC-C-100	DI	AUTOMATIC TRANSFER SWITCH UTILITY MODE			120 VAC	UTILITY		
C	ATS-A101-GEN	PLC-C-100	DI	AUTOMATIC TRANSFER SWITCH GENERATOR MODE			120 VAC	GENERATOR		
C	GEN-A101-FLT	PLC-C-100	DI	GENERATOR FAILED			120 VAC	ALARM		
C	GEN-A101-HAS	PLC-C-100	DI	GENERATOR AUTO			120 VAC	AUTO	MANUAL	
C	GEN-A101-YI	PLC-C-100	DI	GENERATOR RUNNING			120 VAC	RUNNING	STOPPED	
C	LT-C-150	PLC-C-100	AI	BENNETT WELL LEVEL	4-20 mADC	FIELD		XX FT	0 FT	
C	P-C-101-YI	PLC-C-100	DI	BENNETT WELL PUMP RUNNING			120 VAC	RUNNING	STOPPED	
C	P-C-101-HAS	PLC-C-100	DI	BENNETT WELL PUMP AUTO			120 VAC	AUTO	MANUAL	
C	P-C-101-MS	PLC-C-100	DO	BENNETT WELL PUMP RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
C	P-C-101-FLT	PLC-C-100	DI	BENNETT WELL PUMP FAILED			120 VAC	ALARM		
C	PIT-B-170	PLC-C-100	AI	BENNETT WELL SUPPLY PRESSURE	4-20 mADC	FIELD		100 PSI	0 PSI	
C	YS-C-109	PLC-C-100	DI	BENNETT WELL PUMP ROOM INTRUSION			120 VAC	ALARM		
D	FIT-D-130-AI	PLC-D-100	AI	GROVE WELL FLOW ANALOG	4-20 mADC	FIELD		XX GPM	0 GPM	INSTANTANEOUS FLOW
D	FIT-D-130-PLS	PLC-D-100	DI	GROVE WELL FLOW PULSED			24 VDC	XX GALLONS	0 GALLONS	PULSE COUNT FOR TOTALIZER
D	LT-D-150	PLC-D-100	AI	GROVE WELL LEVEL	4-20 mADC	FIELD		XX FT	0 FT	
D	P-D-101-YI	PLC-D-100	DI	GROVE WELL PUMP RUNNING			120 VAC	RUNNING	STOPPED	
D	P-D-101-HAS	PLC-D-100	DI	GROVE WELL PUMP AUTO			120 VAC	AUTO	MANUAL	
D	P-D-101-MS	PLC-D-100	DO	GROVE WELL PUMP RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
D	P-D-101-FLT	PLC-D-100	DI	GROVE WELL PUMP FAILED			120 VAC	ALARM		
D	PIT-D-170	PLC-D-100	AI	GROVE WELL SUPPLY PRESSURE	4-20 mADC	FIELD		100 PSI	0 PSI	
D	YS-C-109	PLC-D-100	DI	GROVE WELL PUMP ROOM INTRUSION			120 VAC	ALARM		
H	LT-H-150	PLC-H-100	AI	HOWARD WELL LEVEL	4-20 mADC	FIELD		XX FT	0 FT	
H	P-H-101-YI	PLC-H-100	DI	HOWARD WELL PUMP RUNNING			120 VAC	RUNNING	STOPPED	
H	P-H-101-HAS	PLC-H-100	DI	HOWARD WELL PUMP AUTO			120 VAC	AUTO	MANUAL	
H	P-H-101-MS	PLC-H-100	DO	HOWARD WELL PUMP RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
H	P-H-101-FLT	PLC-H-100	DI	HOWARD WELL PUMP FAILED			120 VAC	ALARM		

Structure	Equip ID	PLC-	Type	Description	AnaSigLvl	AnaSigPwr	DigSigLvl	ON/20 mA	OFF/4 mA	Remarks1
H	P-H-104-MS	PLC-H-100	DO	HOWARD WELL CHEMICAL PUMP RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
H	PIT-H-170	PLC-H-100	AI	HOWARD WELL SUPPLY PRESSURE	4-20 mADC	FIELD		100 PSI	0 PSI	
H	VFD-H-102-YI	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #1 RUNNING			120 VAC	RUNNING	STOPPED	
H	VFD-H-102-HAS	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #1 AUTO			120 VAC	AUTO	MANUAL	
H	VFD-H-102-MS	PLC-H-100	DO	HOWARD WELL BOOSTER PUMP #1 RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
H	VFD-H-102-SC	PLC-H-100	AO	HOWARD WELL BOOSTER PUMP #1 SPEED COMMAND	4-20 mADC	FIELD		60 Hz	30 Hz	MINIMUM PUMPING SPEED EST 30 Hz
H	VFD-H-102-FLT	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #1 FAILED			120 VAC	ALARM		
H	VFD-H-103-YI	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #2 RUNNING			120 VAC	RUNNING	STOPPED	
H	VFD-H-103-HAS	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #2 AUTO			120 VAC	AUTO	MANUAL	
H	VFD-H-103-MS	PLC-H-100	DO	HOWARD WELL BOOSTER PUMP #2 RUN COMMAND			120 VAC	RUN CMD	STOP CMD	
H	VFD-H-103-SC	PLC-H-100	AO	HOWARD WELL BOOSTER PUMP #2 SPEED COMMAND	4-20 mADC	FIELD		60 Hz	30 Hz	MINIMUM PUMPING SPEED EST 30 Hz
H	VFD-H-103-FLT	PLC-H-100	DI	HOWARD WELL BOOSTER PUMP #2 FAILED			120 VAC	ALARM		
H	YS-H-108	PLC-H-100	DI	HOWARD WELL PUMP ROOM INTRUSION			120 VAC	ALARM		
H	YAL-H-XXX	PLC-H-100	DO	HOWARD WELL LOCAL ALARM HORN/LIGHT			120 VAC	ALARM		

SECTION 40 67 00 - CONTROL PANELS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide control panels, complete and operable, in accordance with the Contract Documents.

B. The provisions of this Section apply to local panels provided in equipment systems specified in other Sections unless indicated otherwise in those Sections.

1.2 REFERENCE STANDARDS

A. ASTM A 283 Low and Intermediate Tensile Strength Carbon Steel Plates

B. UL 508A Industrial Control Panels

1.3 SUBMITTALS

A. Submittals shall be furnished in accordance with Sections 01 33 00 – Submittal Procedures and Section 40 70 00 – Instrumentation and Controls, General.

B. Revisions to design documentation provided by Keller Associates shall be approved by the responsible Engineer. Revisions shall be noted and submitted after completion of the Factory Acceptance Test.

PART 2 - PRODUCTS

2.1 GENERAL

A. Environmental Suitability: Indoor and outdoor control panels and instrument enclosures shall be suitable for operation in the ambient conditions associated with the locations designated in the Contract Documents. Heating, cooling, and dehumidifying devices shall be provided, as indicated, in order to maintain all instrumentation devices within 20 percent of the minimums and maximums of their rated environmental operating ranges. The Contractor shall provide all power wiring for these devices. Instrumentation in hazardous areas shall be suitable for use in the particular hazardous or classified location in which it is to be installed.

B. The control panel shall be the source of power for any 120 VAC solenoid valves interconnected with the control panel. Equipment associated with the control panel shall be ready for service after connection of conductors to equipment, controls, and control panel.

C. Instrument power circuits shall be fed from the associated PLC panel.

D. Control panels shall not contain any voltages greater than 120VAC.

E. Unless indicated otherwise, control panels shall be housed in NEMA rated enclosures in accordance with Section 26 05 00 – Electrical, General. Panels shall be either freestanding, pedestal-mounted or equipment skid-mounted, as indicated. Internal control components shall be mounted on an internal back-panel or side-panel as required.

F. Each source of foreign voltage shall be isolated by providing disconnecting or pull-apart terminal blocks. Each control panel shall be provided with identified terminal strips for the connection of all external conductors. The Contractor shall provide sufficient terminal blocks to connect 25 percent additional conductors for future use.

G. Motor starters, where required, shall be in accordance with Section 26 29 00 – Motor Controllers and Section 26 29 23 – Variable-Frequency Motor Controllers. Each motor starter shall be provided with contact closures for motor overload, local indication, and remote alarm. Discrete outputs from the control panel shall be provided by electrically isolated interposing relay contacts. Analog inputs and outputs leaving the envelope of the building shall be isolated 4-20 mA, 2-wire signals with power supply. All analog inputs and outputs shall be individually fused.

H. Control panel mounted devices shall be mounted a minimum of 3 feet above finished floor elevation.

2.2 CONTROL PANELS

A. Each PLC and remote I/O system and corresponding housing, including I/O modules, power supply modules, communication interface devices, and peripheral equipment shall be mounted inside a NEMA enclosure in accordance with Section 26 05 00 – Electrical, General. I/O wiring from the field to the remote I/O system shall be terminated on terminal blocks in the lower portion of the enclosure.

B. Materials: Panels shall be made of Grade 304 stainless steel. Panel section faces shall be No. 10 gauge minimum thickness for free standing panels and No. 14 gauge minimum thickness for wall mounted or pedestal mounted panels. Materials shall be selected for levelness and smoothness.

1. Relay rack high density type panels shall utilize standard relay racks with No. 14 gauge steel frame and supports.

2. Structural shapes and strap steel shall comply with ASTM A 283 - Low and Intermediate Tensile Strength Carbon Steel Plates, Grade C.

3. Bolting Material: Commercial quality carbon steel bolts, nuts, and washers shall be 1/2-inch diameter with UNC threads. Carriage bolts shall be used for attaching end plates. All other bolts shall be hex end machine bolts. Nuts shall be hot pressed hex, American Standard, heavy. Standard wrought washers shall be used for foundation bolts and attachments to building structures. Other bolted joints shall have SAE standard lock washers.

C. Construction: Dimensions shall be in accordance with vendor's requirements. Elevations and horizontal spacing shall be subject to the Engineer's approval.

D. Fabrication: End plates, top plates, and top closure panels (to hung ceiling) shall be provided when required by the material requisition. End plates, top plates, and top closure panels shall be removable with countersunk bolts to match panels. Top closure panels shall be furnished in lengths which match the widths of standard panels, except that one top closure panel may extend across two 4-foot 6-inch wide or five 2-foot wide standard panels. The vertical joints of these panels shall align with the vertical joints of the standard panels.

1. End closure or rear closure doors shall be provided where required. Such doors shall be flush fitting, gasketed, and be of the hinged lift-off type with lockable door handles. A common key shall be provided for all doors on one panel assembly. Removable access panels shall be provided with dished handle fasteners. Screwdriver 1/4 turn or Dzus type fasteners are not acceptable.

2. The flanged edges of all panels shall be straight and smooth. Corners shall be welded and ground smooth.

3. The face of the panel shall be true and level after angling.

4. All panel cutouts and holes may be cut or drilled by any standard method that does not cause deformation. Burrs shall be ground smooth.

5. Adjacent panels shall assemble with races flush. Gaps or cracks shall not be visible from the front of the assembled instrument board.

6. Stiffeners shall be welded to the back of panels, as required to prevent panel deformation due to the weight of face mounted instruments.

7. Panels shall be self-supporting as defined below.

E. Framework and Supports: The rear of each panel section shall have a steel framework assembled to it for supporting conduit, wireways, switches, piping, and instrument accessory Items such as relay or terminal enclosures, transducers, pressure switches, valves, and air relays.

1. The main framework shall be constructed of standard structural shapes. Special shapes such as "Unistrut" may be used for secondary supports. Framework must neither interfere with instrument connections nor interfere with access needed for maintenance or adjustments.

2. Steel framework shall extend 2-feet 4-inches back from the panel face or as indicated in the material requisition. Where indicated, individual adjustable leg supports shall be provided at the back of the framework so that the entire panel is self-supporting.

F. Preparation of Panel Surface: The following requirements apply to the front and rear face of the panel, both sides and the edges of all flanges, and the periphery of all holes or cutouts.

1. High spots, burrs, and rough spots shall be ground smooth.

2. The surfaces shall be sanded or sandblasted to a smooth, clean, bright finish.

3. All traces of oil shall be removed with a solvent.

4. The first coat of primer shall be applied immediately.

G. Instrument Finishing: The final coats applied to painted surface of instrument cases, doors, or bezels which are visible from the front of panels shall be manufacturer's standard unless otherwise indicated. Black Japan or "crinkle" finishes on instrument cases are not acceptable.

H. Mounting of Instruments: The panel vendor shall provide cutouts and shall mount all instrument items indicated to be panel mounted, including any instruments indicated to be furnished by other vendors but installed in the panel.

1. The panel vendor shall also mount behind the panels other instrument accessory items as required for functionality as indicated.

2. Equipment mounted at the rear of panel shall be installed to allow for commissioning adjustments, servicing requirements, and cover removal.

3. Spare space shall be kept clear of wiring, etc., to give maximum space for future additions.

I. Panel Components:

1. Terminal Blocks.

a. Terminal blocks for power distribution and digital signals shall comply with the following requirements

1) Terminal blocks shall be UL rated for 600V, 30A minimum.

2) Terminal blocks shall have a compression-style screw clamp connection.

3) Terminal blocks shall be capable of accepting #12 AWG wire.

4) Terminal blocks directly associated with digital I/O signals shall be two-tier with pre-manufactured jumper bars for distribution of common signals.

b. Terminal blocks for analog signals shall comply with the following requirements:

1) Terminal blocks shall be UL rated for 300V, 20A minimum.

2) Terminal blocks shall have a compression-style screw clamp connection.

3) Terminal blocks shall be capable of accepting #16 AWG wire.

4) Terminal blocks shall be three-tier sensor blocks for termination of signal positive, negative, and shield with pre-manufactured jumper bars for distribution of common signals.

c. Fuse blocks shall comply with the following requirements:

1) Fuse blocks shall be UL rated for 600V, 10A minimum.

2) Fuse blocks shall incorporate a hinged lever that accepts 5x20 mm fuses.

3) Fuse blocks shall have a compression-style screw clamp connection.

4) Fuse blocks shall be capable of accepting #12 AWG wire.

5) Fuse blocks shall contain blown-fuse indication through the use of a neon lamp or an LED.

d. All terminal blocks and fuse blocks shall be designed for DIN rail mounting. Extra deep 15 mm DIN rail shall be used.

e. Contractor shall provide terminal block end sections and end stops as necessary for a complete installation.

f. Terminal blocks and fuse blocks shall be provided with pre-printed snap-on label strips. Stick-on labeling is not acceptable. Labeling shall be consistent with Contractor's control panel drawings. Contractor shall clearly label all terminal blocks in every control panel; unlabeled terminal blocks are not acceptable.

g. Terminal blocks and fuse blocks shall be ABB, Allen-Bradley, or approved equal.

2. Instrument Power: All instruments requiring power that are wired to a PLC shall also have power supplied from the same PLC control panel. All instrument power sources shall be individually fused.

3. Signal surge suppressors. Signal surge suppressors shall be provided for all analog signals leaving the envelope of the building.

a. Signal surge suppressors shall be Phoenix Contact TT-2-PE-24DC or equal.

4. Control Relays. Control relays shall comply with the following requirements:

a. Relays shall be plug-in style with a DIN-rail mountable base.

b. Relays shall have on/off indication.

c. General purpose control relays shall have 24VDC or 120VAC coil as required for application. Relay contacts shall be rated 10 Amp at 120VAC or 125VDC. Contractor shall be responsible for quantity of contacts as required for application. New general-purpose control relays shall be Allen Bradley 700-HA series or equal.

d. Digital output interposing relays shall be terminal block style. Allen Bradley 700-HL series or equal.

5. Intrinsically Safe Barriers. Relays shall be solid-state electronic type in which the energy level of the sensing or actuation circuit is low enough to allow safe use in hazardous areas. Relays shall be located in non-hazardous areas. Relays shall be manufactured by GEMS, MTL, R.Stahl, Inc., or Turck.

6. Circuit Breakers. Circuit breakers for use in control panels shall be rated for 600V service.

   a. Control panel circuit breakers shall be DIN-rail mounted.

   b. Control panel circuit breakers shall be Allen-Bradley, Square D, or approved equal.

7. Surge Suppression. PLC control panels shall incorporate a transient-voltage surge suppressor on the incoming line. Surge suppressors shall be properly sized by the Contractor based upon the maximum current draw of the control panel.

   a. Surge suppressors shall be Innovative Technology, Leviton, or equal.

8. DC Power Supplies. PLC control panels shall be provided with a redundant DC power supply system containing two identical 24VDC power supplies and a redundancy module to regulate loading.

   a. DC Power Supplies shall be redundant. A redundancy module shall be used to regulate loading.

   b. Size DC power supplies based upon the actual 24V load. Power supplies shall not be loaded more than 50% of rated capacity.

   c. DC power supply systems shall be Sola HD SDN Series, ABB CP Series, or equal.

9. Digital Panel Indicators. Digital indicators shall be designed for semi-flush mounting in a panel. The indicator shall be a 3 1/2-digit LED, LCD, or gas discharge type display, with digits at least 0.5 inch high. The indicator shall be easily read at a distance of 10 feet in varying control room lighting environments. Operating temperature range shall be 32°F to 140°F. Accuracy shall be ±0.1 percent. The indicator shall be scaled in engineering units, with the units engraved on the display face or on the associated nameplate. The indicator shall have a selectable decimal point and shall provide over-range indication. Digital indicators shall be manufactured by Invensys/Eurotherm/Action Instruments, Newport Electronics, Precision Digital Corporation, or Red Lion Controls.

10. Selector Switches. Selector switches shall be 30.5-mm, heavy-duty, oil-tight type with gloved-hand or wing lever operators. Position legends shall be engraved on the switch faceplate. Switches for electric circuits shall have silver butting or sliding contacts, rated 10 amperes continuous at 120 V ac. Contact configuration shall be as indicated on the Drawings or for the application. Switches used in electronic signal circuits shall have contacts suitable for that duty. Switches shall be Eaton/Cutler-Hammer "10250T", General Electric "CR104P", or Allen Bradley “800T”.

11. Indicating Lights. Indicating lights shall be 30.5-mm, heavy-duty, oil-tight type, with full voltage LED lamps. Legends shall be engraved on the lens or on a legend faceplate. Lights shall be push-to-test type. Indicating lights shall be Eaton/Cutler Hammer "10250T", General Electric "CR104P", or Allen Bradley “800T”.

12. Pushbuttons. Push buttons shall be 30.5-mm, heavy-duty, oil-tight type. Legends shall be engraved on the push-button faceplate. Contacts shall be rated 10 amperes continuous at 120 V ac. Push buttons shall be Eaton/Cutler-Hammer "10250T", General Electric "CR104P", or Allen Bradley “800T”.

13. Alarm Horns. Horns shall be high-decibel, panel-mount, vibrating type designed for heavy-duty use. Horn volume shall be field-adjustable from 78 to 103 dB at 10 feet. Horns shall operate at 120 volts ac. Horns shall be weatherproof NEMA Type 4X. Horns shall be panel front mounted and shall be supplied with gasket. Horns shall be Edwards Signals “870P Series. “Horns shall be supplied with a field mounted enclosure. Horns shall be Edwards Signals “876 series.”

J. Electrical Requirements:

1. All conduit, wireways, switches, wire, and electrical fittings for 120-volt circuits to instruments and other electrical devices as required for a complete and operable installation.

2. Conduit, wireways, junction boxes and fittings shall be provided for signal wire, thermocouple, or resistance thermometer lead wire. Conduit or wireway runs shall include those required between temperature sensors and temperature transmitters and between the thermocouple wireway or junction box and instruments.

3. Each terminal connection shall have a plastic plate with a terminal and instrument tag number. Wiring shall be identified with stamped tubular wire end markers.

4. PLC control panels shall be provided with a 15-amp, 120-volt, service outlet circuit within the back-of-panel area.

5. PLC control panels shall be provided with fluorescent light and door activated switch.

6. Wall mounted or pedestal mounted panels shall be so sized as to adequately - dissipate heat generated by equipment mounted in or on the panel.

7. Control panels mounted outside shall be provided with thermostatically controlled heaters that maintain inside temperature above 40 degrees F.

8. Wiring Methods: Wiring methods and materials for all panels shall be in accordance with the NEC requirements for General Purpose (no open wiring) unless otherwise indicated. Control Panels shall be UL508A listed Control Panels.

9. Signal and Control Circuit Wiring: Wire type and sizes: Conductor shall be flexible stranded copper machine tool wire, UL listed Type MTW, and shall be rated 600 volts. Wires, including shielded cables, shall be No. 16 AWG minimum.

   a. Wire Insulation Colors: Ungrounded control circuit conductors operating at the supply voltage shall have a black insulation. Grounded circuit conductors shall have white insulation. Insulation for ungrounded AC control circuit conductors operating at less than the supply voltage shall be red. Wires energized by a voltage source external to the control panel shall have yellow insulation. Insulation for ungrounded DC conductors shall be blue. Insulation for grounded DC conductors shall be white with blue stripe. Twisted pair wiring shall be positive (+) black and negative (-) white/clear.

   b. Wire Marking: Wire numbers shall be marked using white numbered wire markers made from plastic-coated cloth, Brady Type B 500 or equal, or shall be heat shrink plastic.

   c. Flexible conduit is not acceptable except when specifically approved by the Engineer in writing. Conduit fittings shall be Crouse Hinds cast fittings or equal.

   d. Splicing of wires will only be allowed in junction boxes. Splices shall be either soldered or pressure crimped type.

   e. For case grounding, panels shall be provided with a 1/4-inch by 1-inch copper ground bus complete with solderless connector for one No.4 AWG bare stranded copper cable. The copper cable shall be provided by the Contractor and be connected to a system ground loop.

10. Power Supply: Unless otherwise indicated control panel primary power supplies shall be 120-volt, 60 Hz circuits. 24VDC subsystems shall be provided for PLC control panels and as indicated on the drawings.

K. Labor and Workmanship: Panels shall be fabricated, piped, and wired by fully qualified workmen who are properly trained, experienced, and supervised.

L. At a minimum, control panels shall be constructed in a UL shop and contain UL labels prior to shipment.

2.3 UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. Provide and install UPS(s) to power all PLC hardware furnished under this Specification.

B. The UPS shall receive a 120 VAC, 60 HZ power input, and generate a 120 VAC, 60 HZ output signal which is protected from incoming spikes, sags, noise, brownouts, and power outages.

1. The UPS shall incorporate a transformer, a battery pack, a battery charger, an inverter, and a microprocessor-based controller to provide continuous, on-line, computer grade uninterruptible power. Lighting and surge protection shall meet ANSI/IEEE c62.41 categories A and B. The UPS shall be U.L. listed. Spike attenuation shall be 2000 to 1. The output neutral shall be bonded to ground. Noise isolation shall be 120 Db common-mode, 60 Db normal mode. Output voltage regulation shall be + 3% with less than 5% total harmonic distortion. UPS efficiency shall be at least 85%. The UPS shall be rated for ambient temperatures from 32 degrees F to 104 degrees F and relative humidity from 0 to 95%

2. Each UPS shall maintain power to all of its connected loads, including non-constant loads such as alarms and printers, for a minimum of 15 minutes with a 50% growth factor over the connected load. The equipment submittal shall include sizing calculations which support the model and size selected. The UPS shall be supplied with a low output voltage cutoff to prevent damage to loads when the battery power is exhausted.

C. The equipment shall include sizing calculation which support the unit selected being able to power all its connected loads for the indicated time period with a 50% growth factor.

D. The uninterruptible power supply shall be Eaton Ferrups UPS series, Liebert, IPM or equal.

2.4 SPARE PARTS AND SPECIAL TOOLS

A. Control panel spare parts selected by the Engineer and special tools shall be furnished in accordance with Section 40 70 00 – Instrumentation and Control, General.

PART 3 - EXECUTION

3.1 LISTING AND INSTALLATION

A. Control panels shall be installed in accordance with Section 40 70 00 – Instrumentation and Control, General.

B. Control Panels shall be fabricated in accordance with UL 508A, and shall be UL Listed Industrial Control Panels.

3.2 EQUIPMENT DELIVERY

A. Panels shall be crated for shipment using a heavy framework and skids. Panel sections shall be cushioned to protect the finish of the instruments and panel during shipment. Instruments which are shipped with the panel shall further have suitable shipping stops and cushioning material installed to protect parts which could be damaged due to mechanical shock. Each separate panel unit shall be provided with removable lifting lugs to facilitate handling.

B. Shipments by air ride van unless otherwise indicated. Control panel testing and inspection, if required, shall be performed prior to shipping.

3.3 CONTROL PANEL SIGNAL AND CONTROL CIRCUIT WIRING

A. Wiring Installation: Wires shall be run in plastic wireways except (1) field wiring, (2) wiring between mating blocks in adjacent sections, (3) wiring from components on a swing out panel to components on a part of the fixed structure, and (4) wiring to panel mounted components. Wiring run from components on a swing out panel to other components on a fixed panel shall be made up in tied bundles. These bundles shall be tied with nylon wire ties and shall be secured to panels at both sides of the "hinge loop" so that conductors are not strained at the terminals.

B. Wiring run to control devices on the front panels shall be tied together at short intervals with nylon wire ties and be secured to the inside face of the panel using adhesive mounts.

C. Wiring to rear terminals on panel-mount instruments shall be in plastic wireways secured to horizontal brackets above or below the instruments in about the same plane as the rear of the instruments.

D. Shop Drawings shall show conformance to the above wiring installation requirements.

E. Wire Marking: Each signal, control, alarm, and indicating circuit conductor connected to a given electrical point shall be designated by a single unique number which shall be shown on Shop Drawings. These numbers shall be marked on conductors at every terminal.

3.4 CALIBRATION, TESTING, AND INSTRUCTION

A. Calibration, testing, and instruction shall be performed in accordance with Section 40 79 23 – Testing, Calibration, and Commissioning.

B. Inspection and Approval: Panel fabricator shall conduct the following tests before shipment.

1. Alarm circuits rung out to determine their operability.

2. Electrical circuits checked for continuity and where applicable, operability.

3. Any other test required to place the panel in an operating condition.

C. It shall be the responsibility of the Contractor to furnish all necessary testing devices and sufficient manpower to perform the tests required by the Engineer.

D. Factory Acceptance Testing: PLC control panels shall be factory tested with Keller Associates qualified Engineer/Technician as required by Division 40 Specifications.

E. Field Testing: Each control panel shall be tested again for functional operation in the field after the connection of external conductors and prior to equipment startup.

END OF SECTION 40 67 00

ID	Name	Device type	Device Description	Power	Classification	P&ID	Specification	Furnished By	New/ Existing
PLC-A100	LCP-A100	LOCAL CONTROL PANEL	ELEVATED TANK/CITY SHOP	120 VAC	Unclassified	EI-701	40 63 43	INTEGRATOR/CONTRACTOR	NEW
PLC-B100	LCP-B100	LOCAL CONTROL STATION	CEMETERY STAND PIPE	120 VAC	Unclassified	EI-701	46 21 73	INTEGRATOR/CONTRACTOR	NEW
PLC-C100	LCP-C100	LOCAL CONTROL PANEL	BENNETT WELL	120 VAC	Unclassified	EI-701	46 43 21 01	INTEGRATOR/CONTRACTOR	NEW
PLC-D100	LCP-D100	LOCAL CONTROL PANEL	GROVE WELL	120 VAC	Unclassified	EI-701	46 43 21 01	INTEGRATOR/CONTRACTOR	NEW
PLC-H100	LCP-W3	LOCAL CONTROL PANEL	HOWARD WELL	120 VAC	Unclassified	EI-701	46 43 21 01	OWNER	EXISTING

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 70 00 – INSTRUMENTATION AND CONTROL, GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. General requirements applicable to all Process Control and Instrumentation Work.

2. General requirements for process control and instrumentation submittals.

3. As specified in this Section the Contractor, through the services of a sub-consultant, hereinafter referred to as the System Integrator, shall provide the following services including, but not limited to:

   a. PLC panels and panel submittals

   b. PLC software and programming

   c. SCADA computer hardware and installation

   d. HMI software and configuration

   e. Control system startup, documentation, and training.

4. Prequalified System Integrators include the following:

   a. Control Engineers, Boise, ID

   b. Sweeney Controls Company, Fargo, ND

   c. Taurus Power and Controls, Inc., Tualatin, OR

5. It is the intent of these Specifications that the entire instrumentation and control system be complete and operable. Provide all necessary material and labor for the complete system from source of power to final utilization equipment, including all connections, testing, calibration of all equipment furnished by others, as well as equipment furnished by the Contractor.

B. Related sections:

1. The Contract Documents are complementary; what is called for by one is as binding as if called for by all.

2. It is the Contractor’s responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other individuals or entities performing or furnishing any of Contractor’s Work.

a. Items involving electrical, control, and instrumentation construction may be indicated on the Drawings or specified in the Specifications that do not apply specifically to electrical, control and instrumentation systems.

