South Valley

WATER RECLAMATION FACILITY

PROJECT 5

CONTRACT DOCUMENTS

BIDDING REQUIREMENTS, CONTRACT FORMS,

CONDITIONS OF THE CONTRACT,

TECHNICAL SPECIFICATIONS AND DRAWINGS

VOLUME 1 of 5

DIVISIONS 00 to 08

Digitally signed by Brad D. Jeppson
Contact Info: Carollo Engineers, Inc.
Date: 2019.04.15 08:26:07 -06'00'

PROFESSIONAL ENGINEER
REGISTERED
No. 4775621-2202
BRAD D. JEPPSON
STATE OF UTAH

Bids will be received at the office of South Valley Water Reclamation Facility located at

7495 South 1300 West, West Jordan, Utah 84084

until 2:00 PM Wednesday, May 1, 2019.

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VOLUME 2

SECTION 00030 - NOTICE INVITING BIDS

RECEIPT OF BIDS: Sealed Bids will be received at the office of the South Valley Water Reclamation Facility; OWNER of the WORK located at 7495 South 1300 West, West Jordan, Utah 84084, **until 2:00 PM on May 1, 2019**, for construction of South Valley Water Reclamation Facility's Project 5. Any Bids received after the specified time and date will not be considered.

OPENING OF BIDS: The Bids will be publicly opened and read at 2:00 PM on **May 1, 2019**, at the above-mentioned office of the OWNER.

COMPLETION OF WORK: The WORK shall be completed as described below:

a) Contractor shall procure new equipment, demolish and remove existing equipment to be replaced, and install the new equipment. Contractor shall provide all materials required for the Work described. The Work shall be completed by the date set forth in the Agreement (00500).

DESCRIPTION OF WORK: The project consists of the following Items:

a) Construction of a new multi-level grit removal building, including grit removal basins, grit pumping facilities, grit washing and conveying equipment, and associated appurtenances and yard piping.
b) Modifications to existing bioreactors for improved biological phosphorus removal (BPR) including minor modifications to fine bubble diffusers, additional mixing equipment, improvements to the aeration control system, addition of trench drains, improvements to mixed liquor discharge location, and associated appurtenances and yard piping.
c) In addition, the Work includes appurtenant items related to the operation of new/replaced equipment including electrical and mechanical work. Startup, testing and commissioning of the new equipment and pumps is an integral part of the Work.

SITE OF WORK: The site of the WORK is located at the OWNER's water reclamation facility at 7495 South 1300 West, West Jordan, Utah.

OBTAINING CONTRACT DOCUMENTS: The Contract Documents are entitled "South Valley Water Reclamation Facility – Project 5".

The Contract Documents may be obtained by bidders, subcontractors and equipment suppliers at the office of the South Valley Water Reclamation Facility, 7495 South 1300 West, West Jordan, Utah 84084 upon payment of $150.00 (non-refundable) for each set of printed Contract Documents (including technical specifications and accompanying reduced scale drawings). Printed bid packages along with a CD of electronic files will be available from the Owner's receptionist on Monday through Thursday commencing on **March 27, 2019 through April 30**, 2019, from 9:00 AM to 4:00 PM. Interested parties desiring emailed electronic files should contact Taigon Worthen via email at tworthen@svwater.com. There will be no charge for emailed bid documents.

BID SECURITY: Each Bid shall be accompanied by a certified check or cashier's check or Bid Bond in the amount of 5 percent of the Total Bid Price payable to the OWNER as a guarantee that the Bidder, if its Bid is accepted, will promptly execute the Agreement. A bid shall not be considered unless one of the forms of Bidder's security is enclosed with it.

BIDS TO REMAIN OPEN: The Bidder shall guarantee the Total Bid Price for a period of 60 calendar days from the date of bid opening.

MANDATORY PRE-BID VISIT TO WORK SITE: For a bid to be considered complete, prospective bidders are **required** to attend a mandatory pre-bid walk-through of the proposed work site, which will be conducted by the OWNER at 10:00 AM on **April 11, 2019**. The object of the walk through is to acquaint bidders with the site conditions. The pre-bid visit will start at the office of the OWNER located at 7495 South 1300 West, West Jordan City, Utah. Follow-up visits by prospective bidders and subcontractors are available by appointment only. Contact Taigon Worthen, P.E. of the SVWRF for appointments ((801) 566-7711).