3. It is the duty of the Contractor to see that the completed Work complies accurately with the Contract Documents.

C. Interfaces to equipment, instruments, and other components:

1. The Drawings, Specifications, and overall design are based on preliminary information furnished by various equipment manufacturers, which identify a minimum scope of supply from the manufacturers. This information pertains to, but is not limited to, instruments, control devices, electrical equipment, packaged mechanical systems, and control equipment provided with mechanical systems.

2. Provide all material and labor needed to install the actual equipment furnished, include all costs to add any additional instruments, wiring, control system inputs/outputs, controls, interlocks, electrical hardware etc., which may be necessary to make a complete, functional installation based on the actual equipment furnished:

a. Make all changes necessary to meet the manufacturer's wiring requirements.

3. Submit all such changes and additions to the Engineer for acceptance as specified in Section 00 72 00 – General Conditions.

4. Review the complete set of Drawings and Specifications in order to ensure that all items related to the instrumentation and control systems are completely accounted for. Include any items indicated on the Drawings or in Specifications from another discipline in the scope of Work:

a. If a conflict between Drawings and Specifications is discovered, refer conflict to the Engineer as soon as possible for resolution.

D. All instrumentation, and control equipment and systems for the entire project to comply with the requirements specified in the Instrumentation and Control Specifications, whether referenced in the individual Equipment Specifications or not:

1. The requirements of the Instrumentation and Control Specifications apply to all Instrumentation and Control Work specified in other Specifications, including HVAC controls, packaged mechanical systems, LCPs, VCPs, etc.

2. Inform all vendors supplying instrumentation, control systems, panels, and/or equipment of the requirements of the Instrumentation and Control Specifications.

3. The Owner is not responsible for any additional costs due to the failure of the Contractor to notify all subcontractors and suppliers of the Instrumentation and Control Specifications' requirements.

E. Contract Documents:

1. General:

    a. The Drawings and Specifications are complementary and are to be used together in order to fully describe the Work.

2. Specifications:

    a. Section 00 72 00 – General Conditions and Section 00 73 00 – Supplementary Conditions of the Contract Documents govern the Work.

    b. These requirements are in addition to all General Requirements.

3. Contract Drawings:

    a. The Instrumentation and Control Drawings show in a diagrammatic manner, the desired locations, and arrangements of the components of the Instrumentation Work. Follow the Drawings as closely as possible, use professional judgment and coordinate with the other trades to secure the best possible installation, use the entire Drawing set for construction purposes.

    b. Locations of equipment, control devices, instruments, boxes, panels, etc. are approximate only, exercise professional judgment in executing the Work to ensure the best possible installation:

        1) The equipment locations and dimensions indicated on the Drawings and elevations are approximate. Use the shop drawings to determine the proper layout, foundation, and pad requirements, etc. for final installation. Coordinate with all subcontractors to ensure that all instrumentation and control equipment is compatible with other equipment and space requirements. Make changes required to accommodate differences in equipment dimensions.

        2) The Contractor has the freedom to select any of the named manufacturers as identified in the individual Specifications; however, the Engineer has designed the spatial equipment layout based upon a single manufacturer and has not confirmed that every named manufacturer's equipment fits in the allotted space. It is the Contractor's responsibility to ensure that the equipment being furnished fits within the defined space.

    c. Installation details:

        1) The Contract Drawings include installation details showing means and methods for installing instrumentation and control equipment. For cases where typical details are not provided or compatible with an installed location, develop installation details that are necessary for completing the Work, and submit these details for review by the Engineer.

    d. Schematic diagrams:

1) All controls are shown de-energized.

2) Schematic diagrams show control function only. Incorporate other necessary functions for proper operation and protection of the system.

3) Add slave relays, where required, to provide all necessary contacts for the control system or where needed to function as interposing relays for control voltage coordination, equipment coordination, or control system voltage drop considerations.

4) Mount all devices shown on motor controller schematic diagrams in the controller compartment enclosure, unless otherwise noted or indicated.

5) Control schematics are to be used as a guide in conjunction with the descriptive operating sequences in the Specifications. Combine all information and furnish a coordinated and fully functional control system.

F. Alternates/Alternatives:

1. Substitute item provisions as specified in Section 00 72 00 – General Conditions.

G. Changes and change orders:

1. As specified in Section 00 72 00 – General Conditions.

1.2 REFERENCES

A. Code compliance:

1. As specified in Section 01 42 19 - Standard References:

a. The publications are referred to in the text by basic designation only. The latest edition accepted by the Authority Having Jurisdiction of referenced publications in effect at the time of Bid governs.

2. The following codes and standards are hereby incorporated into this Section:

a. American National Standards Institute (ANSI).

b. International Organization for Standardization (ISO):

1) 9001 - Quality Management Systems - Requirements.

c. International Society of Automation (ISA):

1) 5.1 - Instrumentation Symbols and Identification.

2) 5.4 - Instrument Loop Diagrams.

3) 20 - Specification Forms for Process Measurement and Control Instruments, Primary Elements, and Control Valves.

d. National Electrical Manufacturers Association (NEMA):

1) 250 - Enclosures for Electrical Equipment (1000 V Maximum).

e. National Fire Protection Association (NFPA).

f. National Institute of Standards and Technology (NIST).

g. Underwriters Laboratories, Inc. (UL):

1) 508 - Standard of Safety for Industrial Control Equipment.

2) 508A - Standard of Safety for Industrial Control Panels.

B. Compliance with Laws and Regulations:

1. As specified in Section 00 72 00 – General Conditions.

1.3 DEFINITIONS

A. Definitions of terms and other electrical and instrumentation considerations in accordance with:

1. Factory Mutual (FM).

2. International Electrotechnical Commission (IEC).

3. Institute of Electrical and Electronics Engineers (IEEE).

4. International Society of Automation (ISA).

5. International Organization for Standardization (ISO).

6. National Electrical Code (NEC).

7. National Electrical Manufacturers Association (NEMA).

8. InterNational Electrical Testing Association (NETA).

9. National Fire Protection Association (NFPA).

10. National Institute of Standards and Technology (NIST).

11. Underwriters Laboratories (UL).

B. Specific definitions:

1. Control circuit: Any circuit operating at 120 volts alternating current (VAC) or direct current (VDC) or less, whose principal purpose is the conveyance of

information (including performing logic) and not the conveyance of energy for the operation of an electrically powered device.

2. Panel: An instrument support system that may be a flat surface, a partial enclosure, or a complete enclosure for instruments and other devices used in process control systems. Unless otherwise specified or clearly indicated by the context, the term "panel" in these Contract Documents is interpreted as a general term, which includes flat surfaces, enclosures, cabinets and consoles.

3. Power circuit: Any circuit operating at 90 volts (AC or DC) or more, whose principal purpose is the conveyance of energy for the operation of an electrically powered device.

4. Signal circuit: Any circuit operating at less than 50 VAC or VDC, which conveys analog information or digital communications information.

5. Digital bus: A communication network, such as PROFIBUS, Foundation Fieldbus, or DeviceNet, allowing instruments and devices to transmit data, control functions and diagnostic information.

6. 2-Wire transmitter (loop powered): A transmitter that derives its operating power supply from the signal transmission circuit and requires no separate power supply connections. As used in this Section, two-wire transmitter refers to a transmitter that provides 4 to 20 milliamperes current regulation of a signal in a series circuit with an external 24 VDC driving potential.

7. Powered transmitters: A transmitter that requires a separate power source (120 VAC, 240 VAC, etc.) in order for the transmitter to develop its signal. As used in this Section, the produced signal may be a 4 to 20 milliampere current signal, a digital bus communications signal or both.

8. System supplier - As specified in ICSC Qualifications in the Quality Assurance article of this Section.

9. Modifications: Changing, extending, interfacing to, removing or altering an existing circuit.

C. NEMA:

1. Type 1 enclosure in accordance with NEMA 250.

2. Type 2 enclosure in accordance with NEMA 250.

3. Type 3 enclosure in accordance with NEMA 250.

4. Type 3R enclosure in accordance with NEMA 250.

5. Type 3S enclosure in accordance with NEMA 250.

6. Type 3X enclosure in accordance with NEMA 250.

7. Type 3RX enclosure in accordance with NEMA 250.

8. Type 3SX enclosure in accordance with NEMA 250.

9. Type 4 enclosure in accordance with NEMA 250.

10. Type 4X enclosure in accordance with NEMA 250.

11. Type 5 enclosure in accordance with NEMA 250.

12. Type 6 enclosure in accordance with NEMA 250.

13. Type 6P enclosure in accordance with NEMA 250.

14. Type 12 enclosure in accordance with NEMA 250.

15. Type 12K enclosure in accordance with NEMA 250.

16. Type 13 enclosure in accordance with NEMA 250.

D. Acronym definitions:

1. CCS: The SCADA central computer system (CCS) consisting of personal computers and software. The personal computer-based hardware and software system that includes the operator interface, data storage, data retrieval, archiving, alarming, historian, reports, trending, and other higher level control system software and functions.

2. DPDT: Double-pole, double-throw.

3. ES: Enterprise system: Computer based communications or data sharing system utilized for non-process control functions such as E-mail, sharing files, creating documents, etc.

4. FAT: Factory acceptance test.

5. HART: Highway addressable remote transducer.

6. HOA: Hand-Off-Auto control function that is totally PLC based. In the Hand mode, equipment is started or stopped, valves are opened or closed through operator direction under the control of the PLC software. In the Auto mode, equipment is started or stopped and valves are opened or closed through a control algorithm within the PLC software. In the Off mode, the equipment is prohibited from responding from the PLC control.

7. HMI: Human machine interface: PLC based operator interface device consisting of an alphanumeric or graphic display with operator input functionality. The HMI is typically a flat panel type of display mounted on the front of a PLC enclosure with either a touch screen or tactile button interface.

8. ICSC: Instrumentation and control system contractor: Subcontractor who specializes in the design, construction, fabrication, software development, installation, testing, and commissioning of industrial instrumentation and control systems.

9. IJB: Instrument junction boxes: A panel designed with cord sets to easily remove, replace or relocate instrument signals.

10. I/O: Input/Output.

11. IP: Internet protocol or ingress protection.

12. LCP: Local control panel: Operator interface panel that may contain an HMI, pilot type control devices, operator interface devices, control relays, etc. and does not contain a PLC or RIO.

13. LAN: Local area network: A control or communications network that is limited to the physical boundaries of the facility.

14. LOR: Local-Off-Remote control function. In the Remote mode, equipment is started or stopped, and valves are opened or closed through the PLC based upon the selection of the HOA. In the Local mode, equipment is started or stopped, valves are opened or closed based upon hardwired control circuits completely independent of the PLC with minimum interlocks and permissive conditions. In the Off mode, the equipment is prohibited from responding to any control commands.

15. NJB: Network junction box. An enclosure that contains multiple access points to various networks within the facility. Networks could be Ethernet, Ethernet/IP, Fieldbus, RIO etc.

16. OIT: Operator interface terminal: PC-based interface device used for operator interface with the SCADA system.

17. P&ID: Process and instrumentation diagram.

18. PC: Personal computer.

19. PCIS: Process control and instrumentation system: Includes the entire instrumentation system, the entire control system, and all of the Work specified in the Instrumentation and Control Specifications and depicted on the Instrumentation Drawings.

20. PCM: Process control module: An enclosure containing any of the following devices: PLC, RTU, or RIO.

21. PJB: Power junction box: An enclosure with terminal blocks that distribute power to multiple instruments.

22. PLC: Programmable logic controller.

23. RIO: Remote I/O device for the PLC consisting of remote I/O racks, or remote I/O blocks.

24. RTU: Remote telemetry unit: A controller typically consisting of a PLC, and a means for remote communications. The remote communications devices typically are radios, modems, etc.

25. SCADA: Supervisory control and data acquisition system: A general name for the computerized system that gathers and processes data from sensors and applies operational controls to the process equipment. It includes the PLCs and/or RTUs, HMI PLC-based operator interface units, related interconnecting communications systems, and the CCS operator interface and data management system.

26. SPDT: Single-pole, double-throw.

27. SPST: Single-pole, single-throw.

28. UPS: Uninterruptible power supply.

29. VCP: Vendor control panel: Control panels that are furnished with particular equipment by a vendor other than the ICSC. These panels may contain PLCs, RIO, OIT, HMI, etc.

30. WAN: Wide area network: A control or communications network that extends beyond the physical boundaries of the facility.

1.4 SYSTEM DESCRIPTION

A. Scope of work.

1. SCADA Hardware/Software Upgrades.

a. Provide multiple controllers based on the Allen-Bradley Micro800 Control Systems PLC.

b. Provide a Weintek iP Series OIT to be installed in the control panel located in the City Shop. The OIT shall provide local interface and primary SCADA services including full control of each control system throughout the city, alarm notifications and historical data, utilizing a radio Ethernet/IP based communication network.

c. Existing System.

1) Howard Well (Super1Foods) currently has an Allen-Bradley Micro800 Control System installed and is utilized to operate the Booster Pumps.

2) The Well pump is operated via the main controller located in the City Hall Control Panel.

3) Additional I/O modules shall be installed to move the I/O currently communicating via cell to the main controller to the local Micro800.

4) A new radio system shall be installed to provide communication via a dedicated Ethernet/IP link centrally located at the Cemetery Standpipe location.

d. New Systems

1) New Micro800 Control Systems shall be provided at the following locations and shall communicate on the network via radio Ethernet/IP:

a) Cemetery Standpipe

b) Grove Well Pump House

c) Bennet Well Pump House

d) City Shop (Elevated Tank)

2) Each system shall be operated from the OIT located in the City Shop Control Panel.

3) Each system shall communicate on the network via Ethernet/IP connectivity that shall be centrally located at the Cemetery Standpipe location.

4) Each system shall be configured to manage the local operations on loss of communications per the Control Strategy documentation.

5) The City Shop Control Panel shall house the OIT and shall be connected to the Internet for remote access to the systems for alarm notifications and monitoring purposes.

2. PCIS Network Upgrades.

a. Existing PCIS Network.

1) Existing PCIS network originates at the City Hall Control System and is a mixture of old GTE connectivity and a cellular connection to the Howard Well Pump House for well pump control.

2) Each existing location is wired through the GTE offices to the main control panel located at City Hall.

b. PCIS Network Upgrades.

1) Provide and install a new radio system centrally located at the Cemetery Standpipe location.

2) Aim all radio antennas (Yagi's') at each site toward the Cemetery Standpipe Omni Antenna.

3) Provide and install a new Yagi at the Cemetery Standpipe location towards the City Shop to communicate directly to the OIT SCADA Interface.

3. PCIS PLCs.

a. PLC-A100. City Shop: Provide new Control Panel with Micro800 and I/O and add configuration as specified.

b. PLC-B100. Cemetery Standpipe. Provide new Control Panel with Micro800 and I/O and add configuration as specified.

c. PLC-C100. Bennett Well. Provide new Control Panel with Micro800 and I/O and add configuration as specified.

d. PLC-D100. Grove Well. Provide new Control Panel with Micro800 and I/O and add configuration as specified.

e. PLC-H100. Howard Well. Provide new I/O modules for the existing Micro800 to relocate existing cellular RTU I/O to the existing Micro800 and add configuration as specified.

4. Instrumentation. Provide and install control system instrumentation as described in the drawings and specifications.

5. Control Panels. Provide control panels as described in the drawings and specifications.

6. Provide conduit and cable for associated instrumentation and control as described in the drawings and specifications.

7. Programming/Startup/Commissioning/Training. Provide complete system installation, programming, commissioning, and training as described in these drawings and specifications and as necessary to provide a complete and functional instrumentation and control system.

B. Control system installation and startup constraints:

1. Every effort shall be made to minimize downtime and maintain SCADA access to existing PLC hardware during construction and startup.

2. All PCIS and network outages shall be scheduled and pre-approved by the Engineer. The Contractor shall submit a PCIS and network cutover plan to the Engineer for approval.

3. The new SCADA server shall be fully and completely tested as specified prior to installation, cut over, and commissioning. The existing SCADA server shall remain in service through the duration of construction until the new SCADA server is prepared and ready to be put online.

C. General requirements:

1. The Work includes everything necessary for and incidental to executing and completing the Instrumentation and Control System Work indicated on the Drawings and specified in the Specifications and reasonably inferable there from including but not limited to:

a. Preparing hardware submittals for field instrumentation.

b. Design, develop, and draft control panel designs and all other drawing submittals specified in the Instrumentation and Control Specifications.

c. Prepare the test plan, the training plan, and the spare parts submittals.

d. Provide all SCADA system hardware and software.

e. Fabricate panels.

f. Perform factory tests on panels.

g. Perform bench calibration and verify calibration after installation.

h. Oversee and certify installation of the PCIS.

i. Oversee, document, and certify loop testing.

j. Oversee, document, and certify system pre-commissioning.

k. Conduct the performance tests.

l. Prepare operation and maintenance manuals.

m. Conduct training classes.

n. Integrate the PCIS with instrumentation and control devices provided under other sections.

o. Prepare Record Drawings.

1) Develop all Record Drawings associated with instruments and equipment provided under the scope of this contract.

2) Contract Documents and all Owner furnished and any existing equipment the system is interfacing.

p. Resolve signal, power, or functional incompatibilities between the PCIS and interfacing devices.

q. Perform all required corrective and preventative maintenance.

2. Coordinate all aspects of the Work between Contractor and all subcontractors before bidding to ensure that all costs associated with a complete installation are

included. The Owner is not responsible for any change orders due to lack of coordination of the Work between the Contractor, the ICSC, the other subcontractors or suppliers.

3. Furnish detailed, complete, and thorough operations and maintenance documentation, including but not limited to operations manuals, maintenance manuals, as-built wiring drawings, training manuals, as-built software documentation, and all other documentation required to operate, modify, and maintain all parts of the PCIS.

4. Portions of this Project involve installation in existing facilities and interfaces to existing circuits, power systems, controls, and equipment. Perform and document detailed field investigations of existing conditions (circuits, power systems, controls, equipment, etc) before performing any Work.

5. Defective Work:

a. As specified in Section 00 72 00 – General Conditions.

D. Operating facility:

1. Portions of this existing facility must remain fully functional throughout the entire construction period. In consideration of this requirement, comply with the following guidelines:

a. All outages must be of minimal duration and fully coordinated and agreed to by the Owner. Adjust the construction to meet the requirements of the Owner.

b. As weather and facility demand conditions dictate, re-adjust the construction schedule to meet the demands placed upon Owner by its users.

2. The Contractor is responsible for the integrity and measurement accuracy of all loops. However, any defect found in existing equipment is the responsibility of the Owner.

3. The standards of documentation, instrument tagging, cable and conductor termination, terminal identification and labeling that apply to the new installation apply equally to the existing installation effected by this work.

1.5 SUBMITTALS

A. Furnish submittals as specified in Section 01 33 00 – Submittals and this Section.

B. General:

1. Instruct all equipment suppliers of submittals and operation and maintenance manuals of the requirements in this Section.

2. Furnish the submittals required by each section in the Electrical Specifications.

3. Adhere to the wiring numbering scheme specified in Section 26 05 53 – Electrical Identification throughout the Project:

   a. Uniquely number each wire.

   b. Wire numbers must appear on all Equipment Drawings.

4. Use equipment and instrument tags, as indicated on the Drawings, for all submittals.

C. Submittal organization:

1. First page:

   a. Specification section reference.

   b. Name and telephone number of individual who reviewed submittal before delivery to Engineer.

   c. Name and telephone number of individual who is primarily responsible for the development of the submittal.

   d. Include the letterhead and/or title block of the firm responsible for the preparation of all shop drawings. Include the following information in the title block, as a minimum:

      1) The firm's registered business name.

      2) Firm's physical address, email address, and phone number.

      3) Owner’s name.

      4) Project name and location.

      5) Drawing name.

      6) Revision level.

      7) Personnel responsible for the content of the drawing.

      8) Date.

   e. Place for Contractor’s review stamp and comments.

2. Next pages:

   a. Provide confirmation of specification compliance in a tabular form that individually lists each specification section, paragraph, and sub-paragraphs and unequivocally states compliance with said requirement or takes exception to the requirement and lists the reason for said exception and offers alternative means for compliance.

b. Include a response in writing to each of the Engineer's comments or questions for submittal packages which are re-submitted:

1) In the order that the comments or questions were presented throughout the submittal.

2) Referenced by index section and page number on which the comment appeared.

3) Acceptable responses to Engineer's comments are either:

a) Engineer's comment or change is accepted and appropriate changes are made.

b) Explain why comment is not accepted or requested change is not made.

c) Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.

4) Any resubmittal which does not contain responses to the Engineer's previous comments shall be returned for Revision and Resubmittal.

5) No further review by the Engineer will be performed until a response for previous comments has been received.

3. Remaining pages:

a. Actual submittal data:

1) Organize submittals in exactly the same order as the items are referenced, listed, and/or organized in the specification section.

2) For submittals that cover multiple devices used in different areas under the same specification section, the submittal for the individual devices must list the area where the device is intended to be used.

D. Provide submittals in three stages

1. First Stage Submittal. The first stage submittal shall include the following items.

a. A detailed list of any exceptions, functional differences, or discrepancies between the system proposed by Contractor and this specification.

b. Product catalog cut sheets on all instrumentation, control hardware, computer equipment and software items, clearly marked to show the model number, optional features, and intended service of each device.

c. A brief, concise description of the proposed system, including major hardware and software components and personnel training.

d. A block diagram or schematic drawing showing the principal items of equipment furnished, including model numbers, and their interrelationships.

e. Drawings showing floor and wall space or desktop area requirements for all equipment items, including allowances for door swings and maintenance access.

f. Environmental and power requirements, including heat release information for each equipment item.

g. Standard field termination drawings for all process input/output equipment, showing typical terminations for each type of point available in the system.

h. A copy of the proposed software licenses for all software associated with the system.

i. Outline for training classes.

j. Additional Requirements identified in other Division 40 sections.

2. Second Stage Submittal. Before any equipment is released for shipment to the site and before factory acceptance testing is scheduled, the following data shall be submitted. At Contractor's option, the first and second stage submittals may be combined.

a. Complete panel fabrication drawings and details of panel wiring, piping, and painting. Panel and subpanel drawings shall be to scale and shall include overall dimensions, metal thickness, door swing, mounting details, weight, and front of panel arrangement to show general appearance, with spacing and mounting height of instruments and control devices.

b. Wiring and installation drawings for all interconnecting wiring between components of the system and between related equipment and the equipment furnished under this section. Wiring diagrams shall show complete circuits and indicate all connections. If panel terminal designations, interdevice connections, device features and options, or other features are modified during the fabrication or factory testing, revised drawings shall be submitted before shipment of the equipment to the site.

c. Fiber termination diagrams to show all fiber terminations at fiber patch panels and final termination at equipment. Fiber termination diagrams shall show individual fiber type (single or multimode), fiber core/cladding dimensions, fiber colors, circuit identifications, and type of terminator.

d. Screen prints of proposed HMI overview displays and equipment control pop-ups.

e. PCIS and network cut-over plan.

f. Review of drawings submitted prior to the final determination of related equipment shall not relieve Contractor from supplying systems in full compliance with the specific requirements of the related equipment.

g. Input/output listings showing point names, numbers, and addresses. Input/output identification numbers from the contract documents shall be cross-referenced in this submittal.

h. Proposed lesson plans or outlines for all training courses specified herein, including schedule, instructors' qualifications and experience, and recommended prerequisites.

i. Additional Requirements identified in other Division 17 sections.

3. Third Stage Submittal. Complete system documentation, in the form of Operation and Maintenance Manuals, shall be submitted before the commencement of performance testing.

a. Operation and Maintenance Manuals shall include complete instruction books for each item of equipment and software furnished. Where instruction booklets cover more than one specific model or range of device, product data sheets shall be included which indicate the device model number and other special features. A complete set of "as-built" wiring, fabrication, and interconnection drawings shall be included with the manuals. If field-wiring modifications are made after these drawings are submitted, the affected drawings shall be revised and resubmitted.

b. Additional requirements are identified in other Division 17 specification sections.

E. General Submittal requirements:

1. Furnish submittals that are fully indexed with a tabbed divider for every component.

2. Sequentially number pages within the tabbed sections. Submittals and operation and maintenance manuals that are not fully indexed and tabbed with sequentially numbered pages, or are otherwise unacceptable, will be returned without review.

3. Edit all submittals and operation and maintenance manuals so that the submittal specifically applies to only the equipment furnished.

a. Neatly cross out all extraneous text, options, models, etc. that do not apply to the equipment being furnished, so that the information remaining is only applicable to the equipment being furnished.

4. Where submittals are required, provide a separate submittal for each specification section. In order to expedite construction, the Contractor may make more than 1

submittal per specification section, but a single submittal may not cover more than 1 specification section.

5. Exceptions to Specifications and Drawings:

a. Include a list of proposed exceptions to the Specifications and Drawings along with a detailed explanation of each.

b. If there is insufficient explanation for the exception or deviation, the submittal will be returned requiring revision and re-submittal.

c. Acceptance of any exception is at the sole discretion of the Engineer.

1) Provide all items (materials, features, functions, performance, etc.) required by the Contract Documents that are not accepted as exceptions.

d. Replace all items that do not meet the requirements of the Contract Documents, which were not previously accepted as exceptions, even if the submittals contained information indicating the failure to meet the requirements.

F. Specific submittal requirements:

1. Shop drawings:

a. Required for materials, equipment, and control panels listed in this and other sections.

b. Furnish sufficient information to evaluate the suitability of the proposed material or equipment for the intended use, and for compliance with these Specifications.

c. Shop drawings requirements:

1) Front, side, and, rear elevations, and top and bottom views, showing all dimensions.

2) Locations of conduit entrances and access plates.

3) Component layout and identification.

4) Schematic and wiring diagrams with wire numbers and terminal identification.

5) Connection diagrams, terminal diagrams, internal wiring diagrams, conductor size, etc.

6) Anchoring method and leveling criteria, including manufacturer’s recommendations for the Project site seismic criteria.

7) Weight.

8) Finish.

9) Nameplates:

10) As specified in Section 26 05 00 – General Electrical and Section 01 33 00 - Submittals.

11) Temperature limitations, as applicable.

d. Use equipment and instrument tags as depicted on the P&IDs for all submittals.

e. Adhere to wiring numbering scheme outlined in Section 26 05 53 – Electrical Identification throughout the Project:

1) Uniquely number each wire per the Specifications.

f. Wire numbers must appear on all equipment drawings.

g. The work includes modifications to existing circuits:

1) Clearly show all modifications to existing circuits.

2) In addition, show all existing unmodified wiring to clearly depict the functionality and electrical characteristics of the complete modified circuits.

2. Product data:

a. Submitted for non-custom manufactured material listed in this and other sections and shown on shop drawings.

b. Include:

1) Catalog cuts.

2) Bulletins.

3) Brochures.

4) Clearly identify model number and options for the actual equipment being furnished.

c. Use equipment and instrument tags as depicted on the P&IDs for all submittals.

d. Adhere to wiring numbering scheme outlined in Section 26 05 53 – Electrical Identification throughout the Project:

1) Uniquely number each wire per the Specifications.

3. Operation and maintenance manuals:

a. As specified in Section 01 78 23 – Operating and Maintenance Data.

b. Furnish the Engineer with a complete set of written operation and maintenance manuals 8 weeks before energization start-up and/or commissioning.

c. Submit preliminary sets of these manuals to the Engineer for review of format and content:

1) Engineer will return 1 set with comments.

2) Revise and/or amend as required and submit the requisite number of copies to the Engineer 15 days before Pre-commissioning of the systems.

d. Incorporate changes that occur during startup and submit as part of the final manuals.

e. Provide comprehensive information on all systems and components to enable operation, service, maintenance, and repair.

f. Include Record Documents and the approved shop drawing submittals, modified for conditions encountered in the field during the work.

g. Include signed results from Calibration, Loop Validation Tests, Pre-commissioning, and Performance Testing.

h. Provide installation, connection, operating, calibration, setpoints (e.g., pressure, pump control, time delays, etc.), adjustment, test, troubleshooting, maintenance, and overhaul instructions in complete detail.

i. Provide exploded or other detailed views of all instruments, assemblies, and accessory components together with complete parts lists and ordering instructions.

j. Operational Manual:

1) Prepare and provide a simplified version of the standard manufacturer's HMI software and system operations manual that includes basic instructions in the application of the system as required for operators in day-to-day operations.

k. Spare parts list:

1) Include a priced list of recommended spare parts for all the equipment furnished under this Contract:

a) Include recommended quantities sufficient to maintain the furnished system for a period of 5 years.

2) Annotate the list to indicate which items, if any and quantity are furnished as part of this Contract.

3) Provide the name, address, and phone number of manufacturer and manufacturer's local service representative of these parts.

l. Control and SCADA System Software Record Documents:

1) Include complete documentation of all the software programs provided for the entire control and SCADA systems, including:

a) Listings of all application software on both hard copy and CD-ROM.

b) Database, both hard copy and CD-ROM.

c) Communication protocols.

d) All documentation necessary to maintain, troubleshoot, modify, or update the software system.

m. Organize the operation and maintenance manuals for each process in the following manner:

1) Section A - Instrument Summary.

2) Section B - Instrument Data Sheets and Brochures.

3) Section C - Sizing Calculations.

4) Section D - Instrumentation Installation Details.

5) Section E - Test Results.

6) Section F - Operational Manual.

7) Section G - Spare Parts List.

4. Instrument data sheets and cut sheets:

a. Furnish fully completed data sheets, both electronically in Microsoft Word or Excel and in hardcopy, for each instrument and component according to ISA-20 Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves. The data sheets provided with the instrument specifications are preliminary and are not complete. They are provided to assist with the completion of final instrument data sheets. Additional data sheets may be required. Include the following information on the data sheet:

1) Component functional description specified in this Section and indicated on the Drawings.

2) Manufacturers model number or other product designation.

3) Tag number specified in this Section and indicated on the Drawings.

4) System or loop of which the component is a part.

5) Location or assembly at which the component is to be installed.

6) Input and output characteristics.

7) Manufacturer instrumentation details.

8) Scale range with units and multiplier.

9) Requirements for electric supply.

10) Requirements for air supply.

11) Power consumption.

12) Response timing.

13) Materials of construction and of component parts that are in contact with, or otherwise exposed to, process media, and or corrosive ambient air.

14) Special requirements or features, such as specifications for ambient operating conditions.

15) Features and options that are furnished.

b. Provide a technical brochure or bulletin ("cut sheet") for each instrument on the project. Submit with the corresponding data sheets:

1) Where the same make and model of instrument is used in 2 or more applications on the project, and the process applications are nearly identical, and the materials, features and options are identical submit one brochure or bulletin for the set of identical instruments.

2) Include a list of tag numbers for which it applies with each brochure or bulletin.

3) Furnish technical product brochures that are complete enough to verify conformance with all Contract Document requirements, and to reflect only those features supplied with the device.

4) Cross out models, features, options, or accessories that are not being provided.

5) Clearly mark and identify special options and features.

c. Organization: Index the data sheets and brochures in the submittal by systems or loops.

5. Training Submittals.

a. Develop and submit for review a general training plan. Include complete descriptions of all planned training classes, a preliminary training schedule, a list of all proposed instructors along with resumes, examples of proposed training manuals, and a description of any special training tools to be used (simulators, self-paced modules, personal computer-based training, etc.).

b. Training course plan submittals:

1) For each training course or other training activity, submit a detailed, complete outline and agenda for each lesson.

2) Provide an updated schedule for all sessions of the course, including dates, times, durations, and locations.

3) Submit training materials.

c. Incorporate all submittal review comments into the course.

d. Do not conduct training courses before review and acceptance of the Course Plan submittal for the course.

6. Record documents:

a. Furnish as specified in Section 01 77 00 – Closeout Procedures.

b. Provide record documents of all Instrumentation Drawings.

c. Record Drawing requirements:

1) Update Record Drawings weekly.

2) Record Drawings must be fully updated as a condition of the monthly progress payments.

3) Submit Record Drawings upon completion of the Work for final review.

4) Clearly and neatly show all changes made during construction and startup.

d. Shop drawings:

1) General:

a) Shop drawings shall be updated to reflect all changes and additions made during construction. The final version

shall be included in the operations and maintenance documentation.

e. Review and corrections:

1) Correct any record documents or other documents found to be incomplete, not accurate, of poor quality, or containing errors.

2) Promptly correct and re-submit record documents returned for correction.

7. Control Panel Drawings:

a. Complete and detailed bills of materials:

1) Including quantity, description, manufacturer, and part number for each assembly or component for each control panel.

2) Include all items within an enclosure.

b. Layout Drawings:

1) Submit panel, enclosure, console, furniture, and cabinet layout drawings for all items provided.

2) As a minimum, include the following information:

a) To scale front, side, and plan views.

b) Dimensions.

c) Interior and exterior arrangements.

d) Mounting information, including conduit entrance location.

e) Finish data.

f) Tag number and functional name of items mounted in and on each panel, console, and cabinet.

g) Nameplate legend including text, letter size, and colors.

c. Wiring and Piping Diagrams:

1) Submit panel wiring and piping diagrams for every panel that contains wiring and/or piping.

2) Include the following information:

a) Name of panel.

b) Wiring and piping sizes and types.

c) Terminal strip numbers.

d) Wire tags and labels.

e) Functional name and manufacturer's designation for items to which wiring and piping are connected.

f) Electrical control schematics in accordance with ANSI standards.

8. Schematic Diagrams:

a. Submit schematic diagrams for all electrical equipment in ladder diagram format.

b. Include device and field connection terminal numbers on all schematic diagrams.

c. Incorporate equipment manufacturer’s shop drawing information into the schematic diagrams in order to document the entire control system.

9. Complete grounding requirements for each system component including any requirements for PLCs, process LANs, and SCADA equipment.

10. Requirements for physical separation between control system components and 120 VAC, 480 VAC, and medium voltage power cables.

11. UPS and battery load calculations to show that the backup capacity and time meet the specified requirements.

12. Provide a data sheet for each control system component together with a technical product brochure or bulletin.

13. Testing, Calibration, and Start-up Submittal:

a. General testing submittal requirements are specified in this Section. Additional requirements are specified in Section 40 79 23 – Testing, Calibration, and Commissioning and other Sections.

b. Test Procedure Submittals:

1) Submit outline of the specific proposed tests and examples of proposed forms and checklists for the following:

a) Calibration, adjustment, and test details for all components and systems.

b) Factory Acceptance Tests.

c) Loop Validation Tests:

d) Pre-commissioning Test.

e) Performance Test.

14. Calculations:

a. Where required by specific Instrumentation Specifications:

1) Because these calculations are being provided by a registered professional engineer, they will be reviewed for form, format, and content but will not be reviewed for accuracy and calculation means.

1.6 QUALITY ASSURANCE

A. Manufacture instruments at facilities certified to the quality standards of ISO 9001.

B. Furnish all equipment listed by and bearing the label of UL or of an independent testing laboratory acceptable to the Engineer and the Authority Having Jurisdiction.

C. The ICSC must have their own operating UL listed panel fabrication facility. All panels must be fabricated at this facility and meet all UL 508/508A requirements.

D. ICSC:

1. The Contractor, through the use of a pre-qualified ICSC, is responsible for the implementation of the PCIS and the integration of the PCIS with other required instrumentation and control devices.

2. The ICSC assumes full responsibility, through the Contractor, to perform all work to select, furnish, install, test, calibrate, and place into operation all instrumentation, controls, telemetry equipment, control panels, and SCADA system including application software, for a complete, integrated and functional PCIS system.

3. Due to the complexities associated with the interfacing of numerous control system devices, it is the intent of these Specifications that the ICSC be responsible for the integration of the PCIS with existing devices and devices provided under the Contract Documents with the objective of providing a completely integrated control system.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store all equipment and materials delivered to the job site in a location that will not interfere with the construction or the Owner’s operations.

B. Shipping precautions:

1. After completion of shop assembly, successful FAT, pack all equipment, cabinets, panels, and consoles in protective crates and enclose in heavy-duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust, and moisture.

2. Place dehumidifiers when required, inside the polyethylene coverings.

3. Skid-mount the equipment for final transport.

4. Provide lifting rings for moving without removing protective covering.

5. Display boxed weight on shipping tags together with instructions for unloading, transporting, storing, and handling at the job site.

C. Special instructions:

1. Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.

D. Tagging:

1. Tag each component and/or instrument to identify its location, instrument tag number, and function in the system.

2. Firmly attach a permanent tag indelibly machine marked with the instrument tag number, as given in the tabulation, on each piece of equipment constituting the PCIS.

3. Tag instruments immediately upon receipt in the field.

4. Prominently display identification on the outside of the package.

5. Utilize the Tag and Loop Number identifications shown on the P&IDs.

E. Delivery and inspection:

1. Deliver products in undamaged condition, in manufacturer's original container or packaging with identifying labels intact and legible. Include date of manufacture on label.

1.8 PROJECT OR SITE CONDITIONS

A. Site conditions:

1. Provide a PCIS, including all equipment, raceways and any other components required for a complete installation that meets the environmental conditions for the Site as specified in the General Requirements and below.

2. Seismic classification:

a. Provide all equipment and construction techniques suitable for the seismic requirements for the site, as specified on Sheet S-001.

3. Wind:

a. Provide all equipment and construction techniques suitable for the site wind loading criteria, as specified on Sheet S-001.

4. Altitude, temperature and humidity:

   a. Provide all equipment and instrumentation fully rated for continuous operation at this altitude, temperature and humidity conditions with no additional derating factors applied.

   b. Provide additional temperature conditioning equipment to maintain all equipment and instrumentation in non-conditioned spaces or outdoors subject to these ambient temperatures 10 degrees Fahrenheit above the minimum operating temperature and 10 degrees Fahrenheit below maximum operating temperature as determined by the equipment manufacturer's guidelines:

      1) Provide all power wiring for these devices (e.g., heaters, fans, etc.), whether or not indicated on the Drawings.

5. Area classifications:

   a. Furnish enclosures that match the area classifications as specified in Section 26 05 00 – Basic Electrical Materials and Methods.

6. Site security:

   a. Abide by all security and safety rules concerning the Work on the Site, as specified in Division 01.

1.9 SEQUENCING

A. General:

1. As specified in Section 01 31 19 – Project Meetings and 01 35 13 – Special Project Procedures.

2. PCIS and network constraints as specified in Section 40 70 00 – Instrumentation & Control, General.

3. Testing requirements are specified in Section 40 79 23 – Testing, Calibration, and Commissioning and other sections.

4. General scheduling requirements are specified in Section 01 32 16 – Construction Progress Schedule.

B. System configuration meetings:

1. Review the system configuration, the system database, control schemes, displays, report formats, etc. with the Engineer and Owner on at least 3 occasions during development.

   a. Preliminary meeting: Before configuration work is begun. The ICSC must bring to this meeting example of displays, display symbols, reports, etc. to show the capabilities of the system software. Engage in dialog with the

Engineer and Owner regarding the layout of new HMI graphics, screen navigation, etc.

b. Intermediate review meeting: Held after the initial database is entered and typical HMI base display and pop-ups have been developed.

c. Final review meeting: Held after initial completion of all configuration work. This final meeting may not be held in conjunction with the FAT. Make final format revisions after this review.

2. Additional requirements as specified in Section 40 61 96 – Control Strategies and Section 40 63 43 – PLC Based Control Systems Hardware.

C. FAT:

1. Before the delivery and installation of control panels, PLCs, SCADA equipment, and other PCIS components at the job site, but after the procurement and assembly of components, perform FAT testing.

2. Schedule the FAT after receiving approval of the FAT procedures submittal.

3. Notify the Engineer of scheduled tests a minimum of 15 days before the date of the test.

D. Loop validation test.

1. Notify the Engineer of scheduled tests a minimum of 30 days before the estimated completion date of installation and wiring of the PCIS.

2. Complete loop validation testing a minimum of 5 days before the pre-commissioning phase of the project.

3. Loop validation certifications:

a. After the field device loop tests have been successfully completed as specified in Section 40 79 23 – Testing, Calibration, and Commissioning for all individual instruments, all separate analog control networks, all valves, all VCPs, all motors, all local operator interface panels, all motor control centers, etc., submit a certified copy of all test forms signed by the Contractor, ICSC, and the Owner's representative with test data entered, together with a clear and unequivocal statement that all instrumentation, including all control and signal wiring, has been successfully calibrated, inspected, and tested.

E. Training:

1. Complete all training before the pre-commissioning phase of the project may start.

2. Schedule the training sessions a minimum of 15 days before the start date of the courses.

3. Submit training manuals to the Engineer a minimum of 10 days before starting the training session.

4. Within 10 days after the completion of each session, submit the following:

a. A list of all Owner personnel that attended the session.

b. A copy of the training materials utilized during the lesson with all notes, diagrams, and comments.

F. Pre-commissioning test:

1. Commence after acceptance of all training, wire test, calibration tests, and loop validation tests, and all inspections have demonstrated that the PCIS complies with all Contract requirements.

2. Acceptance of the PCIS pre-commissioning testing must be provided in writing by the Engineer before the performance testing may begin.

G. Performance testing:

1. Complete pre-commissioning test a minimum of 5 days before the performance test.

2. Provide all special tools and spare parts, as specified in the Maintenance paragraph of this Section, before performance testing commences, suitably wrapped and identified.

H. Substantial completion: The following conditions be fulfilled before the PCIS is considered complete:

1. All submittals have been completed and approved.

2. The PCIS has been calibrated, loop tested and pre-commissioned.

3. The Owner training has been performed.

4. All required spare parts, expendable supplies, and test equipment have been delivered to the Owner.

5. The performance test has been successfully completed.

6. All debris associated with installation of instrumentation has been removed.

7. All probes, elements, sample lines, transmitters, tubing, and enclosures have been cleaned and are in like-new condition.

1.10 WARRANTY

A. Warrant the PCIS as specified in Section 00 72 00 - General Conditions:

1. Provide additional warranty as specified in the individual Instrumentation and Control Specifications.

1.11 SYSTEM START-UP

A. Replace or modify equipment, software, and materials that do not achieve design requirements after installation in order to attain compliance with the design requirements:

1. Following replacement or modification, retest the system and perform additional testing to place the complete system in satisfactory operation and obtain compliance acceptance from the Engineer.

1.12 MAINTENANCE

A. Before Substantial Completion, perform all maintenance activities required by the Contract Documents including any calibrations, final adjustments, component replacements or other routine service required before placing equipment or systems in service.

B. Furnish all spare parts as required by the Contract Documents.

C. Provide additional spare parts specified in other sections of the Instrumentation and Control Specifications.

D. Submit all special tools and spare parts, suitably wrapped and identified, before performance testing commences.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide similar items from a single manufacturer throughout the PCIS portion of the Project.

B. Allowable manufacturers are specified in individual instrument and equipment specifications in other sections of the Instrumentation and Control Specifications.

2.2 MATERIALS

A. Furnish all materials under this Contract that are new, free from defects, and standard products produced by manufacturers regularly engaged in the production of these devices and that bear all approvals and labels as required by the Specifications.

B. Provide materials complying with the applicable industrial standard as specified in the Contract Documents.

2.3 COMPONENTS

A. Furnish all meters, instruments, and other components that are the most recent field proven models marketed by their manufacturers at the time of submittal of the shop drawings unless otherwise specified to match existing equipment.

B. Unless otherwise specified, furnish individual instruments that have a minimum accuracy of within 0.5 percent of full scale and a minimum repeatability of within 0.25 percent of full scale.

C. Signal transmission:

1. Analog signals:

a. Furnish analog measurements and control signals that vary in direct linear proportion to the measured variable, unless otherwise indicated.

b. Furnish electrical analog signals outside control panels that are 4 to 20 milliamperes 24 VDC, except as indicated.

c. Electrically or optically isolate all analog signals from other signals.

d. Furnish regulated analog signals that are not affected by changes in supply voltage or load resistance within the unit's rating.

e. Maintain the total 4 to 20 milliamperes loop impedance to 10 percent below the published value at the loop operating voltage.

f. Where necessary, reduce loop impedance by providing current-to-current (I/I) isolation amplifiers for signal re-transmission.

g. Analog signal cable shall be minimum #18 AWG with overall foil shield and drain wire. Belden 8760 or equal. Refer to section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables for additional information.

2. Discrete signals:

a. As indicated in the controller hardware specification.

b. Provide interposing relays for all discrete outputs.

c. Configure discrete control circuits to fail safe, on loss of continuity or loss of power.

d. Alarm contacts: Fail to the alarm condition.

e. Control contacts fail to the inoperative condition unless otherwise indicated on the Drawings.

f. Discrete signal cable shall be minimum #16 AWG or equal. Refer to section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables for additional information.

3. Pneumatic Signals:

a. All pneumatic signals: 3 to 15 pounds per square inch gauge.

D. Grounding:

1. Ground single point ground shields and measurement loops at the source panel external terminals, unless otherwise noted, by bonding to the control panel signal ground bus.

2. Provide isolating amplifiers within control panels for field equipment possessing a grounded input or output, except when the panel circuit is galvanically isolated.

2.4 ACCESSORIES

A. Provide flow conditioning devices or other required accessories if necessary to meet the accuracy requirements in the Contract Documents.

2.5 SOURCE QUALITY CONTROL

A. Provide all equipment that is new, free from defects, and standard products produced by manufacturers regularly engaged in the production of these products that bear all approvals and labels as required by the Specifications.

B. Arrange with all manufacturers of the equipment and fabricators of panels and cabinets, to allow the Owner and Engineer to inspect and witness the testing of the equipment at the site of fabrication:

1. Equipment includes the cabinets, special control systems, flow measuring devices, and other pertinent systems and devices.

C. Factory testing is specified in Section 40 79 23 and other sections of the Electrical, and the Instrumentation and Control Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The ICSC is encouraged to attend a pre-bid conference and examine the premises completely before bidding. It is the ICSC's responsibility to be fully familiar with the existing conditions and local requirements and regulations.

B. Review the existing Site conditions and examine all shop drawings for the various items of equipment in order to determine exact routing and final terminations for all wiring and cables.

C. Provide a complete instrumentation and control system:

1. Install all extra conduits, cables, and interfaces as may be necessary to provide a complete and operating electrical, and process control and instrumentation system.

3.2 INSTALLATION

A. Equipment locations indicated on the Drawings may change due to variations in equipment size or minor changes made by others during construction:

1. Verify all dimensions as indicated on the Drawings:

    a. Actual field conditions govern all final installed locations, distances, and levels.

2. Review all information indicated on the Drawings, including architectural, structural, mechanical, instrumentation, and the accepted electrical, instrumentation, and mechanical shop drawings, and coordinate Work as necessary to adjust to all conditions that arise due to such changes.

3. Make minor changes in location of equipment before rough in, as directed by the Owner or Engineer.

B. Perform all related Electrical Work in accordance with the applicable sections of the Electrical Specifications.

C. The PCIS configurations are diagrammatic:

1. The locations of equipment are approximate unless dimensioned.

2. Where Project conditions require, make reasonable changes in locations and arrangements.

D. Field instruments installation:

1. Install field instruments as specified in the Contract Documents and the manufacturer's instructions.

2. Mount field instruments so that they can be easily read, readily approached, and easily serviced, and so they do not restrict access to mechanical equipment:

    a. Mount field instruments on a pipe stand or local panel, if they are not directly mounted, unless otherwise indicated on the Drawings.

    b. Provide sun shields for all field electronic instruments exposed to direct sunlight.

3. Make connections from rigid conduit systems to field instruments with PVC coated flexible conduit:

    a. Type of flexible conduit required for the area classification:

        1) Area classification as specified in Section 26 05 00 – Common Work Results for Electrical.

    b. Maximum length of 18 inches.

4. Connect field instruments with cable as specified in the Electrical Specifications, except when the manufacturer requires the use of special cable, or otherwise specified in this Section:

    a. Special cable applications shall be in accordance with the NEC.

5. Verify the correctness of each installation:

    a. Polarity of electric power and signal connections.

    b. Ensure all process connections are free of leaks.

E. Process sensing lines and air tubing:

1. Install individual tubes parallel and/or perpendicular to and near the surfaces from which they are supported.

2. Provide supports for rigid tubing at intervals of not more than 3 feet.

3. Slope horizontal runs of instrument tubing at a minimum of 1/16th inch per foot to allow for draining of any condensate.

4. Bends:

    a. Use proper tool.

    b. Make bends for parallel lines symmetrical.

    c. Make bends without deforming or thinning the walls of the tubing.

5. Square-cut and clean all ends of tubing before being inserted in the fittings.

6. Provide bulkhead fittings at all panels requiring pipe and/or tubing entries.

7. Use stainless steel tubing for all piping hard piped from the air header, unless otherwise indicated on the Drawings or not compatible with the fluids or atmosphere in the area:

    a. Use flexible connections only on moving equipment and under the constraint that the length shall be less than 1.5 times maximum travel of the equipment.

F. Conduit, cables, and field wiring:

1. Provide all PCIS equipment cables, and process LAN communication networks under the Instrumentation and Control Specifications.

2. Provide terminations and wire identification as specified in the Electrical Specifications.

3. Protect all wiring from sharp edges and corners.

4. Provide all conduits, fittings, boxes, etc. in accordance with all the requirements of the Electrical Specifications.

G. Equipment tie-downs:

1. Anchor all instruments, control panels, and equipment by methods that comply with seismic and wind bracing requirements, which apply to the Site.

2. All control panels, VCPs, LCPs, RTUs, PCMs, etc., shall be permanently mounted and tied down to structures.

H. Existing instrumentation:

1. Clean, recondition and re-calibrate each existing instrument to be reused, removed, or reinstalled using an authorized service facility of the instrument manufacturer.

2. Provide certification of this Work before reinstallation of each instrument.

I. Instrument tagging:

1. As specified in Section 26 05 53 – Electrical Identification.

2. Provide all field-mounted instruments with nameplates:

a. Nameplates engraved with the instrument's full tag number as indicated on the Drawings:

1) Affix tags with stainless steel wire fasteners.

3. Provide all back of panel instruments with nameplates:

a. Engraved with the instrument's full tag number as indicated on the Drawings:

4. Provide all front of panel instruments with a nameplate:

5. Provide all front of panel instruments with a nameplate:

a. Engraving to include the following:

1) Instrument's full tag number

2) Service description.

b. Nameplates:

1) Secure nameplates to the panel with stainless steel screws.

2) Use an approved adhesive if screws would violate the NEMA or other ratings of the enclosure.

J. Cable and conductor termination:

1. Terminate all cables and conductors on terminal blocks.

2. Terminal block enclosures:

a. Suitable for the area classification as specified in Section 26 05 00 – Common Work Results for Electrical.

K. Surge protection:

1. Provide incoming surge suppression devices on control panels ad indicated in the Drawings.

2. Provide surge protection on all analog instrument loops that leave the envelope of the building.

3. Individually fuse each 4 to 20 milliamperes direct current loop with a 1/16 ampere fuse between power supplies and receiver surge protectors.

3.3 FIELD QUALITY CONTROL

A. Inspection:

1. Allow for inspection of PCIS installation.

2. Provide any assistance necessary to support inspection activities.

B. Field testing is specified in Section 40 79 23 – Testing Calibration, and Commissioning. Additional general requirements are specified in Section 01 75 16 – Equipment Testing and Plant Startup.

C. Installation supervision:

1. Ensure that the entire PCIS is installed in a proper and satisfactory manner. At a minimum, the ICSC shall provide the following services:

a. Installation resources:

1) Coordinate with the Contractor regarding installation requirements of the Contract Documents.

b. Provide technical assistance to installation personnel by telephone:

1) Furnish installation personnel with at least one copy of the approved submittals, including all installation details.

c. Periodic inspections during the construction period.

d. A complete check of the completed installation to ensure that it is in conformance with the requirements of the equipment manufacturer and the Contract Documents.

e. Field-verify accuracy and calibration of all instruments.

3.4 ADJUSTING

A. Control valves:

1. Stroke all control valves, cylinders, drives and connecting linkages from the control system as well as local control devices and adjust to verify proper control action, hand switch action, limit switch settings, torque settings, remote control actions, and remote feedback of valve status and position.

2. Check control valve actions and positioner settings with the valves in place to ensure that no changes have occurred since the bench calibration.

B. Make all revisions necessary to the control system software, as directed by the Engineer. It is understood that the Contractor knows and agrees that changes will be required in the control system software during the factory acceptance tests, the pre-commissioning, performance testing, start-up and during the warranty period.

3.5 CLEANING

A. As specified in Section 01 77 00 – Project Closeout.

B. Vacuum clean all control panels and enclosures before start-up and again after final completion of the project.

C. Clean all panel surfaces.

D. Return to new condition any scratches and/or defects.

E. Wipe all instrument faces and enclosures clean.

F. Leave wiring in panels, manholes, boxes, and other locations in a neat, clean, and organized manner:

1. Neatly coil and label all spare wiring lengths.

2. Shorten, re-terminate, and re-label excessive spare wire and cable lengths, as determined by the Engineer.

G. As specified in other sections of the Contract Documents.

3.6 DEMONSTRATION AND TRAINING

A. Demonstration requirements are specified in Section 40 79 23 – Testing, Calibration, and Commissioning.

B. Training:

1. General:

a. Provide system maintenance and operator training courses for all the instrumentation and control systems furnished.

b. Conduct all training at the Project Site unless another location is approved by the Engineer and Owner:

1) Include instruction on the use of all maintenance equipment and special tools provided under the Contract.

c. Tailor training classes to the specific needs of the class participants:

1) Develop separate courses for operators, maintenance staff, and supervisors:

a) The specific categories and number of personnel in each category are identified below.

2) Furnish training courses that are a combination of classroom and hands-on training:

a) To the greatest extent possible, utilize components from the Owner's PCIS system.

b) Limit classes that include extensive hands-on activities to a maximum of 5 students per class.

3) Present the minimum number of sessions, specified in Table 40 61 00-3.10-T1, for each course in order to satisfy class size restrictions and limitations scheduling Owner staff.

4) Furnish additional sessions if required to accommodate the total number of personnel identified for each course.

d. Schedule individual training classes with the Owner at least 3 weeks before the start of the class:

1) Schedule all training classes Monday - Friday between 7:30 AM and 3:30 PM.

2) Each individual daily training session, travel time excluded:

a) Minimum duration of 1 hour.

b) Maximum duration of 4 hours.

c) Breaks scheduled at least every 90 minutes and 1 hour for lunch.

3) Complete training for maintenance personnel before performance testing.

4) As specified in the Sequencing article of this Section.

5) Schedule follow-up training classes after SCADA start-up on a schedule determined by the Owner.

e. Furnish highly qualified training instructors for technical training with demonstrated expertise in not only control system functionality but also professional training techniques:

1) Instructors are subject to the approval of the Engineer.

2. Training manuals and materials:

a. Furnish training manuals and other materials for training courses.

b. Manuals are to be professionally written to present the course material in a format that is easy to comprehend.

c. The manuals are to serve as teaching aids during presentation of the training classes.

d. Manuals are to serve as reference material after the training has been completed.

TABLE 40 61 00-3.10-T1

Course Title	Minimum Course Length	Personnel (Estimated Number of Students)	Minimum Number of Sessions
System Overview	2 hours	2	1
Operator Training - Basic	4 hours	2	1
CIS (Computer) Equipment Maintenance	1 hour	2	1
PLC Hardware	2 hours	2	1
Network Equipment	2 hours	2	1
Instrument Training	4 hours	2	1

3. Training course requirements:

a. System overview training:

1) Furnish training courses that give the Owner's supervisory level personnel an overview of all elements of the PCIS system that focus on the overall functional aspect of elements of the control system and provide an understanding of the interaction of the various components.

2) Furnish a training course that gives the Owner's supervisory level personnel an overview of the new Contractor-provided elements of the PCIS system. Focus on the overall functional aspects of

each new elements of the control system, particularly the mechanical system vendor-provided control packages.

b. Operator training:

1) Furnish training courses that instruct system operators in the efficient operation of all aspects of the PCIS that include not only the general operation of the control system but also the operation of specific system features.

2) Furnish training courses that instruct system operators in the efficient operation of Contractor-provided aspects of the PCIS that include not only the general operation of each control system but also the operation of specific system features.

3) Basic Operator's training shall include the following for each vendor package and programmable device:

a) Control system overview: Architecture, equipment functions, software components, etc.

b) Display navigation, overview, and types of displays.

c) Process and equipment monitoring and control: Basic principles and operation.

d) Logging ON and OFF the system and description of the security and access system.

e) Alarm subsystem.

f) Trending: Provide a thorough session on how to use all trending functions.

g) Reports: How to access, print, and review content.

h) Control strategies: Present an average 15-minute review of each control strategy, including a hands-on demonstration of screens and operator functions for each.

i) Instruction on the use of all operational functionality alarm logging, trending, displays, database, reports, and control software developed for the Project and incorporated in the installed PCIS system.

4) Advanced Operator's training shall include the same topics as basic training but at an accelerated schedule. Additional topics shall include:

a) Security access to protected features

b) Basic system troubleshooting and maintenance such as system restart in emergency

c) Use of Historian software and custom trend creation.

c. CIS computer equipment maintenance training:

1) Furnish training courses that will enable maintenance technicians to perform troubleshooting and repair of all system computer equipment. Include the theory of operation of the system as a whole, including related operating system and utility software.

d. PLC hardware training:

1) Furnish training on PLC hardware and on related components, including battery backup equipment, UPSs, HMI hardware, control circuits, and analog circuits.

2) Furnish training on PLC hardware principles, product features, proper installation, operation, troubleshooting, and maintenance.

3) PLC training may be provided by manufacturer's certified trainers.

e. HMI hardware and software training:

1) Provide the following:

a) Overview of hardware and firmware, including starting, stopping, and PLC interface.

b) Configuration of tag database.

c) Creating, editing, and saving display screens.

d) Troubleshooting.

f. Network equipment training:

1) Furnish basic training on all network hardware, switch and router configuration and software, and network monitoring software.