PROJECT ADMINISTRATION: Technical communications relative to this WORK shall be directed to the ENGINEER prior to opening of the Bids. Communications relative to the purchase of Bid Documents shall be directed to the OWNER.

ENGINEER
Carollo Engineers, Inc.,
7090 S. Union Park Avenue, Suite 600
Telephone: (801)233-2500
Attention: Brad Jeppson
e-mail: Bjeppson@carollo.com

SOUTH VALLEY WATER RECLAMATION FACILITY
7495 South 1300 West
West Jordan, Utah 84084
Telephone: 801-495-5469
e-mail: tworthen@svwater.com
Attention: Taigon Worthen, P.E.

OWNER'S RIGHTS RESERVED: The OWNER reserves the right to reject any or all bids, to waive any informality in a bid, and to make awards to the lowest responsive, responsible bidder as the OWNER in its sole discretion shall determine may best serve the interest of the OWNER.

- END OF NOTICE INVITING BIDS -

SECTION 00100 - INSTRUCTIONS TO BIDDERS

1. DEFINED TERMS. Terms used in these Instructions to Bidders and the Notice Inviting Bids which are defined in the General Conditions have the meanings assigned to them in the General Conditions. The term "Bidder" means one who submits a Bid directly to OWNER, as distinct from a sub-bidder, who submits a price or quote to a Bidder.

2. INTERPRETATIONS AND ADDENDA.

2.1 All questions about the meaning or intent of the Contract Documents are to be directed to the ENGINEER. Additions, deletions, or revisions to the Contract Documents considered necessary by the ENGINEER in response to such questions will be issued by Addenda, mailed, emailed, or delivered to all parties recorded by the OWNER as having received the Contract Documents. Questions received less than 5 days prior to the date of Bids may not be answered. Only answers to such questions issued by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

2.2 Addenda may also be issued to make other additions, deletions, or revisions to the Contract Documents.

2.3 Bidders shall make no special interpretation or inference of intent from differing formats in the Technical Specifications.

3. BIDDER'S EXAMINATION OF CONTRACT DOCUMENTS AND SITE.

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

A. To examine thoroughly the Contract Documents and other related data identified in the Bidding Documents (including "technical" data referred to below);

B. To visit the site to become familiar with local conditions that may affect cost, progress, or performance, of the WORK;

C. To consider federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the WORK;

D. To study and carefully correlate the Bidder's observations with the Contract Documents; and

E. To notify the OWNER of all conflicts, errors, ambiguities, or discrepancies in or between the Contract Documents and such other related data.

3.2 (Not Used)

3.3 It is also the responsibility of each Bidder before submitting a Bid to examine thoroughly those reports of physical conditions in or relating to existing surface and subsurface conditions (except underground utilities as defined in Article 1 of the General Conditions) which are at or adjacent to the site and which were utilized by the OWNER in the preparation of the Contract Documents. Copies of such report and drawings are available for information at the office of the OWNER.

3.4 Information and data reflected in the Contract Documents with respect to Underground Utilities at or contiguous to the site are based upon information and data furnished to the

OWNER by the owners of such Underground Utilities or others, and the OWNER does not assume responsibility for the accuracy or completeness thereof unless it is expressly provided otherwise in the Supplementary General Conditions or Section 01530 - Protection of Existing Facilities.

3.5 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Utilities, and other physical conditions, and possible changes in the Contract Documents due to differing conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions.

3.6 Before submitting a Bid, each Bidder will, at Bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests, and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface, and Underground Utilities) at or contiguous to the site or otherwise which may affect cost, progress, or performance of the WORK and which the Bidder deems necessary to determine its Bid for performing the WORK in accordance with the time, price, and other terms and conditions of the Contract Documents.

3.7 On reasonable request in advance, the OWNER will provide each Bidder access to the site to conduct such examinations, investigations, explorations, tests, and studies as each Bidder deems necessary for submission of a Bid. Location of any excavation or boring shall be subject to prior approval of OWNER and applicable agencies. Bidder shall fill all holes, restore all pavement to match existing structural section, and shall clean up and restore the site to its former condition upon completion of such explorations. OWNER reserves the right to require Bidder to execute an Access Agreement with the OWNER prior to accessing the site.

3.8 The lands upon which the WORK is to be performed, rights-of-way, and easements for access thereto and other lands designated for use by the CONTRACTOR in performing the WORK are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by the CONTRACTOR. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by the OWNER unless otherwise provided in the Contract Documents.