2) Include a detailed description and explanation of the installed network architecture, media, and functions.

3) Furnish an overview of the function and operation of each piece of network equipment.

4) Furnish training on network maintenance troubleshooting and repair.

5) Furnish training on how to install spare or off-line backup equipment.

g. Follow-up training:

1) Provide a series of on-site follow-up training classes beginning after start-up of the SCADA/PCIS system. The intent for these classes is to provide the Owner's personnel the opportunity for a review and "refresher" of the training topics and material after they have had some experience using the system.

2) Mutually schedule and develop the content of these classes with the Owner no later than 1 month before the beginning of the first session:

a) Schedule at the Owner's discretion on non-consecutive days spaced out over the start-up and warranty period.

h. Instrumentation training:

1) Furnish training covering all instruments and control panels.

2) Furnish the specified quantity of training, allocated to cover new instruments and hardwired controls as specified in this Section and specifically determined in the approved training plan.

3) Train maintenance staff in the use, cleaning, calibration, maintenance, and troubleshooting of all the instruments furnished within this Project.

4) Furnish training on the operation of new hardwired controls.

4. Recording training sessions:

a. Record all training.

b. Produce audio-visual presentations by recording the actual training sessions of the Owner's personnel.

c. Furnish digital video disk (DVD) format.

d. These disks become the property of the Owner and cover, in detail, the training for the specific hardware and software of all the systems provided for the Project.

e. Provide all the necessary cameras and recording equipment.

3.7 PROTECTION

A. Protect all Work from damage or degradation until date of Substantial Completion.

END OF SECTION 40 70 00

THIS PAGE LEFT BLANK INTENTIONALLY

ID	Name	Device Description	Device Type	Output Type	Power	Classification	P&ID	Specification	Furnished By	New/ Existing
A	LCP-A-100	ELEVATED TANK CONTROL PANEL	LOCAL CONTROL PANEL		120 VAC	Unclassified	EI-701	40 63 43	CONTRACTOR	NEW
A	LT-A-150	ELEVATED TANK LEVEL	PRESSURE TRANSDUCER	4-20 mA DC	LOOP	Unclassified	EI-701			EXISTING
A	YS-A-107	ELEVATED TANK HATCH #1 INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
A	YS-A-108	ELEVATED TANK GATE INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
A	YS-A-109	ELEVATED TANK HATCH #2 INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
B	LCP-B-100	STANDPIPE CONTROL PANEL	LOCAL CONTROL PANEL		120 VAC	Unclassified	EI-701	40 63 43	CONTRACTOR	NEW
B	LCV-B-150	STANDPIPE LEVEL CONTROL VALVE	MOTORIZED VALVE	4-20 mA,CONTACTS	230 VAC	Unclassified	EI-701	40 05 57	CONTRACTOR	NEW
B	LT-B-150	STANDPIPE LEVEL	PRESSURE TRANSDUCER	4-20 mA DC	LOOP	Unclassified	EI-701	40 72 00 2.1	CONTRACTOR	NEW
B	YS-B-107	STANDPIPE GATE INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
B	YS-B-108	STANDPIPE HATCH #1 INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
B	YS-B-109	STANDPIPE HATCH #2 INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
C	ATS-C-101	POWER TRANSFER	TRANSFER SWITCH	480 VAC	480 VAC	Unclassified	EI-701	26 36 00	CONTRACTOR	NEW
C	GEN-C-101	STANDBY POWER	GENERATOR	480 VAC	DEISEL	Unclassified	EI-701	26 32 13	CONTRACTOR	NEW
C	LCP-C-100	BENNETT WELL CONTROL PANEL	LOCAL CONTROL PANEL		120 VAC	Unclassified	EI-701	40 63 43	CONTRACTOR	NEW
C	LT-C-150	BENNETT WELL LEVEL	SUBMERISIBLE PRESSURE TRANSDUCER 10 PSI	4-20 mA DC	LOOP	Unclassified	EI-701			EXISTING
C	P-C-101	BENNETT WELL PUMP STARTER	ACROSS THE LINE STARTER	480 VAC	480 VAC	Unclassified	EI-701	26 XX YY	CONTRACTOR	NEW
C	PIT-B-170	BENNETT WELL SUPPLY PRESSURE SENSOR	PRESSURE SENSOR	4-20 mA DC	LOOP	Unclassified	EI-701	40 73 00	CONTRACTOR	NEW
C	YS-C-109	BENNETT WELL PUMP ROOM INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
D	FE-D-130	GROVE WELL FLOW METER	MAGNETIC FLOW ELEMENT			Unclassified	EI-701	40 70 13 2.2	CONTRACTOR	NEW
D	FIT-D-130	GROVE WELL FLOW METER	MAGNETIC FLOW TRANMITTER	4-20mA, VDC CONTACT	120 VAC	Unclassified	EI-701	40 70 13 2.2	CONTRACTOR	NEW
D	LCP-D-100	GROVE WELL CONTROL PANEL	LOCAL CONTROL PANEL		120 VAC	Unclassified	EI-701	40 63 43	CONTRACTOR	NEW
D	LT-D-150	GROVE WELL LEVEL	SUBMERISIBLE PRESSURE TRANSDUCER 10 PSI	4-20 mA DC	LOOP	Unclassified	EI-701	40 72 00 2.1	CONTRACTOR	NEW
D	P-D-101	GROVE WELL PUMP STARTER	ACROSS THE LINE STARTER	480 VAC	480 VAC	Unclassified	EI-701	26 XX YY	CONTRACTOR	NEW
D	PIT-D-170	GROVE WELL SUPPLY PRESSURE SENSOR	PRESSURE SENSOR	4-20 mA DC	LOOP	Unclassified	EI-701	40 73 00	CONTRACTOR	NEW
D	YS-C-109	BENNETT WELL PUMP ROOM INTRUSION	INTRUSION SWITCH	1 DRY CONTACT		Unclassified	EI-701	28 31 11	CONTRACTOR	NEW
H	LCP-H-100	HOWARD WELL CONTROL PANEL	LOCAL CONTROL PANEL		120 VAC	Unclassified	EI-701			EXISTING
H	LT-H-150	HOWARD WELL LEVEL	SUBMERISIBLE PRESSURE TRANSDUCER 10 PSI	4-20 mA DC	LOOP	Unclassified	EI-701			EXISTING
D	P-H-101	HOWARD WELL PUMP STARTER	ACROSS THE LINE STARTER	480 VAC	480 VAC	Unclassified	EI-701			EXISTING
D	P-H-104	HOWARD WELL CHLORINE PUMP	METERING PUMP		120 VAC	Unclassified	EI-701			EXISTING
H	PIT-H-170	HOWARD WELL SUPPLY PRESSURE SENSOR	PRESSURE SENSOR	4-20 mA DC	LOOP	Unclassified	EI-701			EXISTING
H	VFD-H-102	HOWARD WELL BOOSTER PUMP #1	VARIABLE FREQUENCY DRIVE	480 VAC	480 VAC	Unclassified	EI-701			EXISTING

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 70 13 - IN-LINE LIQUID FLOW MEASURING SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide in-line liquid flow measuring systems, complete and operable, in accordance with the Contract Documents. The transmitter portion of the system shall be remotely mounted as shown on Contract Drawings.

1.2 REFERENCE STANDARDS

A. Commercial Standards:

1.	ISA – S 5.1	Instrumentation Symbols and Identification
2.	ANSI – B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800
3.	ANSI/AWWA C207	Steel Pipe Flanges for Waterworks Service – Sized 4-inch through 144-inch
4.	ANSI/AWWA C700	Cold Water Meters
5.	ASME Report	Fluid Meters, Sixth Edition, 1971

1.3 SUBMITTALS

A. Shop Drawings: At a minimum, the following information shall be submitted with each meter supplied:

1. Data sheets and catalog literature for the flow meter and the microprocessor-based signal converter.
2. Connection diagrams for equipment wiring.
3. Materials of construction and connection fittings.
4. Recommended spare parts list.

B. Test Data: Signed, dated, and certified calibration data for each flow metering system which requires factory testing, submitted before shipment of equipment.

C. Certifications: The Contractor shall provide Manufacturer's certification of proper installation and certification of satisfactory field testing.

D. Owner’s Manual: Submit Owner’s manual as specified in Special Provisions, to include operation and maintenance data and other information for the equipment.

1.4 QUALITY ASSURANCE

A. Each flow metering system shall be hydraulically calibrated at a facility which is traceable to the National Institute of Standards and Technologies. The calibration procedure shall conform to the requirements of ANSI/NCSL Z 540-1 Calibration. A real-time computer-generated printout of the actual calibration data shall be submitted to the Engineer at least 30 days prior to shipment to the site.

B. Accuracy Requirements: Unless otherwise indicated, flow meters shall be guaranteed to register flow to an accuracy of plus and minus 0.3% of actual flow throughout the range indicated.

C. Guarantees, Warranties: After completion the Contractor shall furnish to the Owner the manufacturer's written guarantee that the metering system swill operate within the published accuracies and flow ranges and meet these Specifications. The Contractor shall also furnish the manufacturer's warranties as published in its literature.

PART 2 - PRODUCTS

2.1 GENERAL

A. All meters shall be capable of operating at a minimum ambient temperature ranging from -4 to 140 degrees F.

B. The Contractor shall be responsible for confirming necessary cable length with meter manufacturer prior to ordering any meter equipment.

2.2 ELECTROMAGNETIC (MAG) FLOW METERS

A. The electromagnetic flowmeter shall consist of a flow sensor based on Faraday's Law of Electromagnetic Induction, the flow of liquid through the sensor induces an electrical voltage that is proportional to the velocity of the flow.

B. Electromagnetic flowmeter systems shall be the low frequency electromagnetic induction type which produces a DC pulsed signal directly proportional to and linear with the liquid flow rate. Complete zero stability shall be an inherent characteristic of the flowmeter system. Each magnetic flow metering system shall include a metering tube, signal cable, transmitter, and flowmeter grounding rings.

C. Meter Tube: The tube shall be constructed of 304 or 316 stainless steel tube with ductile iron flanged or Carbon Steel connections and include a minimum of two (2) self-cleaning electrodes. The electrodes shall be constructed of materials conforming to the manufacturer's recommendation for the intended service. The meter housing shall be IP67 or IP68, rated for a submergence depth of 3 meters for a duration of 48 hours. Grounding rings shall conform to the manufacturer's bore and material recommendation for the intended service. Grounding rings shall be designed to protect and shield the liner's edge interface from abrasion at the meter end.

D. Performance Requirements: The flow metering system shall conform to the following:

No.	Item	Units	Value
1	Time Constant	Secs	0.5 – 1,000
2	Accuracy	%	0.5 of full flow
3	Repeatability	%	0.25 full scale
4	Power Consumption	watts	50 or less
5	Power Requirements	VAC	120

E. Transmitter: The microprocessor-based signal converter/transmitter shall be remote mounted outdoors on disconnect support structure and shall have the following:

1. Transmitter shall be suitable for installation outdoors, subject to direct sunlight and full temperature range at installed location. Transmitter housing to be NEMA 4X, with min. IP65 ingress protection. Provide with sun shield and/or other accessories as recommended by manufacturer.

2. DC pulse technique to drive flux-producing coils and capability to convert DC pulse signal from the tube to a standardized flow VDC pulse contact and a 4-20 mA DC signal into a minimum of 700 ohms.

3. Six-digit LCD displays for flow rate, percent of span, and totalization. An operator interface with keypad which responds to English text entry.

4. Integral low flow cutoff and zero return to produce a consistent zero output signal in response to an external dry contact closure.

5. Automatic range change and capability to measure flow in both directions.

6. Programmable parameters including meter size, full scale Q, magnetic field frequency, primary constant, time constant.

7. Data retention for minimum of five (5) years without auxiliary power (main or battery).

8. Self-diagnostics and automatic data checking.

9. Protected terminals and fuses in a separate compartment which isolates field connection from electronics.

F. Schedule: Provide the magnetic meters listed in following table.

Size (in)	Velocity Range (fps)	Pipe Type / Dia (in)	P&ID	Service
6	0-10	DI, flanged / 6	EI-101	Water

G. Manufacturers, or equal

1. Krohne

2. Siemens

3. Endress+Hauser

4. Badger Meter

PART 3 - EXECUTION

3.1 GENERAL

A. The Contractor shall assemble and install all equipment specified herein, in strict accordance with the manufacturer's published instructions, under the supervision of the manufacturer's representative, under the general review of the Engineer. All installations shall be accomplished by competent craftsmen in a workmanlike manner.

B. Final acceptance of the equipment is contingent on satisfactory operation after installation.

3.2 INSTALLATION

A. The meters shall be installed in easily accessible locations for ease of reading and maintenance, and where shown, for balancing of flow in several lines, in conjunction with throttling and shut-off valves. Where possible, all meters shall be installed in such a way to provide the manufacturer's recommended straight approach and straight piping downstream. All meters, shut-off and balancing valves shall be firmly supported from the structure or from the floor with approved supports. In-line meters shall be installed to provide full-line flow and not less than the manufacturer's recommended head at all items.

B. Wiring between flow sensors and remote mounted signal converters shall use cable type and procedures as per the manufacturer's recommendations. Provide sufficient cable from meter vault to location where local display will be located. Confirm cable lengths prior to submitting shop drawings.

3.3 TESTING

A. Equipment shall be prepared for operational use in accordance with manufacturer's instructions, including bench test and calibration, where required.

B. Each item shall be subjected to an operating test over the total range of capability of the equipment. Where applicable, tests shall be conducted in accordance with the Test Code of the Standards of the Hydraulic Institute. The Contractor shall notify the Engineer one week in advance of all tests to be conducted on site.

3.4 CLEANUP

A. After completion and testing of its work, the Contractor shall remove all debris from the site, clean all meters, controls, cabinets, and other metering appurtenances, to hand over each system in perfect operating condition.

3.5 MANUFACTURERS SERVICE REPRESENTATIVE

A. Erection and Startup Assistance: During erection and startup of the magnetic flow meters, the Contractor shall obtain all necessary assistance from an experienced factory service representative to ensure a correct and first-class installation, in accordance with the manufacturer's instructions.

B. Instruction of Owner's Personnel: After completion of the installation and during startup of the plant, the Contractor shall instruct the Owner's personnel in the proper operation, maintenance and repair of all metering equipment. For this purpose, the Contractor shall obtain the services of an experienced factory service representative, who shall half a day on the site to fully instruct the Owner's operating personnel on all phases of its equipment. The Contractor shall video tape the training session and provide a DVD of the training to the Owner.

END OF SECTION 40 70 13

THIS PAGE LEFT BLANK INTENTIONALLY

SECTION 40 73 00 - PRESSURE MEASURING AND DETECTION SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The Contractor shall provide pressure measuring systems, complete and operable, in accordance with the Contract Documents.

1.2 SUBMITTALS

A. Shop Drawings and Technical Manual, shall be submitted in conformance with the requirements of Section 01 33 00 – Submittal Procedures and Section 40 70 00 – Instrumentation and Controls, General.

1.3 SUBMITTALS

A. Warranty: All pressure measuring and detection systems shall be provided with manufacturer's standard one-year warranty.

PART 2 - PRODUCTS

2.1 GENERAL

A. Pressure gauges shall be provided on suction and discharge connections to pumps; discharge connections from blowers and compressors; each side of pressure reducing valves; and where shown on the Contract Drawings. Vacuum gauges shall be provided for vacuum pumps and where shown on the Contract Drawings. In all locations (such as certain pump suction connections) where pressures may vary below and above atmospheric head, compound gauges shall be installed.

B. Materials in contact with potable water shall be listed as compliant with NSF Standard 61.

C. Diaphragm Seals: Pressure sensing devices shall be equipped with diaphragm seals, or equal protective pressure or vacuum sensing devices as per standard details shown on the drawings. Diaphragm seals shall be provided for all gauges, pressure transmitters, or pressure switches where medium fluid has solids (i.e., non-potable or plant effluent), contains chemicals, is of a corrosive nature, or high temperature which could affect the accuracy of the pressure sensing device. Diaphragm seals shall be provided, whether shown on the drawings or not, for these applications. Materials shall be suitable for the intended application.

D. Annular Seals: Gauges and pressure sensing devices shall be provided with a flanged annular seal for all high solids (raw sewage, scum, and sludge) applications, including clarifier scum and sludge, waste activated sludge, return activated sludge, thickener feed sludge, thickened sludge, and anaerobically digested sludge. Annular seals shall be provided, whether shown on the drawings or not, for these applications.

2.2 PRESSURE AND VACUUM GAUGES

A. Gauges shall be industrial quality type with Type 304 or 316 stainless steel movement and stainless steel or alloy case. Unless otherwise shown or specified, gauges shall have a 4½-inch dial, ¼-inch threaded connection, a Type 304 or 316 stainless steel snubber adapter, and shut-off valve. Gauges shall be calibrated to read in applicable units, with an accuracy of ± 1 percent, to 150 percent of the working pressure or vacuum of the pipe or vessel to which they are connected. Gauges for pumps shall read in feet of water and all gauges for air piping shall read in psi. All gauges shall be vibration and shock resistant.

B. Liquid-filled gauges for potable water service shall be filled with an NSF 61-approved liquid.

C. Manufacturers, or equal:

1. Ashcroft
2. Foxboro
3. Rosemont

2.3 DIFFERENTIAL AND GAUGE PRESSURE TRANSMITTERS

A. Electronic differential transmitters shall consist of a capsule assembly, bottom works, vent plug, drain plug, cover flange, process connector and connection, amplifier unit, integral indicator, terminal box with cover, block and bleed valves, and conduit connections. Pressure applied to the unit shall be transmitted by a sealed fill fluid to both sides of a sensing diaphragm. The sensing diaphragm and the sensor body shall function as the moving and fixed electrodes, respectively, of a differential capacitor. As the applied pressure causes the diaphragm to move, the capacitance of the cell shall change.

B. Performance Requirements: The amplifier unit shall convert the change in capacitance to a 4 - 20 mA DC signal, 2 wire type, with an allowable loop load of no less than 600 ohms. Static pressure rating shall be a minimum of 500 psig. The maximum overrange pressure limit shall be a minimum of 150 percent of the range. Span shall be adjustable over a minimum of 5:1 range. External adjustments shall include zero and span. Output signal damping shall be provided as an internal adjustment.

1. Equipment shall be suitable for an ambient operating range of minus 40 degree F to plus 212 degrees F.
2. The integral indicator shall be calibrated in process units.
3. Power supply shall be 24 VDC.
4. Accuracy, including linearity and repeatability, shall be a plus or minus 0.2 percent of span.
5. Differential pressure transmitters used for flow service shall include square root extraction to produce an output signal linearly proportional to flow.

C. Wetted parts, including block and bleed valve parts, shall be constructed of Type 316 stainless steel.

D. Schedule: Refer to Device Schedule 17100A.

E. Manufacturers, or equal.

1. Foxboro IGP10/IDP10

2. Rosemount 3051

3. Yokogawa YA43/44

2.4 ADJUSTABLE PRESSURE SWITCH

A. Adjustable pressure switches shall be diaphragm-actuated, dual adjustment pressure switches with SPDT contacts rated for a minimum of 5 Amps at 120 V AC. The dead band shall be adjustable up to 60 percent of full scale. Set points shall fall between 20 and 80 percent of the adjustable range. The diaphragm shall be Buna-N, and the lower housing shall be brass with a 1/4-inch bottom sensing connection, unless otherwise indicated.

B. Schedule: Refer to Device Schedule 17100A.

C. Manufacturer, or equal:

1. United Electric Series 400

2. Ashcroft Series B or L Series

2.5 DIAPHRAGM SEALS

A. Diaphragm seals shall consist of bottom housing, lower ring, diaphragm capsule, fill screw, flushing connection, and a top housing.

1. The diaphragm seal shall have a removable bottom housing to permit servicing.

2. The diaphragm seal shall be factory assembled to the corresponding pressure instrument and be factory-filled. The assembly shall be shipped with a tag reading "Do not disassemble for installation".

3. Exposed surfaces housings shall be constructed of Type 316 stainless steel for pressure service over 15 psi.

4. The diaphragm seal shall attach to the inlet connection of a pressure instrument to isolate its measuring element from the process fluid. The space between the diaphragm and the pressure element shall be completely filled with a suitable liquid. Displacement of the liquid fill in the pressure element through the movement of the diaphragm shall transmit process pressure changes directly to a gauge, transmitter, switch, or other pressure instrument.

B. Materials of Diaphragm: Seals shall be of Type 304 or 316 stainless steel with stainless steel diaphragm for pressure over 15 psi and elastomer diaphragm for pressure of 15 psi and less. Type 316 stainless steel nuts and bolts, fill connection and valved flush port size ¼-inch NPT capable of disassembly without loss of filler fluid.

1. Manufacturers, or equal

    a. Ashcroft Model 101

    b. U.S. Gauge (Ametek) SG

    c. Marshalltown Series 225-01

2. Snubber Manufacturers, or equal

    a. Cajon Company

    b. Weksler Instruments, Corp.

2.6 ANNULAR SEALS FOR PRESSURE MEASURING SYSTEMS

A. Annular seals shall consist of a bolt-through Isolator Ring and Type 304 or 316 stainless steel calibration/evacuation accessory. Any required instrument manifolds shall be Type 316 stainless steel, minimum size of ½" with NPT connection of size required for pressure sensing device. Pressure transmitters, switches and gauges shall be shipped to annular seal manufacturer for factory assembly, evacuation and calibration.

B. Isolator ring shall include a valve and/or quick release device to allow instruments to be removed while the piping is in service and to prevent loss of fill fluid.

C. Materials of Diaphragm: Seals shall be of Type 304 or 316 Stainless Steel for center section and end plates with Neoprene or EPDM diaphragm. Fill fluid shall be Silicone Fluid.

1. Manufacturers, or equal

    a. Onyx Valve

    b. Ashcroft

2.7 SCHEDULE

A. The Contractor shall provide pressure and vacuum gauges as indicated in 2.1.A and pressure transmitters and switches as indicated in the Instrumentation Schedule included as Appendix A to Section 40 70 00 – Instrumentation and Controls, General.

PART 3 - EXECUTION

A. Pressure measuring systems shall be handled, installed, calibrated, loop-tested, pre-commissioned, and performance tested.

END OF SECTION 40 73 00

SECTION 40 79 23 – TESTING, CALIBRATION, AND COMMISSIONING

PART 1 - GENERAL

1.1 GENERAL PROCEDURES FOR INSPECTION, TEST, AND INSTRUMENT CALIBRATION

A. Each instrument shall be checked against the latest version of the design documents for tagging, manufacturer, model number, range, action, etc., before functional testing or calibration.

B. Any air system, permanent or temporary, used for energizing instrumentation shall be dry and clean at all times, and be blown down thoroughly before use. Any connection between the air supply system shall be via proper filter and regulator.

C. Plastic sealing plugs shall be used for all pneumatic connections and tubing except during test and immediately before final connection in the field.

D. Care shall be observed when connecting electric power supplies to the instrumentation. Insure correct voltage and frequency on AC power supplies. Insure correct voltage, polarity, and superimposed ripple on DC power supplies. Ensure correct polarity of the supply and proper grounding before connecting instruments.

E. The Instrumentation and Control Systems Contractor shall satisfy the requirement that the installation, calibration, and checkout of the instruments meet the requirements of the project specifications.

F. The Calibration procedures for verifying instrument precision should conform to accepted practices as outlined in ASTM, ASHRAE, ISA, etc. specifications.

G. The Instrumentation and Control Systems Contractor shall provide copies of manufacturer’s installation and calibration instructions to the calibration technicians prior to the commencement of calibration.

1.2 INSTRUMENT QUALITY LEVELS AND METEROLOGY

A. Instrumentation supplied for the calibrating sensing instruments for facility control system shall include documentation concerning the calibration method and traceability to the National Institute for Standards and Testing (NIST).

B. Process instrumentation shall be field checked for accuracy before installation even if the instruments have been calibrated by the manufacturer’s metrology facilities.

PART 2 - PRODUCTS

2.1 CALIBRATION AND TEST EQUIPMENT

A. All calibration and test equipment shall be in proper working order and calibrated using traceable standards and equipment set by the NIST. Certificates of traceability shall be kept on file in the field calibration office or field project office. Copies of the traceability documents shall be included with the submittal of the calibration forms.

B. All calibration and test equipment shall carry a documented current calibration sticker reflecting the date of the last calibration and the name or initials of the technician who performed the calibration. A current calibration will be performed before the equipment is shipped to the site. The calibration equipment shall be shipped directly from the calibrating authority to the site, in packaging provided by the calibrating authority. A current calibration will be performed for all calibration or test equipment every 180 days or within the normal calibration interval, whichever is less.

C. Any field instruments calibrated with test equipment whose calibration has expired will be rejected and will be required to be recalibrated.

D. All Calibration and test equipment shall be of a higher accuracy than the instrument being calibrated. The manufacturer's recommendations for calibration accuracy will prevail in all instances.

E. The Control Systems Contractor shall supply calibration and test equipment of sufficient quantity, quality, and type to calibrate the instruments and sensors used in the installation.

2.2 BENCH TEST AND CALIBRATION FORMS AND METHODOLOGY

A. Calibration forms and calibration procedures for each instrument type shall be generated by the Instrumentation and Control Systems Contractor and approved by the Owner or his representative before proceeding with any calibrations. The manufacturer's procedures or the Owner's existing procedures shall form the basis for the calibration procedure.

B. The following format shall be used for instrument calibration form:

1. A separate calibration form shall be generated for similar types of instruments that have different accuracy and tolerance requirements.

2. The form shall contain as found and as calibrated data areas. The form shall contain areas for the calibrating and test instruments manufacture, serial number, and date of calibration.

3. The forms shall be filled out and signed in black ink.

4. Those instruments that can shall be calibrated on the bench under controlled conditions. Care shall be taken with those instruments that must be calibrated in the field to approximate the conditions of the bench test.

PART 3 - EXECUTION

3.1 GENERAL

A. The Control Systems Contractor shall calibrate all instrumentation in an environment suitable to quality testing procedures. High accuracy comparative instruments or mechanisms shall be the standard against which instrument calibration is tested.

B. Verify that all process and test instruments have been calibrated and traceable to the NIST or other appropriate reference standards. Verify that a calibration sticker has been affixed to the instrument and that each instrument is within its calibration period at the time that the calibration is performed.

C. Each instrument shall be calibrated as per Owner approved calibration procedures and forms.

D. Each instrument shall have a calibration sheet completely filled out with all pertinent data related to the calibration and system. These calibration sheets shall be organized in a binder by system and turned over to the Owner at the completion of the project.

E. Instruments shall have a calibration sticker placed on the instrument. The sticker shall not be placed until the instrument has successfully completed the calibration procedure and the associated calibration form has been filled out and signed. The sticker shall bear the date of calibration and expiration and initials of the technician certifying calibration.

END OF SECTION 40 79 23

THIS PAGE LEFT BLANK INTENTIONALLY

APPENDIX A -

GEOTECHNICAL REPORT

THIS PAGE LEFT BLANK INTENTIONALLY

December 20, 2019
File: CD19048A

Mr. Zack Wallin
Keller Associates, Inc.
601 Sherman Avenue, Suite 1
Coeur d'Alene, Idaho 83814

RE: **Geotechnical Engineering Evaluation**
Athol Water System Improvements
N 6th Street and E Menser Avenue; and
SH-54 and Watkins Avenue
Athol, Idaho

Greetings, Mr. Wallin:

STRATA is pleased to continue our working relationship with Keller Associates, Inc. (Keller) and provide geotechnical recommendations for the Athol Water System Improvements project planned northwest of the Highway 54 (SH-54) and Watkins Avenue intersection (herein referred to as the "cemetery site"); and southeast of the North 6th Street and East Menser Avenue intersection (herein referred to as the "elevated reservoir site") in Athol, Idaho. The purpose of our geotechnical engineering evaluation was to obtain subsurface information at the sites and provide geotechnical opinions and recommendations to assist project planning, design, and construction. We accomplished our geotechnical services referencing our authorized proposal, dated September 18, 2019.

STRATA provided a draft report, dated October 14, 2019; this stamped report version expands upon and supersedes our previous recommendations. This updated report version now includes micropile recommendations for the elevated reservoir site and infiltration properties of soil at the cemetery site to assist Keller's design of the overflow infiltration basin.

Our geotechnical recommendations presented herein must be read and implemented in their entirety; portions or individual sections of our report cannot be relied upon without the supporting text. The following report provides specific geotechnical recommendations for earthwork activities, shallow foundation design, micropile design, and soil infiltration properties.

Our opinion is, project construction success will depend, in part, upon the design team and contractor following our report recommendations, the contractor adhering to good construction practices, and the owner and/or contractor providing the necessary construction monitoring, testing, and geotechnical consultation to verify the work has been accomplished as recommended herein. Geotechnical continuity is an imperative part of the geotechnical design process, as it allows the geotechnical engineer-of-record to confirm soil conditions and potentially address changed conditions rapidly during construction. Therefore, we strongly recommend the City of Athol retain STRATA to provide geotechnical construction monitoring, testing, and consultation services to verify conditions encountered, and to ensure our report recommendations are being followed. If, for some reason, we are not provided the opportunity to provide

geotechnical continuity during construction, we cannot be responsible for designer or contractor errors, omissions, or report misinterpretations.

We appreciate the opportunity to assist Keller and the City of Athol with this project and look forward to our continued involvement during the construction phase. We strive to provide quality, innovative, and timely geoprofessional services. Please let us know if you have any suggestions on how we can improve our quality of service.

Sincerely,
STRATA

Luke R. Michels, P.E.
Staff Engineer

Ryan M. Lewis, P.E.
Coeur d'Alene Business Manager

LRM/RML/cw

© 2019 by STRATA. All rights reserved

Geotechnical Engineering Evaluation
Athol Water System Improvements
N 6th Street and E. Menser Avenue; and
SH-54 and Watkins Avenue
Athol, Idaho

Prepared For:
Keller Associates, Inc.
601 Sherman Avenue, Suite 1
Coeur d'Alene, Idaho 83814

Prepared By:
STRATA
West 280 Prairie Avenue, Suite 2
Coeur d'Alene, Idaho 83815



December 20, 2019

TABLE OF CONTENTS

Page

INTRODUCTION 1
PROJECT UNDERSTANDING 1
Existing Site Conditions 2
Proposed Construction 2
FIELD AND LABORATORY EVALUATION 3
Site Exploration 3
Subsurface Conditions (Cemetery Site) 4
General 4
Native Gravel 4
Groundwater and Bedrock 5
Subsurface Conditions (Elevated Reservoir Site) 5
General 5
Existing Footing Dimensions 5
Footing Backfill 6
Native Gravel 6
Groundwater and Bedrock 6
Subsurface Variability 6
Laboratory Testing 7
GEOTECHNICAL OPINIONS AND RECOMMENDATIONS 7
Earthwork 7
Site and Subgrade Preparation 7
Excavation Characteristics 8
Soil Product Specifications and Required Compaction 8
TABLE 1. SOIL SPECIFICATIONS AND ALLOWABLE USE 9
TABLE 2. REQUIRED SOIL PRODUCTS FOR DESIGNATED PROJECT AREAS 9
Wet Weather, Wet Soil Construction and Over-excavations 10
Site Grading and Drainage 11
Utility Trench Construction 11
Geotextile Applications 11
Foundation Design 12
Corrosivity 12
Seismicity 13
TABLE 3. SEISMIC RESPONSE CRITERIA (2015 IBC)[1,2,3] 13
Micropile Design for the Elevated Reservoir Site 13
Infiltration Properties of Soil at Cemetery Site 15
ADDITIONAL RECOMMENDED SERVICES 16
EVALUATION LIMITATIONS 16

© 2019 by STRATA. All rights reserved

Geotechnical Engineering Evaluation
Athol Water System Improvements
N 6th Street and E Menser Avenue; and
SH-54 and Watkins Avenue
Athol, Idaho

INTRODUCTION

We accomplished the following services referencing our authorized proposal, dated September 18, 2019:

1. Coordinated with Keller and the City to delineate exploration schedules, locations, utility issues, and cleanup expectations.
2. Conducted a site visit to establish and pre-mark the proposed exploration locations prior to public and private utility locating.
3. Contacted the Kootenai County One-Call utility notification center prior to exploration to identify known public utilities within 50 feet of the proposed boring and test pit locations.
4. Subcontracted a private utility locator to perform GPR and EM utility locating within 50 feet of boring and test pit locations.
5. Subcontracted a track-mounted drill rig and operator to accomplish 8 exploratory borings at the 2 sites up to 31.0-feet below the ground surface. Three (3) borings were advanced around the outside of southernmost existing tank at the cemetery site. Four (4) borings were advanced around the outside of the existing elevated water tank foundation and 1 boring near the center of the existing elevated water tank. Boring locations are illustrated on Plate 1, *Exploration Location Plan.* STRATA accomplished Standard Penetration Test (SPT) samples at approximate 2.5- to 5.0-foot intervals, extending to each boring's termination depth.
6. Subcontracted a tracked mini-excavator to advance 2 exploratory test pits at the elevated water reservoir site up to 5.5-feet below the ground surface to expose the existing foundation system and obtain bulk samples of the subgrade soil.
7. Observed the soil borings and test pits and described, classified, and logged the subsurface conditions referencing the *Unified Soil Classification System* (USCS). Prior to departing the site, we staked and labeled the locations to assist future surveying activities. Additionally, we documented the exploration location by measuring from existing site features.
8. Accomplished laboratory testing referencing *ASTM International* (ASTM) test standards to help characterize soil engineering parameters and to correlate soil design factors. Laboratory testing included grain size evaluations, in-place moisture content, Atterberg limits, pH/resistivity/sulfate content, and moisture-density relationship curve (modified Proctor).
9. Provided a draft report dated October 14, 2019 with geotechnical recommendations for:
    - Earthwork
    - Shallow foundation design
    - Additional recommended services
10. Issued this stamped report that includes micropile design recommendations and infiltration properties of the soil to assist Keller's design of the overflow infiltration basin. This report was also updated based on updated structural loading information provided by Keller.

PROJECT UNDERSTANDING

We understand the City has selected Keller to design and oversee construction of improvements to the existing water system that includes the construction of a new standpipe at the cemetery site and the vertical extension of an existing elevated water tank at the elevated reservoir site. We base our

© 2019 by STRATA. All rights reserved

project understanding on the following:

- Our electronic mail and telephone conversations with Mr. Zack Wallin, Project Engineer with Keller from September through December of 2019;
- Reviewing Sheet 7 of Wyatt Engineering's *1995 ICDBG Water Improvement Project* drawings for the elevated reservoir site, dated August 18, 1995;
- Reviewing Sheets FIG–7 and C-101A of the *Athol Water System Improvements* Plans by Keller showing site layouts for both of the sites;
- Reviewing the draft grading and drainage plans developed by Keller, provided on December 17, 2019; and
- Our experience and familiarity with the subsurface conditions near the project sites.

Existing Site Conditions

The **cemetery site** consists of 2 water tanks within a 90-foot by 47-foot fenced area. The site is bordered to the north, east, and west by a vacant wooded area. The site is bordered to the south by a cemetery. The ground surface within the fenced area is covered with gravel base course. Some trees are located just south of the existing fence. The site is relatively flat, with less than 1-foot of elevation change within the fenced area. Adjacent east of the site, the ground slopes downward between 10H:1V (horizontal to vertical) to as steep as 5H:1V for approximately 1000 lineal feet.

The **elevated reservoir site** consists of an existing 250,000 gallon, 94-foot tall elevated water tank within a 145-foot by 145-foot fenced area. The elevated water tank is supported by 6 legs that are each supported by a 12-foot by 12-foot square concrete footing buried between 3.0 and 4.0 feet deep. Per structural loads provided by Keller, each footing is currently supporting a dead load of 11.4 kips for the steel frame and 300 kips of water weight. The site is bordered to the north by East Menser Avenue, to west by North 6th Avenue, to the south by a City of Athol shop building, and to the east by commercial property. The ground surface within the fenced area is covered with gravel base course. The site is relatively flat, with less than 1-foot of elevation change within the fenced area.

Proposed Construction

Proposed construction at the **cemetery site** includes demolishing and replacing the 2 existing water tanks with a single, 300,000-gallon capacity standpipe and a 28-foot by 36.5-foot rectangular-shaped overflow infiltration basin. The proposed standpipe will comprise a 28-foot inside diameter, 60-foot tall steel tank. The new standpipe footprint is planned within the existing footprint of the southernmost tank with an anticipated footing depth of 3-feet below the existing ground surface (top of footing elevation of 2489 feet AMSL). The weight of the tank without water is 147.2 kips and the weight of water (filled tank scenario) is 2,585.8 kips. Based on this loading information, the water head will exert an approximate 4.2 kip per square foot (ksf) pressure along the tank floor. A concrete ring wall is planned around the perimeter of the standpipe to accommodate the standpipe structure dead, wind,

© 2019 by STRATA. All rights reserved

and seismic loads. Unfactored footing dead loads for the tank range between 1.5 to 2.0 kips/foot; assuming a 4-foot wide ring wall foundation, unfactored footing loads are 0.84 ksf for wind with horizontal shear and 5.56 ksf for seismic with horizontal shear. The new overflow infiltration basin is planned to overlay the northernmost tank footprint, with sidewalls sloped at 3H:1V (horizontal to vertical) and a maximum basin depth of 4.5-feet.

Proposed construction at the **elevated reservoir site** consists of adding 50 feet of height to the steel frame to increase the water pressure of the existing system and re-using the existing elevated water tank. This addition to the tower steel frame will increase the dead load on each footing from 11.4 kips to 17.1 kips; the 300 kips of water weight will not change. Unfactored footing loads are 4.07 ksf for wind with horizontal shear and 6.98 ksf for seismic with horizontal shear. Based on this information, we understand micropiles will be necessary to accommodate the increased loading conditions without increasing the size of existing footings at the elevated reservoir site.

FIELD AND LABORATORY EVALUATION

Site Exploration

Prior to exploration, STRATA subcontracted a firm to perform private utility locating at the proposed test pit and boring exploration locations. Our subcontracted private utility locator performed fieldwork activities on September 23, 2019.

We evaluated subsurface conditions at the cemetery site by advancing 3 exploratory borings (B-1 through B-3) on September 27, 2019. We explored subsurface conditions at the elevated reservoir site by advancing 5 exploratory borings (B-4 through B-8) and 2 exploratory test pits (TP-1 and TP-2). Plate 1, *Exploration Location Plan,* illustrates the approximate exploration locations documented in the field by measuring from existing site features.

We advanced the borings to depths ranging from 27.0 to 31.0 feet beneath the ground surface using a track-mounted Diedrich D-50 drill rig equipped with 7-inch outside-diameter hollow-stem augers. Boring B-2 was terminated at 27.0-feet due to practical auger refusal on suspected cobbles and boulders. Soil samples were obtained in the borings at 2.5- to 5.0-foot intervals via standard penetration testing (SPT) using 2-inch-diameter split spoon samplers. We advanced the SPT samplers 18 inches with a 140-pound hammer falling 30 inches. We obtained the SPT N-value by counting the number of hammer blows required to advance the sampler over the interval from 6 to 18 inches. The blow counts for each 6-inch sampler segment are presented on the boring logs. The SPT N-values reported on the boring logs are not corrected for overburden pressure or dilation effects on the sampler. We also obtained select bulk samples of cuttings generated during drilling activities.

© 2019 by STRATA. All rights reserved

Test pits were advanced between 4.5- and 5.5-feet below the ground surface using a Bobcat E20 mini-excavator equipped with a 12-inch wide bucket. We obtained select bulk samples from within the test pit excavations.

Mr. Eric Larson, E.I.T., and Mr. Ryan Lewis, P.E. and Geotechnical Engineer, visually described, classified, and logged the subsurface conditions encountered during exploration referencing the USCS. Appendix A presents exploration logs and a USCS explanation, which should be used to help interpret soil terms used throughout this report and on the exploration logs.

Following exploration completion, we loosely backfilled borings with a combination of bentonite and on-site cutting finished level with the surrounding ground surface. Test pits were backfilled in 6- to 12-inch thick lifts with the excavated soil and compacted using a jumping-jack. STRATA staked and labeled the exploration locations following completion.

Subsurface Conditions (Cemetery Site)

General

In the borings advanced at the cemetery site (B-1 through B-3), we generally encountered native gravel soil beneath a thin (2- to 3-inch) layer of base course gravel that extended to the maximum depth explored in all 3 borings (27.0- to 31.0-feet). Although not encountered in the borings, fill used to backfill the existing tanks will likely be encountered during tank demolition; the fill will likely be derived from on-site native material, loose, and require re-compaction prior to new tank foundation construction.

Surface Gravel

A base course gravel was used to surface the cemetery site and was encountered in each of the three borings. The gravel visually classified as (GM) silty gravel with sand according to ASTM D2488. The gravel was dark brown and moist and ranged from 2- to 3-inches thick. It appears any surficial topsoil or organics were stripped from the site prior to placing gravel base course.

Native Gravel

Native gravel was encountered below the base course in all three borings and extended to each boring's termination depth. The native gravel classified as poorly graded gravel with silt, sand, and cobbles (GP-GM) according to the ASTM classification system. The gravel was gray and brown, moist, with in-situ moisture contents ranging from 1- to 4-percent. Penetration resistance values in the gravel ranged from 7 to greater than 50 blows per foot, indicating a loose to very dense soil stratum. Atterberg limit testing indicated that the portion of native soil passing the #40 sieve is non-plastic; as such, the native gravel fines content is classified as silt (ML). The measured fines content in the native gravel ranged from 6.6- to 11.0-percent.

© 2019 by STRATA. All rights reserved

Groundwater and Bedrock

We did not encounter bedrock or groundwater within the depths explored at the cemetery site. Based on our research and review of available well logs in the area, we do not anticipate bedrock or groundwater will be encountered within the upper 100-feet of the soil profile. However, groundwater can vary with seasonal changes in irrigation, infiltration, precipitation, and adjacent site developments. Groundwater is common as small, nuisance seeps and springs in the subsurface primarily associated with subsurface water conduits (utilities) and seasonal runoff management facilities.

Subsurface Conditions (Elevated Reservoir Site)

General

In the borings advanced at the elevated reservoir site (B-4 through B-8), we encountered native gravel soil beneath a thin (2- to 3-inch) layer of base course gravel that extended to the maximum depth explored in all 5 borings (31.0-feet). In the test pits near tank leg footings at the elevated reservoir site (TP-1 and TP-2), we encountered gravel footing backfill below the upper layer (5- to 6-inches) of base course gravel. The gravel backfill above footings extended to the top of footing elevation (3.0- to 4.0-feet below the ground surface) and was underlain by native gravel extending the termination depths of both test pits (4.5- to 5.5-feet).

Existing Footing Dimensions

The 2 test pits were advanced to expose existing footings at the southwest and northeast corners of the elevated water tank. Refer to Appendix B for photographs illustrating existing footing conditions at the elevated reservoir site. The concrete footing exposed in test pit TP-1 (southwest corner) was approximately 1-foot thick and the 2 exposed sides were both 12-feet long. The depth to the top of the footing ranged from 3.5- to 4.0-feet below the existing ground surface (BGS). The concrete footing exposed in test pit TP-2 (northeast corner) was approximately 1-foot thick and the 2 exposed sides were both 12-feet long. The depth to the top of the footing ranged from 3.0- to 3.5-feet BGS. Both of the exposed concrete footings appeared to have been poured directly against soil as the sides of the concrete footing were rough and tapered. Both of the exposed footings also appeared to have been placed directly on medium dense to dense native gravel and backfilled with on-site native gravel.

The two exposed footings did not match the dimensions provided in the as-built footing detail drawing, which showed 11-foot by 11-foot by 1.5-foot thick footings buried 5.0-feet BGS.

Surface Gravel

A base course gravel was used to surface the elevated reservoir site and was encountered in each of the borings and test pits. The gravel visually classified as (GP-GM) poorly graded gravel with silt and sand according to ASTM D2488. The gravel was gray and moist and ranged from 2- to 6-inches thick.

© 2019 by STRATA. All rights reserved

It appears any surficial topsoil or organics were stripped from the elevated reservoir site prior to placing gravel surfacing.

Footing Backfill

Gravel backfill was encountered below the base course in both test pits and extended to the top of each exposed footing. The gravel backfill classified as (GM) silty gravel with sand and cobbles according to the ASTM classification system and appeared to be derived from on-site native soil. The gravel was brown to gray and moist. Atterberg limit testing indicated that the portion of the gravel backfill passing the #40 sieve is non-plastic; as such, the native gravel fines content is classified as silt (ML). The fines content in the gravel backfill was measured at 12.3-percent. Some garbage and debris was observed in the gravel backfill in test pit TP-2 above the existing footing. No debris or garbage was observed below the existing footings at TP-1 or TP-2.

Native Gravel

Native gravel was encountered below the base course or footing backfill in all 5 borings and both test pits and extended to each exploration's termination depth. The native gravel visually classified as (GM) silty gravel with sand and cobbles according to ASTM D2488. The gravel was brown to gray, and moist, with in-situ moisture contents ranging from 5- to 8-percent. Penetration resistance values in the gravel ranged from 7 to greater than 50 blows per foot, indicating a loose to very dense soil stratum. A fines content ranging from 12.1- to 18.2-percent was measured in the native gravel.

Groundwater and Bedrock

We did not encounter bedrock or groundwater within the depths explored at the elevated reservoir site. Based on our research and review of available well logs in the area, we do not anticipate bedrock or groundwater will be encountered within the upper 100-feet of the soil profile. However, groundwater can vary with seasonal changes in irrigation, infiltration, precipitation, and adjacent site developments. Groundwater is common as small, nuisance seeps and springs in the subsurface primarily associated with subsurface water conduits (utilities) and seasonal runoff management facilities.

Subsurface Variability

Exploratory borings and test pits only allow observation of a relatively small sample of the subsurface conditions at the site. Variations may exist between and beyond exploration locations. Such variations will not be apparent until construction and may impact project schedules and costs. Where such variations exist, it may affect the opinions and recommendations presented in this report as well as construction timing and costs and we must be contacted to review the encountered conditions and our recommendations to make any necessary revisions.

© 2019 by STRATA. All rights reserved

Laboratory Testing

We performed laboratory testing on select soil samples collected in the field referencing *ASTM International* (ASTM) test standards. We used laboratory test results to verify soil classification and to estimate soil engineering properties. Laboratory testing included grain size evaluations, in-situ moisture content, Atterberg limits, pH/resistivity/sulfate content, and moisture-density relationship curves (modified Proctor). Index laboratory test results are presented on exploratory logs in Appendix A. Graphical test results are provided in Appendix C.

GEOTECHNICAL OPINIONS AND RECOMMENDATIONS

We present the following geotechnical recommendations to assist project planning, design and construction for the Athol Water System Improvements project in Athol, Idaho. We based our geotechnical recommendations on our experience with similar soil and geologic conditions, findings from our field and laboratory evaluation, geotechnical engineering analyses, and our understanding of the proposed construction. If development plans change, we should be contacted to review the project modifications and revise our recommendations as necessary.

Earthwork

Site and Subgrade Preparation

STRATA did not encounter surficial/remnant topsoil or undocumented fill at either project site. However, if the earthwork contractor encounters topsoil (defined as soil containing greater than 3 percent vegetation and organics by weight per ASTM D2974) or undocumented fill, we recommend it be removed to expose undisturbed native gravel soil from the structure footprint prior to concrete placement for footings and slabs. We recommend topsoil and undocumented fill removal extend a minimum 5 lateral feet beyond structure footprints. In areas where the excavation extends deeper than 5-feet, the excavation should extend a minimum 1-foot laterally for every 1-foot of vertical depth.

Following topsoil stripping and undocumented fill removal (if necessary), we recommend 6- to 8-inches of the resulting surface be scarified, moisture-conditioned to within 3 percent of optimum moisture content, and re-compacted to *Structural Fill* requirements presented in this report's *Soil Product Specifications and Required Compaction* section. Recompacting the subgrade to *Structural Fill* requirements will require moisture-conditioning and soil processing. Although not anticipated, such subgrade preparations can often help identify areas susceptible to subgrade pumping and rutting. Pumping or rutting subgrade areas should be removed to a depth of 12 inches below the subgrade elevation as discussed in this report's *Wet Weather, Wet Soil Construction and Over-excavations* section. After the subgrade has been moisture-conditioned, compacted, and reviewed by STRATA, *Structural Fill* or concrete placement may commence.

© 2019 by STRATA. All rights reserved

Excavation Characteristics

Temporary Excavations

We anticipate on-site native site soil may be excavated using conventional excavation techniques. In general, slopes and excavations must be excavated, shored and/or braced in accordance with the *Occupational Safety and Health Administration* (OSHA) regulations and local codes. The on-site soil is generally classified as a "C" type soil according to OSHA requirements. As such, we recommend provisions be made to allow temporary excavations of any type, and soil to be sloped back to at least 1.5H:1V (horizontal to vertical) or as otherwise determined to be safe according to the selected contractor's competent person.

Excavations must be planned carefully, allowing water collection points and utilizing conventional sumps and pumps to remove nuisance water from runoff, precipitation or groundwater seeps. Additionally, site runoff should be directed away from temporary excavation slopes by grading, berms, or other devices.

If soil excavations are not immediately backfilled, they may degrade when exposed to water and require overexcavation and replacement with *Structural Fill*. We recommend construction activities and excavation backfilling be performed as rapidly as possible to reduce the potential for subgrades to degrade under construction traffic.

Moisture Sensitivity Considerations

The on-site native soil is low- to moderately-moisture sensitive and susceptible to disturbance when moist or wet. Soil disturbance will negatively impact the soil's performance below foundations. *Disturbed and/or uncompacted soil shall not be allowed below any structure.* Equipment with large tracks, lugs or having toothed buckets has a significant potential to disturb the site soil prior to or following compaction. Rubber-tired transport vehicles should not access prepared subgrades unless the subgrade is sufficiently stiff to allow construction traffic without disturbance. We recommend project earthwork specifications specifically outline that the contractor is required to maintain the subgrade in a compacted condition and protect subgrades from construction traffic disturbance after they have been prepared and meet compaction requirements.

Soil Product Specifications and Required Compaction

Soil Products and Re-use

We recommend any fill or backfill placed below, beside, or above existing or new foundations comprise *Structural Fill* meeting the requirements presented in Table 1. The on-site native gravel is expected to be suitable for reuse as *Structural Fill* provided it is moisture-conditioned to within 3 percent of optimum moisture content.

© 2019 by STRATA. All rights reserved

TABLE 1. SOIL SPECIFICATIONS AND ALLOWABLE USE

Soil Fill Product	Allowable Use	Material Specifications
Structural Fill[1]	• Fills below structures (if required to meet site grades) • Foundation wall backfill • Over-excavations • Utility trench backfill above bedding course for underground pipe	Soil must be classified as GP, GM, GW, SP, SM, or SW according to the USCS. GM and SM soils must not contain greater than 20 percent soil passing the No. 200 sieve (fines content). SP, SM, or SW soils must contain at least 15 percent soil retained on the No. 4 sieve (gravel content). Soil may not contain particles larger than 12 inches in median diameter. Soil may not contain particles larger than 6 inches in median diameter within 2 vertical and horizontal feet of concrete footings or pipes. Soil must contain less than 3 percent organics and vegetation by weight (per ASTM D2974) Soil must contain less than 3 percent wood, metal, plastic, or other deleterious substances (quantity can be approximated by the geotechnical engineer-of-record).
Unsatisfactory Soil	• **NONE**	Soil classified as CL, CH, ML, MH, OH, OL or PT may not be used at the project site. Any soil type not maintaining moisture contents within 3 percent of optimum during compaction is unsatisfactory soil.[2] Any soil containing more than 3 percent (by weight) of organics, vegetation, wood, metal, plastic or other deleterious substances.

1. The on-site native soil within the planned construction depths generally meets the intent of our recommendations for *Structural Fill*.
2. Unsatisfactory soil that is wetted or dried to within 3 percent of optimum moisture may be used as *Structural Fill*, providing other criteria are met for appropriate *Structural Fill* use per Table 1 above.

Compaction

Table 2 summarizes soil product compaction requirements in designated project areas.

TABLE 2. REQUIRED SOIL PRODUCTS FOR DESIGNATED PROJECT AREAS

Project Area	Required Soil Product	Compaction Requirement[1]
Subgrades beneath structures (including foundations and slabs)	Native soil (scarified and recompacted)	95%
Footing backfill, utility trench backfill (above pipe bedding/shading), and fill below structures (including foundations and slabs)	Structural Fill	95%
Over-excavations caused by wet weather and/or wet soil conditions	Structural Fill	95%

1. Reference ASTM D1557 (modified Proctor) or American Association of State Highway and Transportation Officials (AASHTO) T180.

Place soil products over approved subgrades. Never place soil products over frozen, saturated, or soft subgrades. Soil products must be moisture conditioned to within 3 percent of the optimum moisture content and placed in maximum 12-inch-thick, loose lifts. The contractor is responsible for selecting compaction equipment suitable for achieving compaction. If the contractor is unable to achieve the specified compaction requirements listed in Table 2 using the selected compaction equipment, a lift thickness reduction may be required.

© 2019 by STRATA. All rights reserved

Coarse Soil Conditions

ISPWC recommends soil containing more than about 10 percent retained on the ¾-inch sieve be compacted according to Idaho IT-74, *Idaho Standard Method of Test for Vibratory Spring-Load Compaction for Coarse Granular Material*.

Alternatively, we recommend on-site or imported soil products that contain more than 30 percent particles retained on the ¾-inch sieve be compacted using a "method specification" specified as follows. Method compaction should occur by applying at least 5 complete passes over the soil using vibratory compaction equipment with a drum energy rating of at least 10 tons. We do not recommend smaller compaction equipment for method compaction. Method compaction should be observed on a full-time basis by STRATA and should achieve a firm, unyielding, and interlocking soil surface.

Wet Weather, Wet Soil Construction and Over-excavations

We strongly recommend earthwork construction take place during dry weather conditions. In soft or wet soil areas and during wet weather conditions, earthwork contractors must be familiar with the hazards of using rubber-tired equipment, which exerts a point load on the subgrade. Staggering wheel paths, using tracked equipment to traverse exposed subgrades and other techniques are important processes that reduce the potential for subgrade pumping, rutting, and contractor rework.

Earthwork should not be performed immediately after rainfall, or until soil can dry sufficiently to allow construction traffic without disturbing the subgrade. Potential disturbance and the moisture-sensitive soil at the project site will likely require isolated removal and replacement during construction. We recommend any soil exhibiting pumping, rutting, weaving, or otherwise exhibiting unstable performance be moisture-conditioned to within 3 percent of the optimum moisture content and recompacted to *Structural Fill* requirements, or removed. If moisture-conditioning is impractical or may create project delays, the soil should be removed to undisturbed native soil using smooth-blade equipment and *Structural Fill* placed to desired grades. We recommend the "over-excavation" process occur as follows:

1. STRATA and/or the selected contractor should identify and delineate unstable subgrade soil conditions. STRATA must review the affected area and provide the contractor, the City, and Keller feedback to help facilitate the over-excavation process.
2. After attempting proper moisture conditioning, remove unstable areas using smooth-blade equipment to a minimum depth of 1.0 foot below the subgrade surface. Extend the over-excavation a minimum of 2.0 feet laterally beyond the delineated unstable area.
3. STRATA shall verify the over-excavation base consists of undisturbed native soil or documented embankment fill.
4. A geotextile fabric may be placed over the verified over-excavation base to assist soil stabilization efforts. Refer to this report's *Geotextile Applications* section for additional information.

© 2019 by STRATA. All rights reserved

5. Place *Structural Fill* in the over-excavation to desired grades in accordance with the *Soil Product Specifications and Required Compaction* report section.

In some instances, a 1.0-foot-deep over-excavation may not be sufficient to expose suitable native soil; additional over-excavation depth may be needed. Further, areas may require a woven or nonwoven geotextile fabric to assist remediation. We recommend STRATA be present to observe all over-excavations to verify they have been constructed according to the above criteria, but also to provide immediate on-site feedback and discussion with the project team regarding soft soil conditions to help facilitate the construction schedule.

Site Grading and Drainage

Any runoff from precipitation or other runoff must not be allowed to infiltrate the soil adjacent to footings or structures. We recommend the ground surface outside of any structure be sloped a minimum of 5 percent away for a minimum of 10 feet to rapidly convey surface water or roof runoff away from foundations. Collected stormwater must not be allowed to saturate the soil at the slab subgrade. Stormwater should be routed away from structures and slab subgrades and should be disposed of in a suitable location greater than 25 feet from any structure and in a suitable location as determined by the civil engineer.

Based on the granular nature of the native soil, foundation drains may be omitted from this project provided the site grading recommendations above are followed.

Utility Trench Construction

Loose soil must be removed from the base of utility trenches prior to placing pipe bedding course. Based on our observations during exploration, loose soil and sloughing will be likely at the base of utility trenches. In addition, groundwater in utility trenches can be present during wet weather conditions and standing water must be removed from the utility trench base before placing pipe bedding course. We recommend bedding course extend 6 inches below bottom of pipes and 12 inches above top of pipes. Place bedding course over approved subgrades or otherwise supported according to the pipe manufacturer's specifications. After bedding the pipe, backfill the utility trenches with the appropriate *Structural Fill* in accordance with this report's *Soil Product Specifications and Required Compaction* section.