3.9 The submission of a Bid will constitute an absolute representation by the Bidder that the Bidder has complied with every requirement of this Paragraph 3 and the following:

A. That the Bid is premised upon performing the WORK required by the Contract Documents without exception and such means, methods, techniques, sequences, or procedures of construction (if any) as may be required by the Contract Documents;

B. That Bidder has given the OWNER written notice of all conflicts, errors, ambiguities, and discrepancies in the Contract Documents and the written resolution thereof by the OWNER is acceptable to the Bidder; and

C. That the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the WORK.

4. BID FORMS. The Bid shall be submitted on the Bid Forms bound herein. All blanks on the Bid Forms shall be completed in ink. All names must be printed below the signatures. The Bid shall be submitted in a sealed envelope which shall be plainly marked in the upper left hand corner with the name and address of the Bidder and shall bear the words "BID FORM" followed by the title of the Contract Documents for the WORK, the name of the

OWNER, the address where Bids are to be delivered or mailed to, and the date and hour of opening of Bids.

5. CERTIFICATES.

5.1 Bids by corporations must be executed in the corporate name by the president, a vice-president, or other corporate officer. Such Bid shall be accompanied by the enclosed Certificate of Authority to sign, attested by the secretary or assistant secretary, and with the corporate seal affixed. The corporate address and state of incorporation must appear below the signature.

5.2 Bids by partnerships must be executed in the partnership name and be signed by a managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the partnership must appear below the signature.

5.3 Bids by joint ventures must be executed in the joint venture name and be signed by a joint venture managing partner, accompanied by the enclosed Certificate of Authority to sign, and his/her title must appear under the signature and the official address of the joint venture must appear below the signature.

6. DISQUALIFICATION OF BIDDERS. More than one Bid from an individual, firm, partnership, corporation, or association under the same or different names will not be considered. If the OWNER believes that any Bidder has financial interest in more than one Bid for the WORK contemplated, all Bids in which such Bidder is interested will be rejected. If the OWNER reasonably believes that collusion exists among the Bidders, all Bids will be rejected. A party who has quoted prices to a Bidder is not hereby disqualified from quoting prices to other Bidders, but is disqualified from submitting a Bid directly for the WORK.

7. QUANTITIES OF WORK. The quantities of work or material stated in unit price items of the Bid are supplied only to give an indication of the general scope of the WORK; the OWNER does not expressly or by implication agree that the actual amount of work or material will correspond therewith, and reserves the right after award to increase or decrease the quantity of any unit price item of the WORK by an amount up to and including 25 percent of any Bid item, without a change in the unit price, and shall include the right to delete any Bid item in its entirety, or to add additional Bid items up to and including an aggregate total amount not to exceed 25 percent of the Bid price.

8. COMPETENCY OF BIDDERS. Only qualified B100 and E100 licensed CONTRACTORS specializing in mechanical construction may submit a bid for the performance of the WORK.

9. SUBMISSION OF BIDS. The Bid shall be delivered by the time and to the place stipulated in the Notice Inviting Bids. It is the Bidder's sole responsibility to see that its Bid is received in proper time and at the proper place.

10. BID SECURITY, BONDS, AND INSURANCE. Each Bid shall be accompanied by a certified or cashier's check or approved Bid Bond in the amount stated in the Notice Inviting Bids. Said check or bond shall be made payable to the OWNER and shall be given as a guarantee that the Bidder, if awarded the WORK, will enter into an Agreement with the OWNER, and will furnish the necessary insurance certificates, Payment Bond, and Performance Bond; each of said bonds to be in the amount stated in the Supplementary General Conditions. In case of refusal or failure to enter into said

Agreement, the check or Bid Bond, as the case may be, shall be forfeited to the OWNER. If the Bidder elects to furnish a Bid Bond as its Bid security, the Bidder shall use the Bid Bond form bound herein, or one conforming substantially to it in form. Bid Bonds shall comply with the requirements applicable to payment and performance bonds in the General Conditions.

11. DISCREPANCIES IN BIDS. In the event there is more than one Bid item in a Bid Schedule, the Bidder shall furnish a price for all Bid items in the Schedule, and failure to do so will render the Bid non-responsive and shall cause its rejection. In the event there are unit price Bid items in a Bidding schedule and the amount indicated for a unit price Bid item does not equal the product of the unit price and quantity, the unit price shall govern and the amount will be corrected accordingly, and the BIDDER shall be bound by said correction. In the event there is more than one Bid item in a Bid Schedule and the total indicated for the Schedule does not agree with the sum of the prices Bid on the individual items, the prices Bid on the individual items shall govern and the total for the Schedule will be corrected accordingly, and the BIDDER shall be bound by said correction.