Geotextile Applications

Although not specified for this project, nonwoven or woven geotextiles may be useful for subgrade separation in over-excavations and, if employed, should meet requirements outlined in the subgrade separation geotextile property requirements provided in *Section 2050 – Construction Geotextiles* of the ISPWC.

Geotextiles shall be applied directly on approved subgrade, taut, overlapped at least 12 inches or otherwise placed according to manufacturers' recommendations. When used for over-excavation

© 2019 by STRATA. All rights reserved

applications, geotextile fabric must completely separate native soil from *Structural Fill*. STRATA should be consulted to review geotextile applications, soil reinforcement methods, or other subgrade improvement alternatives during construction.

Foundation Design

The following section includes foundation design criteria for new ring wall footings at the **cemetery site** and new/existing shallow foundations at the **elevated reservoir site**. Allowable bearing pressures are presented separately for each site; estimated settlement, lateral load resistance, equivalent fluid pressures, and footing embedment recommendations apply to both sites. These recommendations assume the loading conditions stated in our *Project Understanding* report section are accurate and new foundation subgrades are prepared per our report recommendations.

- **Cemetery Site**
  - Maximum allowable bearing pressure for new ring walls: 5,000 psf
  - Minimum ring wall footing width: 4.0 feet
  - Maximum 30 percent increase allowed for short-term load increases such as wind or seismic.
- **Elevated Reservoir Site**
  - Maximum allowable bearing pressure for new/existing foundations: 4,000 psf
  - Minimum isolated column footing width: 10.0 feet
  - Maximum 30 percent increase allowed for short-term load increases such as wind or seismic.
- Estimated foundation vertical settlement:
  - Total settlement: Less than 1.0 inches.
  - Differential settlement:
    - Less than 0.25 inches between adjacent footings.
    - Less than 0.25 inches between center of standpipe and outside edge of ring walls.
- Lateral load resistance:
  - Foundation base friction coefficient:
    - 0.45 for foundations cast directly on re-compacted native or *Structural Fill* soil.
- Passive soil resistance on foundation sides:
    - Equivalent fluid pressure: 350 pounds per cubic feet (pcf); requires ¾-inch lateral movement to mobilize full resistance.
    - Neglect upper 36 inches of wall backfill due to frost action.
- Footing embedment:
  - Exterior footings must extend at least 36 inches below the final, exterior ground surface to help protect against frost action.

<u>Corrosivity</u>

Based on laboratory test results, the soil at the two sites maintains a slightly basic pH (7.37 to 7.66) and has mild corrosivity (resistivity = 37,500 to 64,000 ohms-cm). We recommend all foundations and utility conduits have appropriate corrosion protection and the design team adhere to all code-minimum

© 2019 by STRATA. All rights reserved

steel reinforcement clearances. Sulfate content testing (1.51 to 6.85 mg/Kg) indicates a negligible capacity for sulfate attack of concrete. Type I/II Portland Cement Concrete is used commonly in the area without known concrete-soil reaction impacts.

Seismicity

STRATA utilized site soil and geologic data, the project location, the *2015 International Building Code* (IBC), the *National Earthquake Hazards Reduction Program* (NEHRP), and Table 20.3-1 *Site Classification* from Chapter 20 of the *American Society of Civil Engineers* (ASCE) 7-10 to establish a Seismic Site Classification of "C" at the project site. We recommend seismic design reference the seismic parameters provided in Table 3 based on the soil conditions and project location. The risk-targeted maximum considered earthquake (MCE_R) spectral response acceleration parameters provided in Table 3, column 4 have been modified from a Site Class B to a Site Class C. The design spectral acceleration parameters provided in Table 3, column 5 are equal to 2/3 the Risk Targeted MCE_R acceleration parameters.

TABLE 3. SEISMIC RESPONSE CRITERIA (2015 IBC)[1,2,3]

Period (seconds)	Standard Acceleration Coefficients for Site Class B (g)	Site Factor for Site Class C	MCE_R Spectral Acceleration Parameters for Site Class C (g)	Design Spectral Acceleration Parameters for Site Class C (g)
0.0 (Peak)	PGA = 0.158	F_{PGA} = 1.200	PGA_M = 0.189	-
0.2 (Short)	S_S = 0.364	F_a = 1.200	S_{MS} = 0.437 (F_a*S_S)	S_{DS} = 0.292 (⅔ S_{MS})
1.0	S_1 = 0.117	F_v = 1.683	S_{M1} = 0.197 (F_v*S_1)	S_{D1} = 0.132 (⅔ S_{M1})

1. Values for locations Latitude 47.949143° and Longitude -116.721011° (cemetery site) and Latitude 47.943892° and Longitude -116.701950° (elevated reservoir site).
2. Acceleration coefficients based on 2% probability of exceedance in 50 years.
3. Values for an IBC occupancy category II (other hazard).

Based on the lack of groundwater at the two sites and subsurface conditions encountered, our opinion is liquefaction potential and seismic-induced settlement is negligible.

Micropile Design for the Elevated Reservoir Site

Given the maximum allowable differential settlement tolerances, allowable bearing pressures provided in this report, and desire to use existing foundations without increasing the size of footings, we understand the design and ownership team plan to utilize micropiles to accommodate the increased loads at the elevated reservoir site. The micropile design recommendations provided herein are only applicable for the elevated reservoir site and cannot be used at the cemetery site.

Grouted micropiles achieve their load capacity via side frictional resistance between the grout to soil bond interface. The micropile layout and configuration will be selected by the structural design team and we understand the selected contractor will perform a specific micropile design following receipt of the selected layout configuration. STRATA can provide technical specifications for the micropile

© 2019 by STRATA. All rights reserved

installation and micropile proof and performance testing sections of the project plans and specifications, if requested. STRATA should be retained to review the contractor's micropile design, assist in developing the micropile specifications and observe micropile installation and testing.

Based on the subsurface conditions encountered at the site and the micropile preferences provided by Keller, we provide the following recommendations to assist project design:

- 6.0-inch-diameter grouted micropiles should be installed at a spacing and geometry selected by the structural design team using a minimum 3.5-inch bit and 1.75-inch diameter rod. The rod should be installed using a self-drilling low to moderate pressure grout installation.
- Each micropile shall be installed a minimum depth of 35 feet with the top 10 feet cased using a 6-5/8 inch outside diameter steel pipe.
- Based on the above, we estimate an ultimate (unfactored) axial capacity of 118 kips per micropile. We recommend an **allowable axial capacity of 65 kips per pile**, applying an LRFD resistance factor of 0.55.
- Micropiles should be spaced a minimum of 3 pile diameters apart (18.0 inches approximate minimum). The design team plans to space piles at a center to center spacing equal to 8 to 10 pile diameters; as such, no strength reduction is necessary to account for group effects. If this changes and micropiles are spaced closer than 3 pile diameters, STRATA must be contacted to review group effects and revise the recommended allowable capacity.
- We anticipate total settlement will be less than 1.0-inch and differential settlement will be less than 0.25 inches between adjacent footings supported on micropiles.
- Micropile should be field tested (proof and performance) to verify their vertical capacity prior to production installation; compliant test pile can be re-purposed as a production pile. Since uplift and compression side friction resistance for piles are anticipated to be equivalent, we recommend no less than 3 micropiles be proof tested in tension to 130 percent of their required design loads in accordance with the *Post Tensioning Institute* (PTI).

Micropiles should be drilled to the desired depth utilizing a drill bit capable of penetrating gravel with cobbles and boulders. Where cobbles and boulders are encountered which will not allow advancement of the micropile, it may be necessary to predrill the obstruction with a rock bit or offset the pile location. We recommend the City require a unit bid item for pre-drilling activities. Alternatively, drilled and grouted micropiles with button bits can be installed through soil containing cobbles and boulders without predrilling.

© 2019 by STRATA. All rights reserved

Plastic (non-metal) centralizers should be used at a minimum of 10-foot spacing along the steel bar to maintain the micropile in the center of the drill hole. The centralizer diameter should be less than the diameter of the drill bit to mitigate the potential for damage to the centralizer during installation of the grouted hollow bar and to allow for the passage of drill cuttings out of the annulus of the drill hole.

Micropiles should be backfilled under pressure with appropriately designed, grout mixtures capable of achieving at least 4,000 pounds per square inch (psi) compressive strength in 28 days. Micropiles shall not be structurally loaded or proof tested until grout has achieved a minimum compressive strength of 2,000 psi (typically 4 days). The contractor shall provide laboratory test results that indicate grout has achieved the minimum compressive strength, prior to loading.

Grout should be installed under a continuous pressure and at the pressure prescribed in the micropile contractor's design. Grout quantities should be continuously monitored through the pump discharge or by using an electromagnetic flow meter and grout sampling and testing should be conducted each day of grouting. The measured grout take of the micropile should be compared to the theoretical grout take for the design. The expected grout take is a function of the drill bit diameter, the length of the micropile, and the ratio of drill bit diameter to grout body diameter. All pumping equipment, including the pressure gauge and stroke counter should have been calibrated within 6 months of the micropile installation date. Micropiles spaced closer than 3 feet should not be installed within 24 hours of each other. Micropile reinforcement must be specified by the structural engineer for the actual loading conditions.

Infiltration Properties of Soil at Cemetery Site

The following recommendations are applicable for the native gravel soils that will be encountered at the base of the overflow infiltration basin at the cemetery site only. We estimated the infiltration properties of soil at the cemetery site based on the Spokane 200 Method outlined in the Spokane Regional Stormwater Manual (SRSM). The Spokane 200 Method is based on a comparison of field-measured hydraulic conductivities to the fines content (percent passing the No. 200 sieve) of sand and gravel that has been deposited in the Spokane, Coeur d'Alene, and Athol region; as such, the Spokane 200 Method correlations are applicable for this project. Laboratory sieve analyses measured between 6 and 10 percent fines for the native gravel soil within the upper 10 feet of the existing ground surface. Based on this information, we estimate an unfactored infiltration rate between 5 and 15 inches per hour for the on-site native gravel that will be exposed at the base of the overflow infiltration basin. Note the infiltration rate is water head dependent and will decrease as the water head decreases. We recommend any over-excavations required for tank demolition and removal within the overflow infiltration basin be backfilled with a soil exhibiting equivalent or better drainage characteristics as the native gravel. Following construction of the overflow infiltration basin, we recommend the base of the

© 2019 by STRATA. All rights reserved

basin be tested using a single-ring infiltrometer to confirm the infiltration rate meets or exceeds the rate assumed by Keller for design.

ADDITIONAL RECOMMENDED SERVICES

The information contained in this report is based on our understanding of the planned construction, anticipated structural loads, and site grades. Changes in foundation elevations and footing configuration, structural loads, site geometry, and actual subsurface conditions can alter our opinions and design recommendations. Therefore, we recommend STRATA provide geotechnical continuity through final project planning and design as individual design aspects become available. We further recommend STRATA be retained to review the structural engineer's foundation design to verify our recommendations have been correctly interpreted. Further, verification of the subsurface conditions during construction is an important part of the geotechnical design process. We recommend you retain STRATA to be on-site during foundation and slab subgrade preparations to verify the conditions encountered during exploration are exposed during construction and our recommendations are followed.

EVALUATION LIMITATIONS

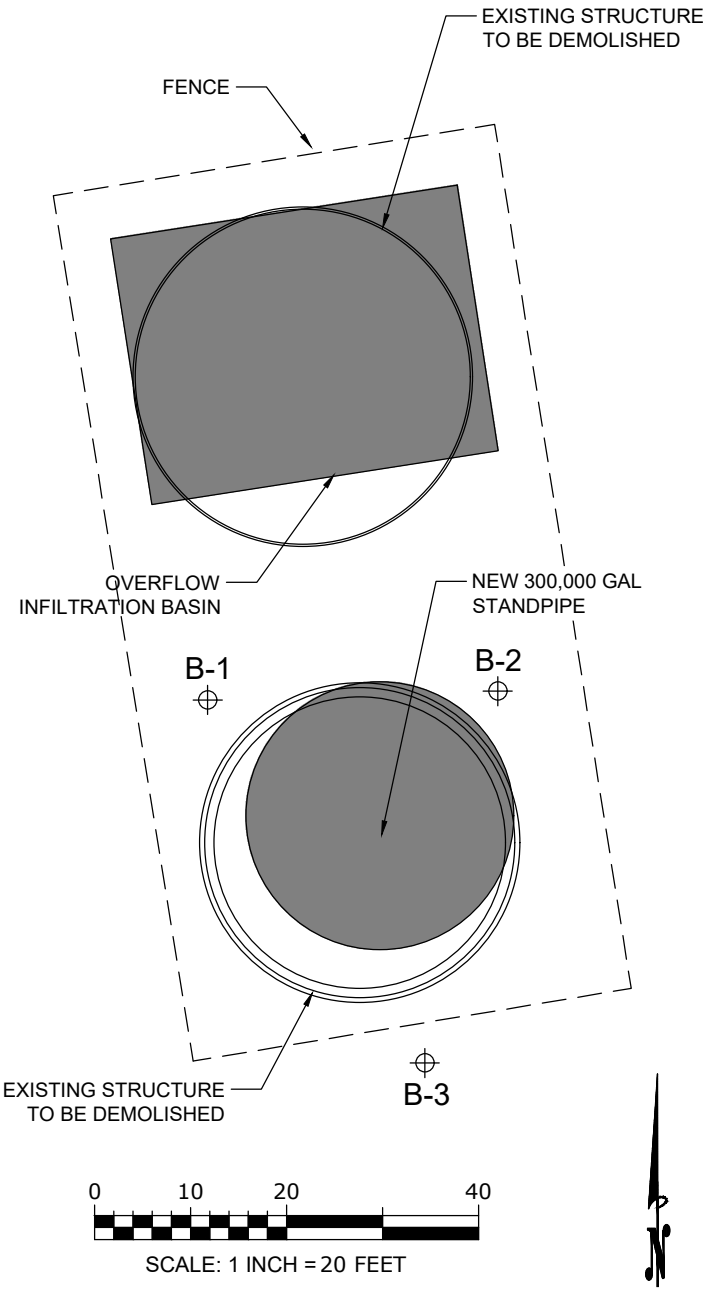
This report has been prepared to assist project planning, design and construction for the Athol Water System Improvements project planned in Athol, Idaho. Our geotechnical engineering evaluation did not include a site specific geohazard evaluation, liquefaction analysis, or lateral spreading analysis. Our services consist of professional opinions and recommendations provided in accordance with generally accepted geotechnical engineering principles and practices as they exist at this time, and in the area of this report. This report has been prepared specifically for this project and exclusively for the use of Keller Associates, Inc. and the City of Athol. We do not authorize its use by firms other than the design team, as a reference document to support the design process. The geotechnical recommendations provided herein are based on the premise that STRATA will continue our project involvement to observe and document our recommendations are implemented during construction, and to confirm conditions between exploration locations. This acknowledgement is in lieu of any express or implied warranty.

The following plates and appendices accompany this report:

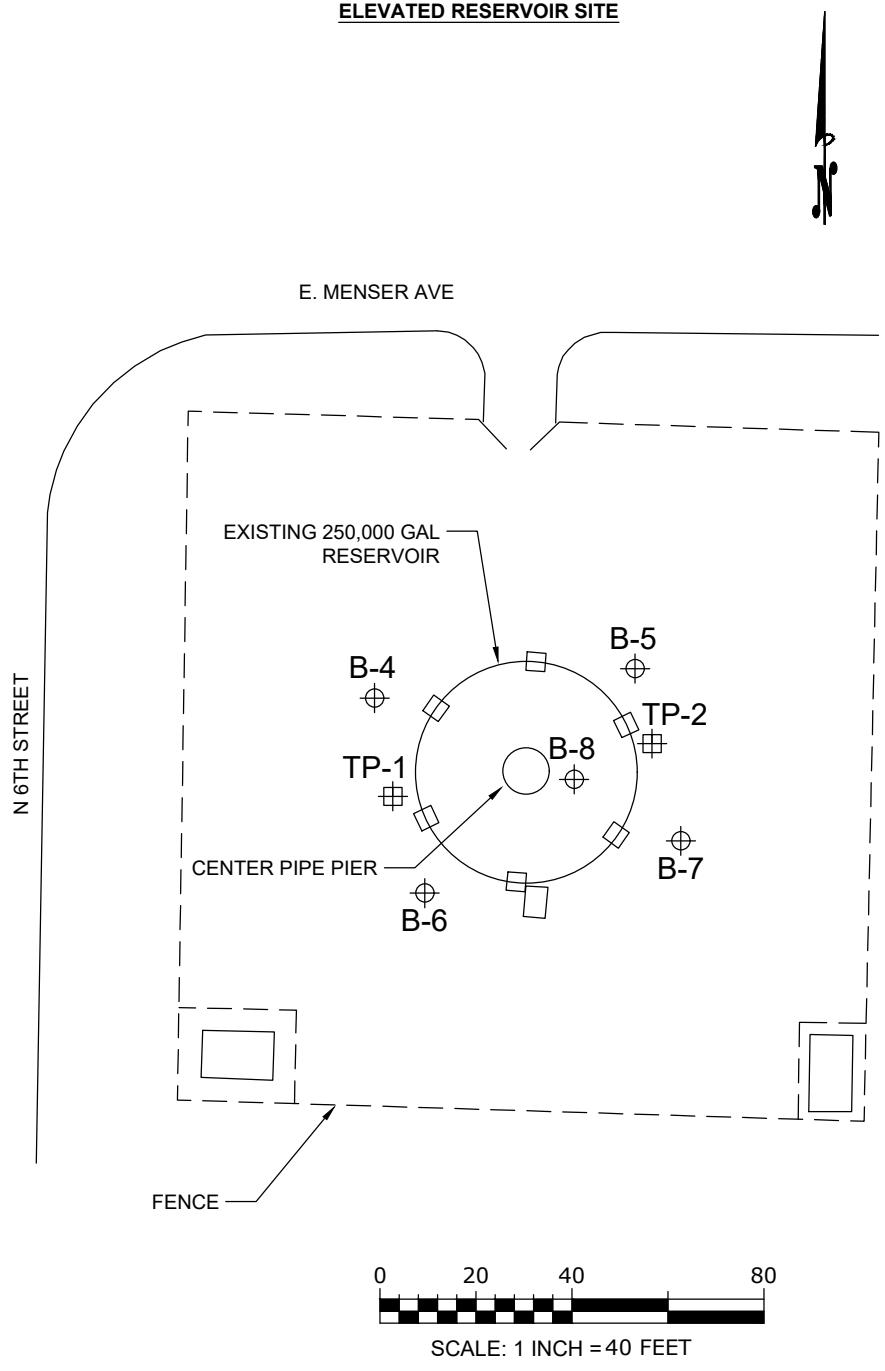
Plate 1:	Exploration Location Plan
Appendix A:	USCS Explanation
	Exploratory Logs
Appendix B:	Photographic Documentation
Appendix C:	Laboratory Test Results

© 2019 by STRATA. All rights reserved

CEMETERY SITE



ELEVATED RESERVOIR SITE



STRATA
WEST 280 PRAIRIE AVENUE, STE 2,
COEUR D'ALENE, ID 83815 | 208-772-2428

ATHOL WATER SYSTEM IMPROVEMENTS
ATHOL, IDAHO

EXPLORATION LOCATION PLAN

STRATA PROJ #: CD19048A
DRAWN BY: RML
DESIGN BY: N/A
CHECKED BY: LRM
LAST UPDATED: 12/19/2019
REVISION NO: 1

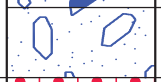
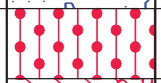
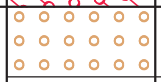
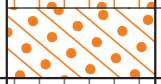
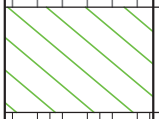
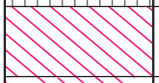
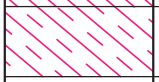
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY

PLATE 1

Appendix A

USCS Explanation and
Exploration Logs

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL NAMES
COARSE GRAINED SOIL	GRAVEL	CLEAN GRAVEL		GW	Well–Graded Gravel, Gravel–Sand Mixtures.
				GP	Poorly–Graded Gravel, Gravel–Sand Mixtures.
		GRAVEL WITH FINES		GM	Silty Gravel, Gravel–Sand–Silt Mixtures.
				GC	Clayey Gravel, Gravel–Sand–Clay Mixtures.
	SAND	CLEAN SAND		SW	Well–Graded Sand, Gravelly Sand.
				SP	Poorly–Graded Sand, Gravelly Sand.
		SAND WITH FINES		SM	Silty Sand, Sand–Silt Mixtures.
				SC	Clayey Sand, Sand–Clay Mixtures.
FINE GRAINED SOIL	SILT AND CLAY LIQUID LIMIT LESS THAN 50%			ML	Inorganic Silt, Sandy or Clayey Silt.
				CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
				OL	Organic Silt and Clay of Low Plasticity.
	SILT AND CLAY LIQUID LIMIT GREATER THAN 50%			MH	Inorganic Silt, Micaceous Silt, Plastic Silt.
				CH	Inorganic Clay of High Plasticity, Fat Clay.
				OH	Organic Clay of Medium to High Plasticity.
				PT	Peat, Muck and Other Highly Organic Soil

BORING LOG SYMBOLS

- Standard 2–Inch OD Split–Spoon Sample
- California Modified 3–Inch OD Split–Spoon Sample
- Rock Core
- Shelby Tube 3–Inch OD Undisturbed Sample

GROUNDWATER SYMBOLS

- Groundwater After 24 Hours
- (7–3–07) Indicates Date of Reading
- Groundwater at Time of Drilling

TEST PIT LOG SYMBOLS

- BG — Baggie Sample
- BK — Bulk Sample
- RG — Ring Sample

Shorthand Notation:
BGS = Below Existing Ground Surface
N.E. = None Encountered

STRATA

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
BASE COURSE (3") - (GM) Silty GRAVEL with Sand. Dark brown, moist.	0							
(GP-GM) Poorly Graded GRAVEL with Silt, Sand, and Cobbles (Native). Gray and brown, moist, loose to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.				5 4 3	7			
	5			7 7 6	13		○3 ★	
				7 8 9	17			
	10			10 10 10	20		○1 ★	
	15	GP-GM		18 25 32	57			
	20			50/5.0"	50+		50+	
	25			20 23 23	46		○3 ★	
	30			22 28 34	62			
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-1	STRATA	**EXPLORATORY BORING LOG**
Project: CD19048A - Athol Cemetery Site	**Date Drilled:** 09-27-2019		
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"		
Depth to Groundwater: N.E.	**Logged By:** EIL		Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:21 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks
BASE COURSE (3") - (GM) Silty GRAVEL with Sand. Dark brown, moist.	0							Note: BGS = Below Ground Surface
(GP-GM) Poorly Graded GRAVEL with Silt, Sand, and Cobbles (Native). Gray and brown, moist, medium dense to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.		GP-GM		6 9 11	20		○ 2 ★	
	5			22 19 22	41			
				8 11 8	19		○ 0 ★	
			BK					
	10			8 8 10	18			
	15			10 11 14	25			
	20			12 20 35	55		○ 4 ★	
	25			18 15 17	32			
Borehole Terminated at 27.0 Feet.								Boring terminated at 27 feet BGS due to auger refusal.

Client: Keller Associates, Inc.	**Boring Number:** B-2
Project: CD19048A - Athol Cemetery Site	**Date Drilled:** 09-27-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:21 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
BASE COURSE (2") - (GM) Silty GRAVEL with Sand. Dark brown, moist. (GP-GM) Poorly Graded GRAVEL with Silt, Sand, and Cobbles (Native). Gray and brown, moist, medium dense to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.	0							
				17 22 32	54			
	5			10 13 8	21		3	
				11 11 9	20		4 ★	
	10			8 11 13	24			
	15	GP-GM		12 14 15	29		4 ★	
	20			12 12 10	22			
	25			9 12 15	27			
	30			19 7 22	29			
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-3	STRATA	**EXPLORATORY BORING LOG**
Project: CD19048A - Athol Cemetery Site	**Date Drilled:** 09-27-2019		
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"		
Depth to Groundwater: N.E.	**Logged By:** EIL		Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:21 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks
BASE COURSE (3") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0							Note: BGS = Below Ground Surface
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist, medium dense to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.		GM		7 6 6	12		○7	
	5			11 11 21	32			
				17 18 20	38		○5 ★	
	10			7 10 15	25			
	15			16 20 22	42			
	20			25 21 21	42			
	25			21 50				
	30			19 28 39	67			
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-4
Project: CD19048A - Athol Reservoir Site	**Date Drilled:** 09-28-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:23 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
BASE COURSE (2") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0							
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist, loose to dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.				8 12 18	30			
	5			4 3 4	7		5	
				18 15 25	40			
	10			18 23 23	46			
	15	GM		17 13 20	33			
	20			12 13 10	23		6 ★	
	25			12 21 20	41			
	30			20 18 22	40			
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-5
Project: CD19048A - Athol Reservoir Site	**Date Drilled:** 09-28-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:23 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks
BASE COURSE (3") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0							Note: BGS = Below Ground Surface
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist, medium dense to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.		GM		6 8 6	14			
	5			10 9 8	17			
				8 11 8	19		○8 ★	
	10			11 12 26	38			
	15			20 28 28	56			
	20			19 12 12	24			
	25			9 11 9	20		○6 ★	
	30			10 24 46	70			
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-6
Project: CD19048A - Athol Reservoir Site	**Date Drilled:** 09-28-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:23 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS	Remarks
							Pocket Penetrometer, TSF ▲ 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 SPT, N-Value ● % Passing No. 200 Sieve ★ PL MC LL 20 40 60 80	Note: BGS = Below Ground Surface
BASE COURSE (3") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0							
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist, medium dense to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.				8 8 9	17			
	5			7 8 9	17		○5	
				8 9 13	22			
	10			31 32 20	52		○5 ★	
	15	GM		9 11 13	24		○5	
	20			47 50/4.0"	50+		50+	
	25			12 13 12	25			
	30			11 50				
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-7
Project: CD19048A - Athol Reservoir Site	**Date Drilled:** 09-28-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:23 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	Symbol	Sample Type	SPT Blows Per 6 Inches	SPT N	Dry Density (pcf)	TEST RESULTS: Pocket Penetrometer, TSF ▲ (0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5); SPT, N-Value ●; % Passing No. 200 Sieve ★; PL MC LL (20 40 60 80)	Remarks
BASE COURSE (3") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0							Note: BGS = Below Ground Surface
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist, loose to very dense. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.				10 11 10	21		○7 ★	
	5			5 5 3	8		●	
				5 7 9	16		●	
	10			8 14 16	30		○7 ★	
							●	
	15	GM		17 27 22	49		●	
							●	
	20			16 22 22	44		●	
							●	
	25			13 19 30	49		●	
							●	
	30			26 39 32	71		○6 ★	
Borehole Terminated at 31.0 Feet.								

Client: Keller Associates, Inc.	**Boring Number:** B-8
Project: CD19048A - Athol Reservoir Site	**Date Drilled:** 09-28-2019
Drill Rig: Diedrich D-50	**Borehole Diameter:** 7"
Depth to Groundwater: N.E.	**Logged By:** EIL

STRATA

EXPLORATORY BORING LOG

Sheet 1 Of 1

STRATA BOREHOLE - STRATA.GDT - 10/11/19 22:23 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
BASE COURSE (5") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0.0									
FOOTING BACKFILL - (GM) Silty GRAVEL with Sand and Cobbles. Brown to gray, moist. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.					12.3				NP NP	
	2.5									
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.		GM								Top of footing exposed from 3.5- to 4.0-feet BGS.
	5.0									
Test Pit Terminated at 5.5 Feet.										

Client: Keller Associates, Inc.	**Test Pit Number:** TP-1	STRATA	**EXPLORATORY TEST PIT LOG**
Project: CD19048A - Athol Reservoir Site	**Date Excavated:** 09-24-2019		
Backhoe: Bobcat E20 Mini Excavator	**Bucket Width:** 12"		
Depth to Groundwater: N.E.	**Logged By:** RML		Sheet 1 Of 1

STRATA TEST PIT - STRATA.GDT - 10/11/19 22:18 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

USCS Description	Depth (ft)	U.S.C.S. Class	Symbol	Sample Type	% Passing No. 200 Sieve	Dry Density (pcf)	Moisture Content (%)	Pocket Pen. (tsf)	Atterberg Limits LL PI	Remarks Note: BGS = Below Ground Surface
BASE COURSE (6") - Poorly Graded Gravel with Silt and Sand. Gray, moist. Medium to coarse grained sand, fine gravel.	0.0									
FOOTING BACKFILL - (GM) Silty GRAVEL with Sand and Cobbles. Brown to gray, moist. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.										
	2.5									Observed black trash bag and moderate wood debris in southeast corner of excavation from 2.5- to 3.0-feet BGS.
(GM) Silty GRAVEL with Sand and Cobbles (Native). Brown to gray, moist. Fine to coarse grained sand, fine to coarse rounded to subangular gravel.		GM								
Test Pit Terminated at 4.5 Feet.										