12. MODIFICATIONS AND UNAUTHORIZED ALTERNATIVE BIDS. Unauthorized conditions, limitations, or provisos attached to the Bid shall render it informal and may cause its rejection as being non-responsive. The Bid forms shall be completed without interlineations, alterations, or erasures in the printed text. Alternative Bids will not be considered unless called for. Oral, telegraphic, telephonic or electronic Bids or modifications will not be considered.

13. WITHDRAWAL OF BID. The Bid may be withdrawn by the Bidder by means of a written request, signed by the Bidder or its properly authorized representative. Such written request must be delivered to the place stipulated in the Notice Inviting Bids for receipt of Bids prior to the scheduled closing time for receipt of Bids.

14. AWARD OF CONTRACT. Award of the contract, if awarded, will be made to the lowest responsive, responsible Bidder whose Bid complies with the requirements of the Contract Documents. Unless otherwise specified, any such award will be made within the period stated in the Notice Inviting Bids that the bids are to remain open. Unless otherwise indicated, a single award will be made for all the Bid items in an individual Bid Schedule.

15. RETURN OF BID SECURITY. Within 14 days after award of the contract, the OWNER will, if requested, return the Bid securities accompanying such Bids that are not being considered in making the award. All other Bid securities will be held until the Agreement has been finally executed. They will then be returned, if requested, to the respective Bidders whose Bids they accompany.

16. EXECUTION OF AGREEMENT. The Bidder to whom award is made shall execute a written Agreement with the OWNER on the form of agreement provided, shall secure all insurance, and shall furnish all certificates and bonds required by the Contract Documents within 14 calendar days after receipt of the agreement forms from the OWNER. Failure or refusal to enter into an Agreement as herein provided or to conform to any of the stipulated requirements in connection therewith shall be just cause for annulment of the award and forfeiture of the Bid security. If the lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the Contract to the second lowest responsive, responsible Bidder. If the second lowest responsive, responsible Bidder refuses or fails to execute the Agreement, the OWNER may award the contract to the third lowest responsive, responsible Bidder. On the failure or refusal of such second or third lowest Bidder to execute the Agreement, each such Bidder's Bid securities shall be likewise forfeited to the OWNER.

17. LIQUIDATED DAMAGES. Provisions for liquidated damages, if any, are set forth in the Agreement.

18. PREFERENCE FOR RESIDENT CONTRACTORS. The OWNER will apply the provisions of Utah Procurement Code 63G-6-405. titled Preference for Resident Contractors (Utah Code -- Title 63G -- Chapter 6) wherein it is stated “(2) (a) When awarding contracts for construction, a public procurement unit shall grant a resident contractor a reciprocal preference as against a nonresident contractor from any state that gives or requires a preference to contractors from that state. (b) The amount of the reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor.”

- END OF INSTRUCTIONS TO BIDDERS -

SECTION 00300 – BID FORMS

BID

BID TO: South Valley Water Reclamation Facility

1. The undersigned Bidder proposes and agrees, if this Bid is accepted to enter into an Agreement with the OWNER in the form included in the Contract Documents to perform the WORK as specified or indicated in said Contract Documents entitled "South Valley Water Reclamation Facility - Project 5."
2. Bidder accepts all of the terms and conditions of the Contract Documents, including without limitation those in the Notice Inviting Bids and Instructions to Bidders, dealing with the dispositions of the Bid security.
3. This Bid will remain open for the period stated in the "Notice Inviting Bids" unless otherwise required by law. Bidder will enter into an Agreement within the time and in the manner required in the "Notice Inviting Bids" and the "Instructions to Bidders", required by the Contract Documents.
4. Bidder has examined copies of all the Contract Documents including the following Addenda (receipt of all of which is hereby acknowledged):

Number	Date
_____	_____
_____	_____
_____	_____

Failure to acknowledge addenda shall render the bid non-responsive and shall be cause for its rejection.

5. Bidder has familiarized itself with the nature and extent of the Contract Documents, WORK, site, locality where the WORK is to be performed, the legal requirements (federal, state, and local laws, ordinances, rules, and regulations), and the conditions affecting cost, progress or performance of the WORK and has made such independent investigations as Bidder deems necessary.