Client: Keller Associates, Inc.	**Test Pit Number:** TP-2	STRATA	**EXPLORATORY TEST PIT LOG**
Project: CD19048A - Athol Reservoir Site	**Date Excavated:** 09-24-2019		
Backhoe: Bobcat E20 Mini Excavator	**Bucket Width:** 12"		
Depth to Groundwater: N.E.	**Logged By:** RML		Sheet 1 Of 1

STRATA TEST PIT - STRATA.GDT - 10/11/19 22:18 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\CD19048A - ATHOL WATER SYSTEM IMPROVEMENTS.GPJ

Appendix B

Photographic Documentation



Photograph 1

Looking southwest at TP-1 during excavation.

STRATA

Project Name: Athol Water System Improvements	
Location.: Athol, Idaho	STRATA Project No.: CD19048A
	Client: Keller Associates, Inc.



Photograph 2

Looking at exposed footing in TP-1 during excavation.

STRATA

Project Name: Athol Water System Improvements	
Location.: Athol, Idaho	STRATA Project No.: CD19048A
	Client: Keller Associates, Inc.



Photograph 3

Looking at exposed footing in TP-1 during excavation.

STRATA

Project Name: Athol Water System Improvements	
Location.: Athol, Idaho	STRATA Project No.: CD19048A
	Client: Keller Associates, Inc.



Photograph 4

Looking at exposed footing and debris in TP-2 during excavation.

STRATA

Project Name: Athol Water System Improvements	
Location.: Athol, Idaho	STRATA Project No.: CD19048A
	Client: Keller Associates, Inc.



Photograph 5

Looking at exposed footing in TP-2 during excavation.

STRATA

Project Name: Athol Water System Improvements	
Location.: Athol, Idaho	STRATA Project No.: CD19048A
	Client: Keller Associates, Inc.

Appendix C

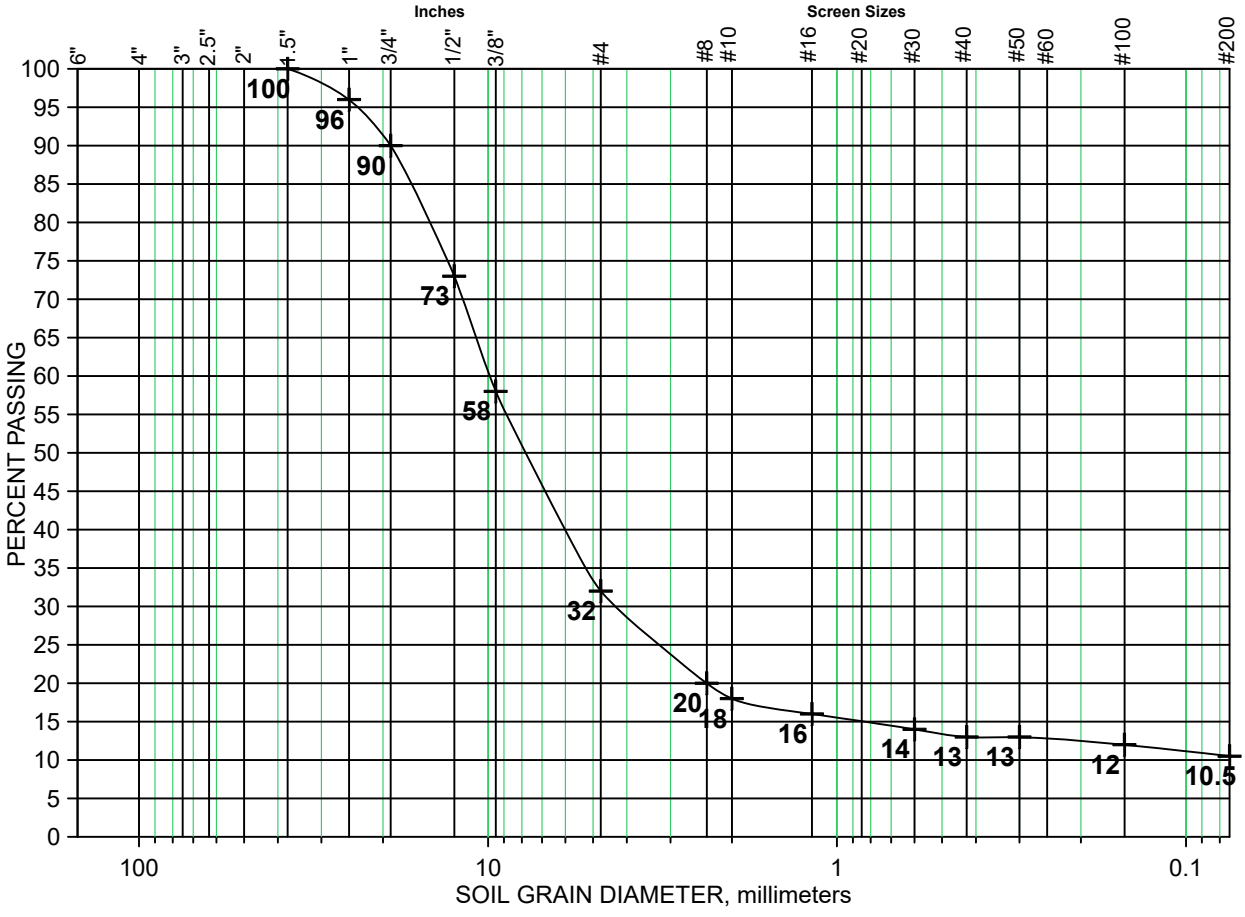
Laboratory Test Results

GRADATION ANALYSIS

ASTM D6913

Project: Athol Water System Improvements
Client: Keller Associates, Inc.
File: CD19048A
Sample No.: CD1900203
Sample Location: Boring B-2 from 7.0 to 10.0 feet BGS
Site: Cemetery
Description: Poorly graded GRAVEL with Silt and Sand (GP-GM)
Date Sampled: September 27, 2019 By: Eric Larson
Date Tested: October 3, 2019 By: Ciara Wilmer

Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



Reviewed by: Ryan Lewis

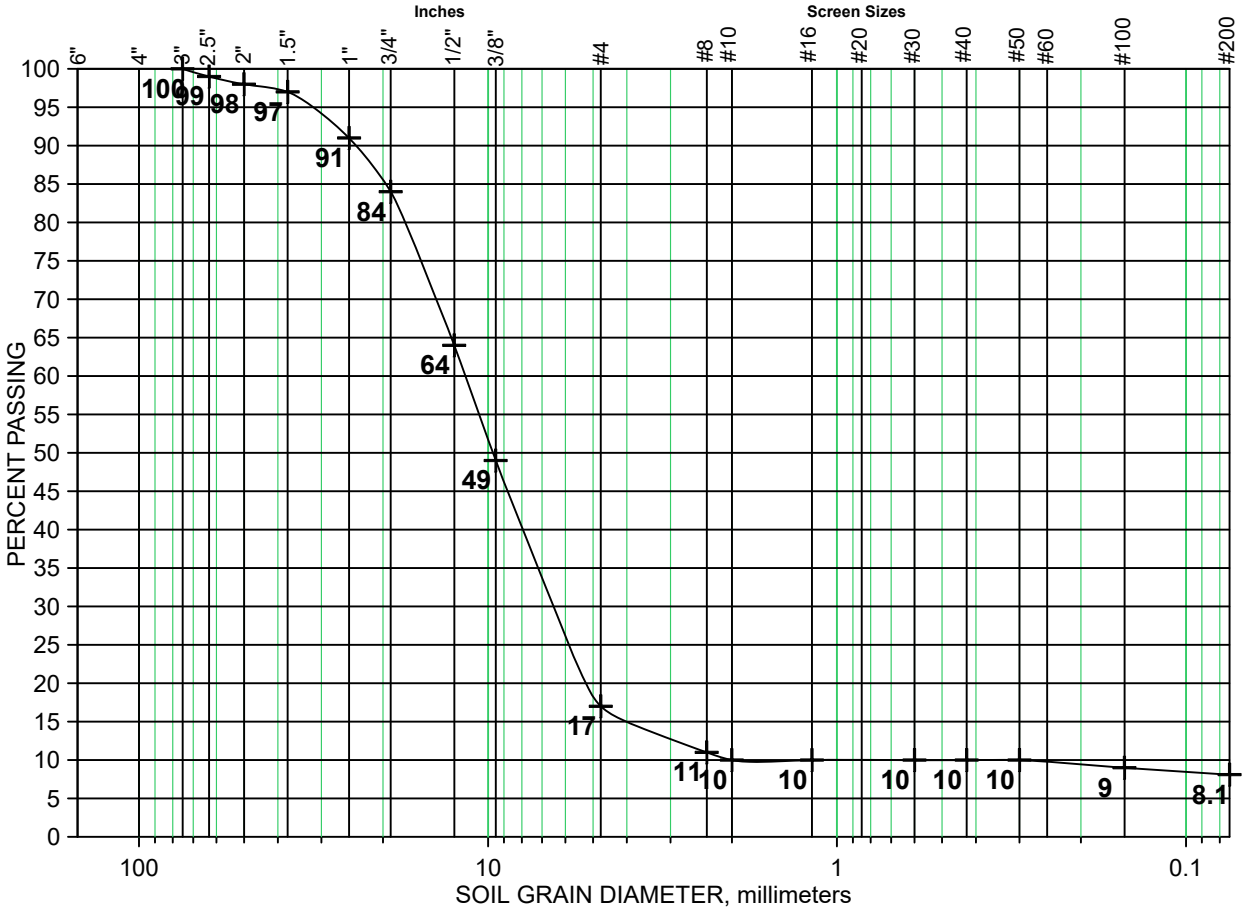
STRATA

GRADATION ANALYSIS

ASTM D6913

Project: Athol Water System Improvements
Client: Keller Associates, Inc.
File: CD19048A
Sample No.: CD1900204
Sample Location: Boring B-5 from 15.0 to 20.0 feet BGS
Site: Elevated Reservoir
Description: Poorly graded GRAVEL with Silt (GP-GM)
Date Sampled: September 28, 2019 By: Eric Larson
Date Tested: October 4, 2019 By: Ciara Wilmer

Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



Reviewed by: Ryan Lewis

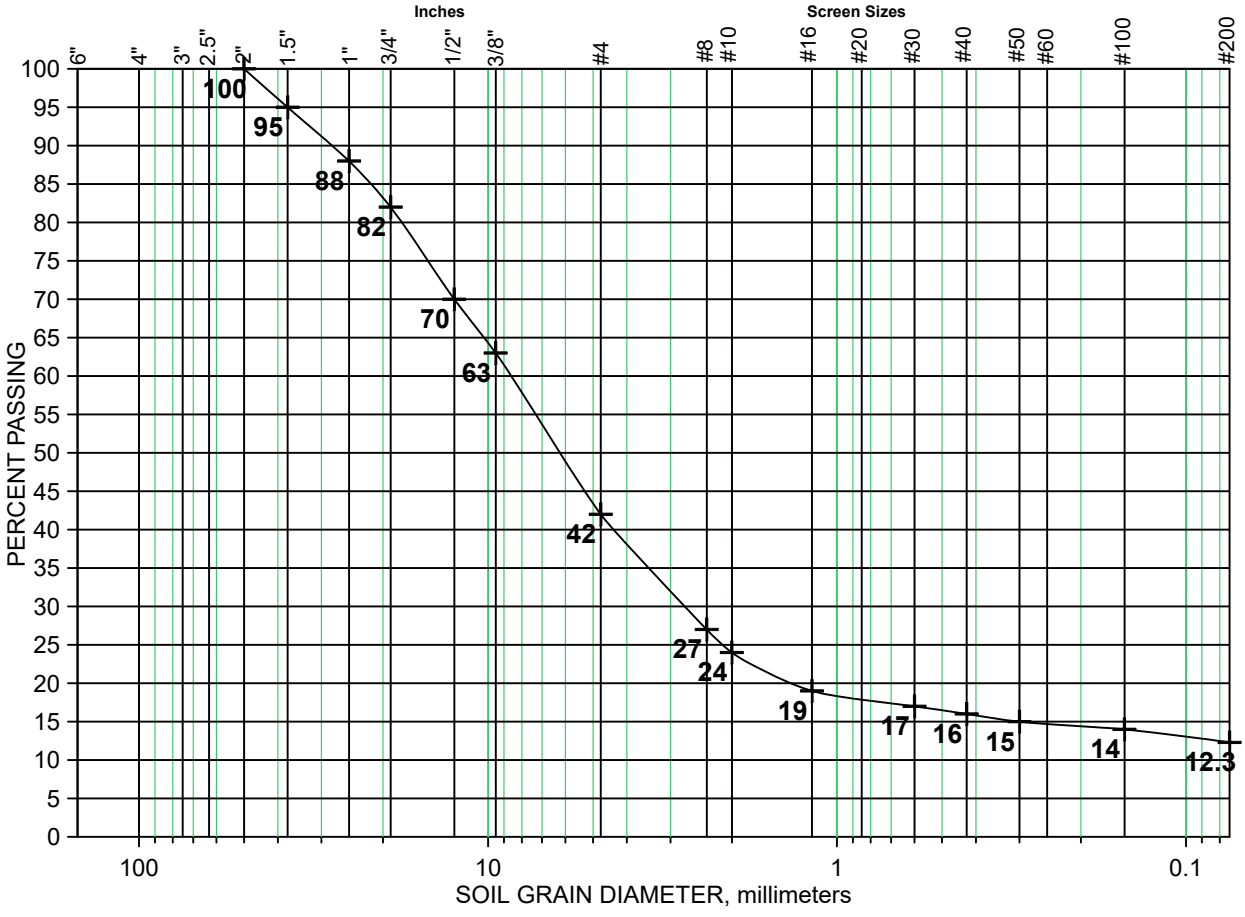
STRATA

GRADATION ANALYSIS

ASTM D6913

Project: Athol Water System Improvements
Client: Keller Associates, Inc.
File: CD19048A
Sample No.: CD1900202
Sample Location: Test Pit TP-1 from 1.5 to 2.5 feet BGS
Site: Elevated Reservoir
Description: Silty GRAVEL with Sand (GM)
Date Sampled: September 24, 2019 By: Ryan Lewis
Date Tested: October 2, 2019 By: Ciara Wilmer

Cobbles	Gravel		Sand		
	Coarse	Fine	Coarse	Medium	Fine



Reviewed by: Ryan Lewis

STRATA

MOISTURE DENSITY RELATIONSHIP CURVE and CORRECTED MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT

Project:	Athol Water System Improvements	Project Number:	CD19048A
Client:	Keller Associates, Inc.	Tested By:	Ciara Wilmer
		Date Tested	October 2, 2019
Sample Location:	Test Pit TP-1 from 1.5 to 2.5 feet BGS	Sample Number:	CD1900202
Site:	Elevated Reservoir	Sampled By:	Ryan Lewis
Sample Description:	Silty GRAVEL with Sand (GM)	Date Sampled:	September 24, 2019

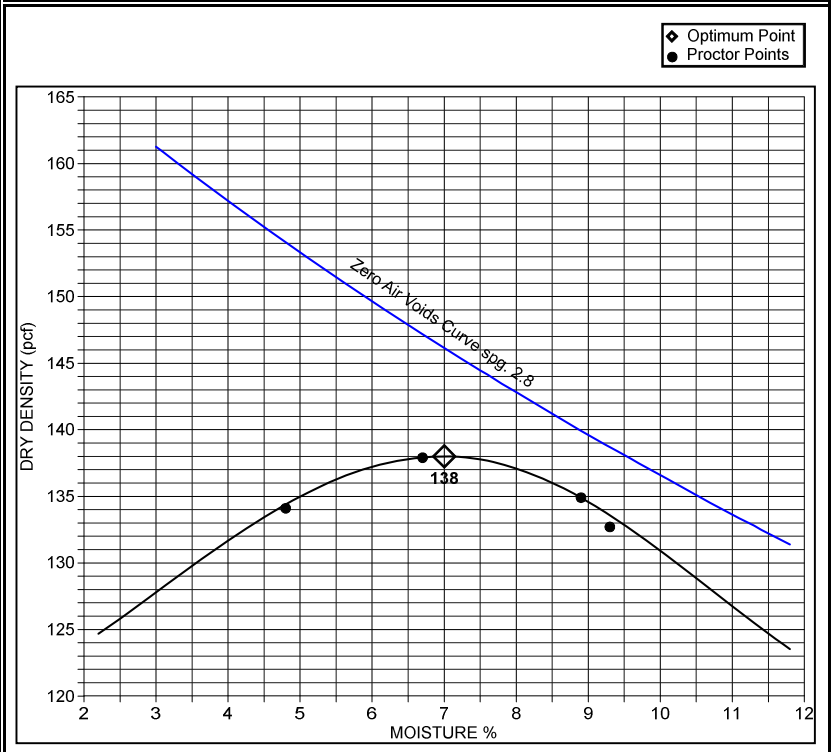
Oversize Material: + ¾-in. 18 % (As Received)

Test Method: ASTM D1557 - Method C

Grading Analysis

Screen Size	% Passing	As Tested
6 inch	100	100
3 inch	100	100
3/4 inch	82	100
3/8 inch		
#4 screen		

ASTM D1557 (Method C)		ASTM C127		ASTM D4718		
Uncorrected Maximum Dry Density (pcf)	Uncorrected Optimum Moisture Content (%)	Oversize Bulk Specific Gravity[1]	Oversize Absorption[1] (%)	Percent Oversize (%)	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)
138.0	7.0	2.650	1.0	5	139.0	6.5
				6	139.5	6.5
				7	139.5	6.5
				8	140.0	6.5
				9	140.0	6.5
				10	140.5	6.5
				11	140.5	6.5
				12	141.0	6.5
				13	141.0	6.0
				14	141.5	6.0
				15	141.5	6.0
				16	142.0	6.0
				17	142.0	6.0
				18	142.0	6.0
				19	142.5	6.0
				20	142.5	6.0
				21	143.0	5.5
				22	143.0	5.5
				23	143.5	5.5
				24	143.5	5.5
				25	144.0	5.5
				26	144.0	5.5
				27	144.5	5.5
				28	144.5	5.5
				29	145.0	5.5
				30	145.0	5.0



1. Assumed Values

Reviewed By: Ryan Lewis

STRATA

MOISTURE DENSITY RELATIONSHIP CURVE and CORRECTED MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT

Project:	Athol Water System Improvements	Project Number:	CD19048A
Client:	Keller Associates, Inc.	Tested By:	Ciara Wilmer
		Date Tested	October 3, 2019
Sample Location:	Boring B-2 from 7.0 to 10.0 feet BGS	Sample Number:	CD1900203
Site:	Cemetery	Sampled By:	Eric Larson
Sample Description:	Poorly graded GRAVEL with Silt and Sand (GP-GM)	Date Sampled:	September 27, 2019

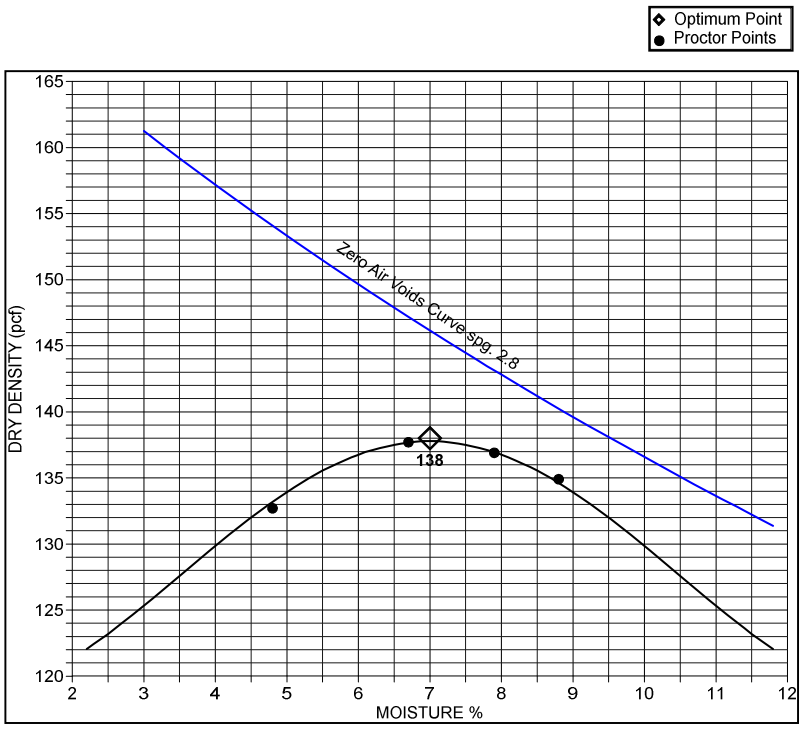
Oversize Material: + ¾-in. 10 % (As Received)

Test Method: ASTM D1557 - Method C

Grading Analysis

Screen Size	% Passing	As Tested
6 inch	100	100
3 inch	100	100
3/4 inch	90	100
3/8 inch		
#4 screen		

ASTM D1557 (Method C)		ASTM C127		ASTM D4718		
Uncorrected Maximum Dry Density (pcf)	Uncorrected Optimum Moisture Content (%)	Oversize Bulk Specific Gravity[1]	Oversize Absorption[1] (%)	Percent Oversize (%)	Corrected Maximum Dry Density (pcf)	Corrected Optimum Moisture Content (%)
138.0	7.0	2.650	1.0	5	139.0	6.5
				6	139.5	6.5
				7	139.5	6.5
				8	140.0	6.5
				9	140.0	6.5
				10	140.5	6.5
				11	140.5	6.5
				12	141.0	6.5
				13	141.0	6.0
				14	141.5	6.0
				15	141.5	6.0
				16	142.0	6.0
				17	142.0	6.0
				18	142.0	6.0
				19	142.5	6.0
				20	142.5	6.0
				21	143.0	5.5
				22	143.0	5.5
				23	143.5	5.5
				24	143.5	5.5
				25	144.0	5.5
				26	144.0	5.5
				27	144.5	5.5
				28	144.5	5.5
				29	145.0	5.5
				30	145.0	5.0



1. Assumed Values

Reviewed By: Ryan Lewis

STRATA

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: STRATA, INC CDA
Address: 280 W PRAIRIE AVE, STE 2
COEUR D' ALENE, ID 83815
Attn: RYAN LEWIS

Batch #: 191003034
Project Name: CD19048A-ATHOL WATER SYSTEM IMPROVEMENTS

Analytical Results Report

Sample Number	191003034-001	**Sampling Date**	9/27/2019	**Date/Time Received**	10/3/2019	10:30 AM	
Client Sample ID	CD1900202	**Sampling Time**	1:00 PM	**Extraction Date**			
Matrix	Soil	**Sample Location**					
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
pH	7.66	ph Units		10/3/2019 4:00:00 PM	NDE	EPA 9045	
Resistivity	37500	ohms-cm	1	10/7/2019	NDE	ASTM G57a	
Sulfate	6.85	mg/Kg	1	10/10/2019 1:50:00 PM	LMC	EPA 300.0	
%moisture	5.7	Percent		10/3/2019	NDE	%moisture	

Sample Number	191003034-002	**Sampling Date**	9/27/2019	**Date/Time Received**	10/3/2019	10:30 AM	
Client Sample ID	CD1900203	**Sampling Time**	1:00 PM	**Extraction Date**			
Matrix	Soil	**Sample Location**					
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
pH	7.37	ph Units		10/3/2019 4:00:00 PM	NDE	EPA 9045	
Resistivity	64000	ohms-cm	1	10/7/2019	NDE	ASTM G57a	
Sulfate	1.51	mg/Kg	1	10/10/2019 2:07:00 PM	LMC	EPA 300.0	
%moisture	2.6	Percent		10/3/2019 4:00:00 PM	NDE	%moisture	

Authorized Signature

Kathleen A. Sattler, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

This report shall not be reproduced except in full, without the written approval of the laboratory.
The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

Anatek Labs, Inc.

1282 Alturas Drive • Moscow, ID 83843 • (208) 883-2839 • Fax (208) 882-9246 • email moscow@anateklabs.com
504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: STRATA, INC CDA
280 W PRAIRIE AVE, STE 2
COEUR D' ALENE ID 83815

Order ID: 191003034
Order Date: 10/3/2019

Contact Name: RYAN LEWIS
Comment:

Project Name: CD19048A-ATHOL WATER SYSTEM IMPROVEMENTS

Sample #: 191003034-001 **Customer Sample #:** CD1900202

Recv'd: ☑ **Matrix:** Soil **Collector:** RYAN LEWIS **Date Collected:** 9/27/2019
Quantity: 1 **Date Received:** 10/3/2019 10:30:00 AM **Time Collected:** 1:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	10/10/2019	***5 Days***
pH 1:5	S	EPA 9045	10/10/2019	***5 Days***
RESISTIVITY	S	ASTM G57a	10/10/2019	***5 Days***
SULFATE	S	EPA 300.0	10/10/2019	***5 Days***

Sample #: 191003034-002 **Customer Sample #:** CD1900203

Recv'd: ☑ **Matrix:** Soil **Collector:** RYAN LEWIS **Date Collected:** 9/27/2019
Quantity: 1 **Date Received:** 10/3/2019 10:30:00 AM **Time Collected:** 1:00 PM
Comment:

Test	Lab	Method	Due Date	Priority
%Moisture	S	%moisture	10/10/2019	***5 Days***
pH 1:5	S	EPA 9045	10/10/2019	***5 Days***
RESISTIVITY	S	ASTM G57a	10/10/2019	***5 Days***
SULFATE	S	EPA 300.0	10/10/2019	***5 Days***

Customer Name:	STRATA, INC CDA			**Order ID:**	191003034
	280 W PRAIRIE AVE, STE 2			**Order Date:**	10/3/2019
	COEUR D' ALENE	ID	83815		
Contact Name:	RYAN LEWIS			**Project Name:**	CD19048A-ATHOL WATER SYSTEM IMPROVEMENTS
Comment:					

SAMPLE CONDITION RECORD

Samples received in a cooler?	No
Samples received intact?	Yes
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Labels and chain agree?	Yes
Total number of containers?	2

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

191003 034 STRC Last Due 10/10/2019
1st SAMP 9/27/2019 1st RCVD 10/3/2019
CD19048A-ATHOL WATER SYSTEM IMPROVEMENTS

Company Name: STRATA	Project Manager: Ryan Lewis
Address: W. 280 Prairie Avenue	Project Name & #: CD19048A-Athol water system Improvements
City: CDA State: ID Zip: 83815	Email Address: rlewis@stratageotech.com
Phone: 208-772-2428	Purchase Order #: 150-11806
Fax: N/A	Sampler Name & phone: R.Lewis 208-755-5367

Please refer to our normal turn around times at: http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* X Other* 5day RUSH

*All rush order requests must be prior approved.

__Phone __Mail __Fax __Email

Provide Sample Description

List Analyses Requested

Note Special Instructions/Comments

SWBS

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Preservative:	Sample Volume	Resistivity ASTM G187	pH ASTM 4972	Sulfate EPA 300.0
	CD1900202	9/27/19 1:00pm	soil	1		5gal	✓	✓	✓
	CD1900203	9/27/19 1:00pm	soil	1		5gal	✓	✓	✓

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	N

Vol/HC/MF

Temperature (°C):

Preservative:

Date & Time: 10-3-19 1515

Inspected By: MG

	Printed Name	Signature	Company	Date	Time
Relinquished by	Ciara Wilmer	C. Wilmer	STRATA	10/03	10:30
Received by	KScott	KScott	Anatek	10/3/19	1030
Relinquished by					
Received by					
Relinquished by					
Received by					

Form COC01.00 - Eff 1 Mar 2015

Samples submitted to Anatek Labs may be subcontracted to other accredited labs if necessary. This message serves as notice of this possibility. Sub-contracted analyses will be clearly noted on the analytical report.