To all the foregoing, and including all Bid Forms contained in the Bid, said Bidder further agrees to complete the WORK required under the Contract Documents within the Contract Time stipulated in said Contract Documents, and to accept in full payment therefore the Contract Price based on the Total Bid Price(s) named in the aforementioned Bid forms.

Dated: _____ Bidder: _____

By: _____

Title: _____

BID CERTIFICATE

(if Corporation)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Board of Directors of the _____

_____

_____
a corporation existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of this Corporation, be and is hereby authorized to execute the Bid dated _____, 20___, to the South Valley Water Reclamation Facility by this Corporation and that his/her execution thereof, attested by the Secretary of this Corporation, and with the Corporate Seal affixed, shall be the official act and deed of this Corporation."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the corporation this _____, day of _____, 20___.

_____
Secretary

(SEAL)

BID CERTIFICATE

(if Partnership)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Partners of the _____

_____

_____
a partnership existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Partnership, be and is hereby authorized to execute the Bid dated_____, 20___, to the South Valley Water Reclamation Facility by this Partnership and that his/her execution thereof, attested by the _____ shall be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20___.

_____

BID CERTIFICATE

(if Joint Venture)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Principals of the _____

_____

_____
a joint venture existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____of the Joint Venture, be and is hereby authorized to execute the Bid dated_____, 20___, to the "South Valley Water Reclamation Facility by this Joint Venture and that his/her execution thereof, attested by the _____ shall be the official act and deed of this Joint Venture."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the corporation this _____, day of _____, 20___.

_____

LIST OF SUBCONTRACTORS

The Bidder shall list below the name and the location of the place of business of each Subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement, or a Subcontractor who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime contractor's total bid or ten thousand dollars ($10,000), whichever is greater. The Bidder shall also list below the portion of the WORK which will be performed by each Subcontractor under its contract. The prime contractor shall list only one Subcontractor for each portion as is defined by the prime contractor in its bid. The prime contractor shall submit information (see next page) required of specialty subcontractors which are proposed to do Sheet Metal (HVAC) Work, Mechanical Work or Electrical Work, if any.

The Bidder's attention is directed to the provisions of Paragraph entitled "Subcontract Limitations," of the Supplementary General Conditions which stipulates the percent of the WORK to be performed with the Bidder's own forces. Failure to comply with this requirement will render the Bid non-responsive and may cause its rejection.

Work to be Performed	Subcontr. License Number	Percent of Total Bid	Subcontractor's Name and Address
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Note: Attach additional sheets if required.

INFORMATION REQUIRED OF SPECIALTY SUBCONTRACTORS

The Bidder shall furnish the following information for each specialty subcontractor. Additional sheets shall be attached as required. Failure to complete Item Nos. 1, 2, and 3, will cause the Bid to be non-responsive and may cause its rejection.

(1) SPECIALTY SUBCONTRACTOR's name and address:

_____

_____

_____

(2) SPECIALTY SUBCONTRACTOR's license:

Primary Classification _____

State License No. and Expiration Date _____

Specialty classifications held, if any: _____

Name of Licensee, if different from (1) above:

_____

_____

_____

.

(3) ATTACH TO THIS BID a list of the 5 most recent construction contracts or subcontracts completed by the SPECIALTY SUBCONTRACTOR involving HVAC, Mechanical or Electrical Work of similar type and comparable value at Municipal Water Treatment Plants or Municipal Wastewater Treatment Plants. The list shall include the following information as a minimum:

- Names, address, and telephone number of owner.
- Name of Project.
- Location of Project.
- Brief description of the work involved.
- Contract amount.
- Date of completion of the contract.
- Name, address, and telephone number of architect or engineer.
- Name of owner's project engineer.

INFORMATION REQUIRED OF BIDDER

The Bidder shall furnish the following information. Additional sheets shall be attached as required. Failure to complete Item Nos. 1, 3, and 6, will cause the Bid to be non-responsive and may cause its rejection.

(1) CONTRACTOR's name and address:

_____

_____

_____

(2) CONTRACTOR'S telephone number: _____

(3) CONTRACTOR's fax number: _____

(4) CONTRACTOR's license: Primary Classification _____

State License No. and Expiration Date _____

Specialty classifications held, if any: _____

Name of Licensee, if different from (1) above: _____

_____

_____

(5) Name, address, and telephone number of surety company and agent who will provide the required bonds on this contract:

_____

_____

_____

(6) ATTACH TO THIS BID a financial statement, references, and other information, sufficiently comprehensive to permit an appraisal of CONTRACTOR's current financial condition.