THIS PAGE LEFT BLANK INTENTIONALLY

APPENDIX B -

PERMIT INFORMATION

THIS PAGE LEFT BLANK INTENTIONALLY

Right-Of-Way Encroachment Application And Permit For Utilities

ITD 2110 (Rev. 08-16)
itd.idaho.gov

ITD Permit Application Number _____

Key Number	Project Number	Beginning Station	Ending Station

Segment Code	Roadway Type (Urban, Rural, Interstate)	Number of Lanes

Fee $50 ☐ Paid ☐ No Charge	☐ Inspection Fee Required $	☐ Performance Bond Required $

Applicant Information (Please Print or Type)

Permit Type

☐ New Installation ☐ Upgrade ☐ Relocation ☐ Other

☐ Gas ☐ Water ☐ Cable ☐ Telephone ☐ Electric ☐ Sewer ☐ Fiber Optic ☐ Other

☐ Overhead ☐ Underground ☐ Overhead and Underground Both Involved

Installation Method

☐ Jack ☐ Bore ☐ Pavement Cut ☐ Trench ☐ Casing ☐ Plow ☐ Other

Location

Route	Beginning Milepost (e.g. 0.123)	Ending Milepost (e.g. 0.123)	Section, Township, Range

GPS Coordinates	Latitude	Longitude	Elevation

County(s)	Name of Nearest Crossroad	Distance and Direction From Crossroad (Feet) ☐ N ☐ S ☐ E ☐ W

Distance From Center of Road (Feet)	Right-of-Way Line (Feet)	Edge of Pavement (Feet)	Right-of-Way Width (Feet)

Angle of Crossing (Degrees)	Vertical Clearance (Feet)	Depth (Inch)

Facility Specifications

Potential (V, KV)	Pipe Size (Inch)	Pressure (PSI)

Structure Attachment Type **(Requires Bridge Approval)**

Contacts

Construction Contractor	Phone Number	E-Mail Address

Traffic Control Contractor	Phone Number	E-Mail Address

Traffic Control Plan Submitted ☐ Yes ☐ No	Projected Start Date	Project Duration

I certify that I am the Authorized Utility Company Representative and request permission to construct the above facilities within the State Highway Rights-of-Way in accordance with the General Provisions printed on the reverse side of this form, the Special Provisions, and the Plans made a part of this permit. **I request receipt of the approved Permit in the following manner: ☐ Paper ☐ Electronic**

Company Name	Authorized Representative (Print)	Phone Number

Mailing Address	City	State	Zip

Authorized Representative's Signature	E-Mail Address	Date

A copy of this permit, complete with special provisions, plans and traffic control requirements, shall be kept at the work site at all times when work is in progress.

Subject to all terms, conditions, and provisions shown on this form or attachments, permission is hereby granted to the above-named applicant to perform the work described.

	Signature	Title	Date
Local Government Approval (when required)			
Department Approval	ITD's Authorized Representative's Signature		Date

Note: The permit will be considered Temporary until final inspection and approval by an ITD representative.

General Provisions: ITD Permit Application Number _____

1. No work shall commence until the permittee is given notice to proceed by an authorized representative of the Department. The permittee shall notify the Department five (5) working days prior to commencing the permitted work or as otherwise approved. This permit is valid for one year and **SHALL BE VOID** if all work is not completed and as-built drawings submitted, and the Department has not been contacted to make final inspection for approval within one year of the issuance date.
2. The permittee shall observe and comply with all applicable laws, ordinances, regulations, orders and decrees. By signing this permit, the permittee, his designated representative or successors, agree to indemnify, save harmless, and defend regardless of outcome the State from the expenses of and against all suits or claims, including costs, expenses, and attorney fees that may be incurred by reason of any act or omission, neglect, or misconduct of the permittee or its contractor in the design, construction, and maintenance or use of the facility covered by this permit. The permittee is responsible for obtaining all other necessary permits and approvals prior to starting work. The permittee must adhere to Idaho Code 55, Chapter 22, "Underground Facilities Damage Prevention," prior to any excavation work.
3. During the progress of all work, traffic control devices shall be erected and maintained as necessary or as directed for the protection of the traveling public. All utility companies, or contractors working for utility companies, are required to identify the name of the utility company at the work site. All traffic control devices shall conform to the *Manual on Uniform Traffic Control Devices for Streets and Highways* (latest edition adopted by the Department) and all other Department requirements. All flagging personnel shall have flagging certification valid in Idaho (some other State's are accepted). All traffic control plans shall be prepared and signed by a Traffic Control Supervisor or Professional Engineer.
4. All utilities shall be installed under culverts.
5. Except as herein authorized, all underground crossings shall be bored or jacked.
6. Parked equipment and stored materials shall be as far from the traveled way as feasible. Items, excavations or obstacles within 30 feet of the traveled way shall be properly marked and/or protected.
7. Upon completion of the permitted work, the permittee shall restore the site to original condition or better at no expense to the Department. Restoration includes, but is not limited to, repair of any and all damage, correction of any interferences with highway drainage, restoration of survey monuments and traffic control devices, and all required grading and seeding. All rubbish and debris shall be immediately removed from the work area, to the satisfaction of the Department.
8. The permitted work shall be subject to inspection at any time by the Department. The Department shall be reimbursed by the permittee for any additional inspection required under the Special Provisions of this permit. All work shall be in conformity with the permit requirements including location and depth or height, and current government and Industry standards. The permittee shall provide satisfactory evidence to the Department that the work was performed, and the utility located, as required by this permit.
9. A copy of this permit, complete with special provisions, plans and traffic control requirements, shall be kept at the work site at all times when work is in progress.
10. This permit shall not be deemed or considered an exclusive right, and shall not prohibit the Department from using any of its highways, streets, or public places or affect its right to full supervision and control over all or any part of them, none of which is hereby surrendered. This permit shall not prohibit the Department from granting other permits or franchise rights of like or other nature to other public or private utilities. The Department reserves the right to make at any time such modification, addition, repair, relocation, or removal of an existing encroachment(s) or its appurtenances or any encroachment(s) or subject(s) authorized by this permit within the highway right-of-way as may be necessary to permit the relocation, reconstruction, widening, and maintenance of the highway and/or to provide proper protection to life and property on or adjacent to the highway. Said change or removal shall be made at the sole expense of the permittee, or its successors and assigns. All such modifications, relocation, or removal by the permittee shall be done in such a manner as will cause the least interference with the traveling public or any of the Department's work.
11. The Department may revoke, amend, amplify, or terminate this permit or any of the conditions herein enumerated if the permittee fails to comply with any or all of its provisions, requirements, or regulations as herein set forth or through willful or unreasonable neglect, fails to heed or comply with notices given, or if the utility herein granted is not installed or operated and maintained in conformity herewith.
12. The permittee shall maintain at its sole expense the structure or subject for which this permit is granted.
13. If trench or pavement settlement should occur, or any other kind of displacement, due to the work covered under this permit, within two years from the date of installation, repairs shall be made by the permittee as directed by the ITD Authorized Representative at no cost to the Department. If the permittee fails to make the necessary repairs, the Department will make the repairs and bill the permittee. No new permits shall be issued to the permittee until such claims have been settled.
14. Any modification or addition to, or removal or relocation of, work granted by this permit may require a new permit for approval by the ITD Authorized Representative. All work within the highway right-of-way shall be documented on as-built drawings and submitted to the District within 30 days of completion of work.

Also see attached Special Provisions

District Staff Review									
Review	**Reviewer's Signature**	**Date**	**Recommend** Yes	No	**Review**	**Reviewer's Signature**	**Date**	**Recommend** Yes	No
Traffic			☐	☐	Planner			☐	☐
Maintenance			☐	☐	Permit Coord			☐	☐
Design			☐	☐	Construction			☐	☐
Property Mgmt			☐	☐				☐	☐
Appeal Review									
Review	**Reviewer's Signature**	**Date**	**Recommend** Yes	No	**Review**	**Reviewer's Signature**	**Date**	**Recommend** Yes	No
Local Agency			☐	☐	CE			☐	☐
DTE			☐	☐	Hearing Officer			☐	☐
DE			☐	☐	Director			☐	☐
STE			☐	☐	Board			☐	☐

***Attach reason(s) for denial and/or recommendations for variance.**

Instructions For Completing ITD 2110, Right-Of-Way Encroachment Application And Permit - Utilities

You may be able to expedite the application process and reduce site designing and engineering costs by requesting a pre-application conference with the Idaho Transportation Department (ITD). Contact your local ITD District Office and ask to speak with the Permits Coordinator to schedule a meeting.

District 1	District 2	District 3	District 4	District 5	District 6
600 W. Prairie Ave. Coeur d'Alene, Idaho 83815-8764 (208) 772-1200	P.O. Box 837 Lewiston, Idaho 83501-0837 (208) 799-5090	8150 Chinden Blvd. Boise, Idaho 83714-8028 (208) 334-8300	216 S. Date St. Shoshone, Idaho 83352-0820 (208) 886-7800	5151 S. 5th Ave. Pocatello, Idaho 83205-4700 (208) 239-3300	206 N. Yellowstone Ave. Rigby, Idaho 83442-0097 (208) 745-7781
Counties served: Benewah, Bonner, Boundary, Kootenai, Shoshone	Counties served: Clearwater, Idaho, Latah, Lewis, Nez Perce	Counties served: Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Valley, Washington	Counties served: Blaine, Camas, Cassia, Custer, Gooding, Jerome, Lincoln, Minidoka, Twin Falls	Counties served: Bannock, Bear Lake, Bingham, Caribou, Franklin, Oneida, Power	Counties served: Bonneville, Butte, Clark, Custer, Fremont, Jefferson, Lemhi, Madison, Teton

1. The form initially serves as an ***application*** to install a **utility facility** within the State's right-of-way. If approved, the completed form becomes a ***permit***. Applicant shall anticipate 30 days from submission of a completed application for ITD review and/or approval. An incomplete application will delay processing.
2. Please print (in ink), type, or complete the application electronically in Adobe Pro. The form must be signed by Applicant or an Authorized Representative.
3. Read and understand these instructions and all of the General Provisions on page 2 of the form. These requirements apply to all utility permits. Additional special provisions may be conditions of the final approved permit.
4. Complete each item in the shaded area of the form under "Applicant Information." If you require any assistance, or additional information, please contact your area permit coordinator.
5. Include the following with your application:
   - ☐ $50 non-refundable application fee.
   - ☐ A vicinity sketch which includes north arrow, Section, Township and Range.
   - ☐ Plans or drawings showing proposed work, installation location with offsets from the centerline of the Highway, location of all existing utilities within the work area with offsets from the centerline of the Highway, trench details (24-inch minimum width). Applicant shall contact ITD for roadway alignment or highway project plans.
   - ☐ Traffic Control Plan - drawn and signed by a certified Traffic Control Supervisor, include certification number.
   - ☐ Standard Details or Shop Drawings if proposing to attach a facility to any structure(s) within the right-of-way.
6. Upon receipt of a complete application:
   A. ITD will review the application, discussing with appropriate staff. The application may be approved as submitted, approved with conditions, or denied.
      i. If application is approved, or approved with conditions, a copy of the permit will be transmitted to the Applicant electronically (unless Applicant elects to receive via "paper" on page 1 of application) along with any special provisions that must be adhered to. Applicant must notify the ITD Maintenance Foreman at least five (5) days prior to installation start date. Foreman will email the Applicant with an approved date to commence work. Afterwards, the Applicant may (if required) transmit their road/lane closure information to ITD's 511 Traffic and Traveler Information contact person.
      ii. All work associated with the permit shall be completed within one year of Department's approval date. Prior to expiration of permit, the Applicant may request a one-time 6-month extension. This request must be made in writing to the Permits Coordinator.
      iii. All permitted work shall be available for final inspection within thirty (30) days after construction is complete, unless otherwise stated in the special provisions of the permit.
      iv. Upon completion of work, Applicant shall contact and coordinate with the Foreman for a final inspection of the work. The contact information for the Foreman will be included in the permit documentation.
      v. Failure to complete all work in accordance with the requirements of the permit and receive final approval within the allotted time will render the permit invalid.
   B. If application is denied, notification will be made to the Applicant via US Certified Mail. Reason(s) for denial and the process for appeal will be outlined in the notification letter.

THIS PAGE LEFT BLANK INTENTIONALLY

IDAHO TRANSPORTATION DEPARTMENT
DISTRICT ONE TRAFFIC SECTION

RIGHT OF WAY UTILITY PERMIT PACKET

ENCLOSED YOU WILL FIND THE FOLLOWING:

1. ITD UTILITY PERMIT APPLICATION FORM NUMBER 2110. Please complete this form in its entirety; signature is needed by the **utility owner** or the local entity that will be responsible to maintain the utility.

   The mile post must be to the one-hundredth (0.01) of a mile, and include the side of the highway (i.e. left or right as you are facing increasing milepost markings).

2. CHECKLIST FOR APPLICATION RETURN. Reseeding Specifications; Open Cut Specifications; and Fee List. (At the discretion of D-1 Traffic Section, other information may accompany your application packet.)

3. Traffic control worksheet and drawing.

4. Special Provisions and Backfill for Utility Trenches / Pavement Cut detail drawing.

5. **BE SURE YOU CONTACT THE ONE-CALL LOCATOR "CALL BEFORE YOU DIG". Idaho State: 8-1-1 or www.digline.com**
   Kootenai Co: 800-428-4950
   Boundary / Bonner Co: 800-626-4950
   Shoshone / Benewah Co: 800-398-3285

   ITD does not belong to this service. You must call ITD at 772-1299 to have District 1's electrician, Chris Fields, locate ITD utilities.

UTILITY APPLICATION CHECKLIST

☐ Completed ITD 2110 form

☐ Cover letter with a narrative and approximate start/end date of project

☐ County parcel map. Identify your ownership and any affected parcels.

☐ 3 Copies of detailed drawing on a 11 x 17 sheet, to include, but not be limited to the following:

- Cross section of any bore pits and length of conduit
- Depth – must be a minimum of 36" below ditch line; gas must be 48" below ditch line; fiber optic must be 48" below ditch line and marked with tape 1-foot above line
- Where construction materials will be stored on job
- Ballast detail
- Shoulder detail
- Drainage detail
- Distance from right of way lines and edge of pavement
- If utility poles are being involved, are they new or existing
- Location of poles in regards to edge of pavement
- Type of back fill to be used – is top soil to be salvaged and replaced
- When the work area will be re-seeded according to ITD specifications (see attachment)

☐ Traffic Control Plan in accordance with MUTCD

☐ Utility application fee, check made out to "Idaho Transportation Department"

▪ Non-Interstate (new, modify, or relocate)	$50.00
▪ Interstate	To be determined
▪ Interstate and Non-Interstate, emergency or maintenance repair with no prior easement rights	$50.00

☐ If this is NOT a public utility, provide owner's name, legal description, and plat map.

Return to:

Idaho Transportation Department
Permit Coordinator
600 W. Prairie Ave.
Coeur d'Alene, Id 83815

All information must be completed before your application can be submitted for review. Approval of application will take 2 to 3 weeks, providing application information is complete. If you have any questions or need assistance, please call (208) 772-1297.

500. LOCATION AND DESIGN STANDARDS FOR UTILITIES.

01. Approved Permit Required. An approved right-of-way encroachment permit shall be required for all utility encroachments, including new utility installation and the relocation, maintenance, modification, or removal of existing utility facilities prior to the initiation of any work within the state highway right-of-way. (3-30-01)

02. Utility Locations. Final utility locations shall be identified on the appropriate roadway and bridge plans. (3-30-01)

03. Interstate Highways. As addressed in the 1996 Telecommunications Act, longitudinal placement of telecommunication utilities in any Interstate right-of-way shall require a permit approved by the Department for the installation of utilities. Longitudinal placement of all other utilities in Interstate right-of-way shall require a utility permit approved by both the Department and the FHWA. (10-1-12)T

04. Utility Maintenance and Emergency Repair. Right-of-way encroachment permits, approved annually by the Department, shall be required for all maintenance or emergency repairs of utility facilities. The utility shall notify the Department in advance of any work that affects the traveling public. (3-15-02)

05. Conduits Under the Roadway. (12-26-90)

a. Conduits crossing under highways that carry utility structures including, but not limited to, water, sewage, chemicals, electrical wire, and communications cables, shall be installed by jacking, driving or boring unless trenching can be justified. Acceptable justification would only be poor soil conditions, such as rock or boulders, inadequate room for a boring pit, or conflicts with other utility lines which cannot be located accurately (gas lines, multiple telephone conduits). If gravel or boulders prevent boring or jacking on the first attempt, at least two (2) other documented attempts should be made at different locations before contacting the District about an alternate installation method, unless the utility can provide documentation from a qualified agency or engineer that indicates the strata is not conducive to boring, driving or jacking. Normally installation of conduit twenty-four (24) inches or less outside diameter should be attempted by jacking, driving or boring before consideration of trenching as an alternative. (10-1-12)T

b. The applicant is required to submit for review and approval, a set of construction plans stamped by an engineer licensed in the state of Idaho. The plans shall show all details on casing, conduits, bulkheads and placement, vertical and horizontal dimensions of the pit and shoring, method of installing the conduit, drainage, void filling, and traffic control devices. Sluicing or jetting shall not be allowed. If required by the engineer, casings should be installed from highway right-of-way line to highway right-of-way line to allow for servicing of the utility facility with minimal disruption to traffic flows. Casings should be installed wherever feasible to allow for placement of multiple conduits. (3-15-02)

c. Conduits under interstate highways shall not be installed by cutting through the pavement under any circumstance. (3-30-01)

06. Conduits Attached to Structure. Conduits attached to any structure shall meet the following requirements: (3-30-01)

a. A set of construction plans showing all details and calculations of a crossing or proposed attachments, stamped by an engineer licensed in the state of Idaho, shall be submitted to the Department for review and approval at the time of permit application. A copy of the existing structure plans shall also be submitted that are marked to show the proposed structure modifications. (3-30-01)

b. Reinforcement shall be located prior to the placement of threaded inserts to suspend utilities using a method approved by the Department. (3-30-01)

c. All attaching hardware shall be galvanized or coated as directed by the Department. (3-30-01)

d. Bolts for the attachment clamps shall be a minimum of one-half (1/2) inch in diameter. (10-1-12)T

e. Slip joints shall be installed as directed by the Department. (3-30-01)

f. Drilling of any bridge structural element shall be prohibited without approval from the Department. (3-30-01)

g. Utilities shall be attached to bridges in an interior bay, unless interior attachment is not practical due to the bridge diaphragm or end beam construction. (3-30-01)

h. Placing brackets along or around the structure rail is prohibited. (3-30-01)

i. The installing utility shall relinquish exclusive rights to future use of a hanger system, once installed. However, the responsibility for required maintenance shall remain with the installing utility until the hangar system is placed into a joint-use system. At that time, the responsibility for maintenance shall become a shared responsibility. (3-30-01)

j. A set of “as-built” plans for all conduit or utility crossings and structure attachments shall be submitted to the Department and the local utility locating service with all details of construction within thirty (30) days of the work completion. All “as-built” plans are required to be stamped by an engineer licensed in the state of Idaho. (3-30-01)

Attachment to ITD 2110 – Right-Of-Way Encroachment Application and Permit for Utilities
SPECIAL PROVISIONS **Permit Number _____**

The following provisions amend the General Provisions on Page 2 of 2 of the Permit:

Add to Paragraph 1: The permittee shall contact the following ITD Maintenance Foreman at least five (5) working days prior to commencing the permitted work:

☐ Area 112	Athol	208-683-1059
☐ Area 120	Bonners Ferry	208-267-3531
☐ Area 130	Sandpoint	208-263-3412
☐ Area 140	I-90 East	208-772-1276
☐ Area 150	St. Maries	208-245-2021
☐ Area 160	US95 South	208-772-1250

Add to Paragraph 2: The permittee shall obtain utility locates prior to excavation or other work that might damage any utility facility. Utility one-call numbers (Password) are:

Bonner and Boundary Counties	1-800-626-4950
Benewah and Shoshone Counties	1-800-398-3285
Kootenai County	1-800-428-4950

NOTE: Idaho Transportation Department facilities (signals, illumination, etc.) are NOT covered by the one-call provider. Locates for ITD facilities may be obtained from the District 1 Signal Foreman at 208-772-1299.

Add to Paragraph 3: The permittee shall provide traffic control in accordance with the attached Traffic Control Plan. Any changes to the plan must be approved by the appropriate Maintenance Foreman prior to the change being made. Violations of the Traffic Control Plan or MUTCD requirements may result in immediate shut-down of the permitted work and revocation of the permit.

Replace Paragraph 4 with the following: Except as herein authorized, all underground crossings of state or other public roadways and private approaches to them shall be installed by trenchless methods. If, due to site conditions, a trenchless method is found to be unconstructable, the permittee shall contact the appropriate Maintenance Foreman prior to beginning any work on an alternate construction method. Should trenching be allowed as an alternate construction method, work shall be done in accordance with these provisions.

Add to Paragraph 6: Seeding and erosion control shall be performed in accordance with the following:

Erosion Control

The permittee shall maintain structural integrity of the State's highway right of way. No undercutting of present highway fills and ballast sections or construction of unprotected cuts (bare soil cuts) for access from the highway shall be allowed.

The permittee shall not grade, excavate, or perform ground disturbing activities during rainy periods. Permittee will, as much as possible, avoid these activities during the spring and fall rainy seasons. If work must be done during rainy seasons, the permittee will install check dams in drainage channels and/or provide a sediment retention basin to avoid discharging sediment containing runoff into the drainage system, or any wetlands, or water bodies (streams, rivers, lakes and ponds).

Any activities involving soil disturbance in excess of one acre and that will discharge to water bodies or wetlands will require coverage under the EPA General Permit for construction activities.

The permittee shall use appropriate Best Management Practices (BMP's) to control erosion and resulting sediment. Typical practices that can be used for erosion control (soil surface protection) are: erosion control blankets, testified mulches of straw, wood fiber, paper fiber or weed free grass; or rock mulch may be used. Typical practices that can be used for sediment control are: silt fences (off toe of slopes); rock check dams (in drainage channels); sediment basins/ponds; inlet culvert riser; and inlet rock filters. For further information on BMP's, contact one of the ITD Environmental Planners at (208) 772-1232 or 772-8018.

The permittee shall provide adequate drainage that will not increase discharge volumes or velocities to the current highway drainage system.

The permittee shall not discharge sediment-laden storm water or sediment to wetlands or other water bodies (streams, ponds, lakes) without appropriate permits.

The permittee shall not perform work in or adjacent to any wetland, or water body (stream, river, lake) without providing ITD with documentation (copies of permits) from the Army Corps of Engineers, and/or the Idaho Department of Water Resources, and/or the Idaho Department of Lands, and/or the Division of Environmental Quality.

Reseeding

Upon completion of all other work, the permittee shall reseed, fertilize, and mulch all areas of disturbed ground. Reseeding shall be done between September 15th and May 15th. Seeding will be accomplished using one of the following seed mixtures:

Seed Mix 1	Lb/Acre	Seed Mix 2	Lb/Acre	Seed Mix 3	Lb/Acr
Canada Bluegrass	5	Kentucky Bluegrass	5	Canada Bluegrass	5
Red Fescue	12	Smooth Bromegrass	12	Sheep Fescue	12
Durar Hard Fescue	12	Red Fescue	12	Red Fescue	12
White Dutch Clover	2	White Dutch Clover	2	White Dutch Clover	2
	31		31		31

Seed is available at most farm and garden stores or feed stores in north Idaho or Spokane, WA.

Fertilizer shall be a general purpose or multi-use fertilizer with a Nitrogen (N), Phosphorous (P), Potassium (K), ratio of 1:1:1. This is usually shown on the fertilizer information label as 12-12-12 or 16-16-16. The minimum percentage that will be allowed is the 12-12-12%. Greater

percentages will be allowed up 20%. These types of fertilizers are also available at most farm and garden stores or feed stores.

Mulch can be made from grass, wheat, or oat straw, wood fibers (not bark), or rock (2 ½ inch to ¾ inch, fractured or crushed). Mulch should be spread out to provide even coverage over the seed and fertilizer to protect them and the soil from erosion while the seed is germinating and growing (rock mulch does not need to be more than one to two inches in depth).

Should seeding operations not provide acceptable growth after one growing season, the permittee shall be required to reseed disturbed areas.

Add to Paragraph 7: Work included in this permit shall be performed in general compliance with the Idaho Transportation Department Standard Specifications for Highway Construction and Supplemental Specifications and Standard Drawings in effect at the time of the issuance of the permit, and the following provisions as they are applicable to the work permitted:

MATERIALS. The following materials shall be obtained from ITD approved sources and shall meet the following requirements.

Bedding Material – Bedding material shall consist of sand or Aggregate Base which conforms to the specification shown below for Aggregate Base.

Aggregate Backfill – Aggregate Backfill shall consist of a high quality sand/gravel pit run material. The material shall have a minimum R-value of 40, as measured by Idaho T-8 and shall not show a loss of more than 40 in the Los Angeles Abrasion Test.

The sand equivalent shall not be less than 30 if 5 percent or more of the material passes the No. 200 sieve. Sand equivalent will not be required if less than 5 percent passes the No. 200 sieve, as measured by AASHTO T176 Modified.

Lean Concrete Backfill – Lean Concrete Backfill shall be made up of materials conforming to the proportions shown below, for a volume of approximately 1 cubic yard.

Coarse aggregate (3/8 inch minus)	2,300 lbs
Sand	800 lbs
Portland Cement	94 lbs (1 sack)
Water (maximum)	12 gallons

Or a previously approved commercial mix.

Water content given above is maximum and may be reduced. Care shall be taken to assure that excess water is not present in the mixing drum prior to charging the mixer with materials. Thorough mixing will be required prior to discharge.

Aggregate Base - Aggregate Base shall conform to the following gradation.

Sieve Size	Percent Passing (1/2 inch)	Percent Passing (3/4 inch)
1 inch	100	100
¾ inch	100	90-100
½ inch	90-100	
No. 4	50-70	40-65
No. 8	35-55	30-50
No. 30	12-30	
No. 200	3-9	3-9

The material shall have a minimum R-value of 75, as measured by Idaho T-8 and shall not show a loss of more than 30 in the Los Angeles Abrasion Test.

The sand equivalent shall not be less than 30 if 5 percent or more of the material passes the No. 200 sieve. Sand equivalent will not be required if less than 5 percent passes the No. 200 sieve, as measured by AASHTO T176 Modified.

Sixty (60) percent of the aggregate retained on the No. 4 sieve shall have at least one fractured face as determined by WAQTC TM-1, method 1.

Aggregate for Plantmix Pavement – The aggregate shall be from an ITD approved source. The aggregate for plantmix pavement shall be as required by the job-mix design for ¾ inch or 1 inch plantmix pavement.

Plantmix Pavement – An ITD approved Class SP-2 or SP-3 Plantmix Pavement mix design from a previous ITD project no older than two years shall be used. The mix design shall include the source of aggregate, source and grade of performance grade binder, asphalt content, source of antistrip, and percent antistrip.

Asphalt – Performance Graded (PG) asphalt binder shall be used for plantmix pavement. The binder grade used shall be PG58-28.

Antistrip – All plantmix designs shall use a minimum of one-half percent of approved antistrip additive by weight of asphalt.

Tack Coat – CSS-1 dilute (50/50) emulsified asphalt shall be used for tack coat.

CONSTRUCTION REQUIREMENTS

General – Utility trench backfill/patches shall match the existing roadway section as to the type of material used and thickness or dimensions. Prior to beginning work sufficient labor, materials and equipment shall be at the job site to expediently complete the project. Open trenches and pavement drop-offs shall not be left overnight unless properly protected with appropriate traffic control devices.

Excavation – Excess material and material not suitable for use as backfill shall be removed from the job and disposed of in an approved disposal site provided by the permittee. Shoring of the trenches shall meet OSHA standards.

Bedding Material – Bedding material shall be placed as shown in the drawing.

Backfill – When backfilling within the roadway prism, either aggregate backfill or lean concrete backfill will be used, as determined by the District 1 Materials Engineer.

Aggregate backfill shall be uniformly distributed in layers not to exceed 8 inches loose thickness and compacted to the following standards:

- For material with a maximum dry density of 120 pcf or less, compact to 95 percent of standard density using AASHTO T-99.
- For material with a maximum dry density greater than 120 pcf, compact to 100 percent of standard density using AASHTO T-99.

Backfill placed more than 12 inches below sub grade shall be compacted to 95 percent of standard density.

Lean concrete backfill shall be placed in the trench so as to avoid segregation of the mixture. No compaction, vibration or finishing of the backfill is required. The backfill shall be allowed to set until it will bear traffic loads or be covered by a steel plate.

Aggregate Base – Aggregate base shall be placed in layers not to exceed 6 inches loose and compacted to 100 percent of standard density prior to placing any subsequent layers. Compaction shall be determined using WAQTC TM-7. Moisture content shall be as required to obtain compaction.

Plantmix Pavement – Plantmix pavement shall be placed in layers not less than 0.15 foot for 1/2 inch pavement and 0.20 foot for 3/4 inch pavement. The plantmix pavement shall be compacted to no less than 92 percent of maximum theoretical density prior to placing successive layers. Maximum theoretical density shall be determined using WAQTC TM-8. A roller pattern to obtain maximum compactive effort shall be established at the beginning of pavement.

Joints – Joints between existing and new pavement shall be constructed as per the drawing. A tack coat shall be applied at the interface area between the new and existing pavement at a rate of 0.05 gal per square yard prior to paving.

Markers for Utility Lines – Markers shall be placed at each right-of-way crossing point, at 500 foot intervals and at angle points. A plastic locate/warning ribbon shall be placed at least one foot above the top of the utility where trenched.

The permittee shall be responsible for providing inspection and testing services using WAQTC qualified inspectors and testing facilities to assure compliance with these Specifications. Inspection and testing reports shall be submitted with the as-built drawings required by this permit. Upon completion of the work, the permittee shall contact the appropriate Maintenance Foreman to arrange for a final on-site inspection of the work.

THIS PAGE LEFT BLANK INTENTIONALLY