(7) ATTACH TO THIS BID a list of the 5 most recent construction contracts completed by the CONTRACTOR involving Work of similar type and comparable value at Municipal Water Treatment Plants or Municipal Wastewater Treatment Plants. The list shall include the following information as a minimum:

- Names, address, and telephone number of owner.
- Name of Project.
- Location of Project.
- Brief description of the work involved.
- Contract amount.
- Date of completion of the contract.
- Name, address, and telephone number of architect or engineer.
- Name of owner's project engineer.

NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER

AND SUBMITTED WITH BID

STATE OF)

) SS:

COUNTY OF)

_____, being first duly sworn, deposes and says that he or she is _____ of_____ the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit or cost element of awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Signed: _____

Subscribed and sworn to before me

this _____day of _____, 20____

_____

Notary Public in and for the
County of _____
State of _____

(SEAL)

BID BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____as Principal, and _____as Surety, are held and firmly bound unto the South Valley Water Reclamation Facility hereinafter called "OWNER," in the sum of _____dollars, for the payment of which sum, well and truly to be made, we jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns firmly by these presents.

WHEREAS, said Principal has submitted a Bid to said OWNER to perform the WORK required under the bidding schedule(s) of the OWNER's Contract Documents entitled "South Valley Water Reclamation Facility – Foul Air Fan VFD Replacement".

NOW THEREFORE, if said Principal is awarded a contract by said OWNER and, within the time and in the manner required in the "Notice Inviting Bids" and the "Instruction to Bidder" enters into a written Agreement on the form of agreement bound with said Contract documents, furnishes the required certificates of insurance, and furnishes the required Performance Bond and Payment Bond, and performs in all other respects the agreement created by this bid, then this obligation shall be null and void, otherwise it shall remain in full force and effect. The Surety stipulates and agrees that the obligation of said Surety shall in no way be impaired or affected by an extension of the time within which the OWNER may accept such bid and Surety further waives notice of any such extension. In the event suit is brought upon this bond by said OWNER and OWNER prevails, said Principal and Surety shall pay all costs incurred by said OWNER in such suit, including reasonable attorney's fees and costs to be fixed by the court.

SIGNED AND SEALED, this _____day of _____, 20_____

_____ (SEAL) _____ (SEAL)

(Principal) (Surety)

By: _____ By: _____

(Signature) (Signature)

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

- END OF BID FORMS -

BID SCHEDULES

PART 1 – GENERAL

1.01 CONSTRUCTION CONTRACT

A. This Bid is submitted to:

South Valley Water Reclamation Facility (Owner)
7495 South 1300 West
West Jordan, Utah 84084

B. Name of Project: SOUTH VALLEY WATER RECLAMATION FACILITY – PROJECT 5

1.02 SCHEDULES TO BE ADDED TO THE AGREEMENT

A. This Bid Schedules contain the schedules of prices which will be incorporated into the Agreement by reference.

1.03 TAXES

A. The Bidder agrees that all sales, consumer, use, and other similar taxes are included in the stated bid prices for the Work, unless provision is made herein for the Bidder to separately itemize the estimated amount of tax.

1.04 SCHEDULES OF PRICES

A. **Lump Sum Bid & Basis of Award**: Schedule of Prices for South Valley Water Reclamation Facility - Project 5 as specified and shown on the Drawings. Bidder shall complete Schedule A, Schedule B, and Additive Schedule C in their entirety. Award of the contract shall be based on the total combined amount of the bid that is within available funds. Bids shall be evaluated in the following manner for determination of the lowest, responsible, responsive bidder:

a. Schedule A only
b. Schedule A plus Schedule B

However, the OWNER reserves the right to award Schedule A or Schedule A plus Schedule B with any combination of Line Items from Additive Schedule C which results in a sum total within available funds, which in the OWNER's sole discretion, is in the OWNER's best interest. An award is anticipated to be made to a single Bidder. If bids exceed available funds, the OWNER reserves the right to reject all bids.

B. Schedule A contains prices for the WORK on Bioreactors 2, 3, & 4 related to the improvements shown in South Valley Water Reclamation Facility Project 5 Contract Documents including, but not limited to, mechanical mixing, pumping, piping, valves, structural modifications, aeration system modifications, controls integration, and electrical improvements. It includes pre-selected equipment & pre-negotiated pricing for such equipment for this project for which the CONTRACTOR shall be assigned the existing Memorandum of Agreement between the OWNER and the suppliers. The CONTRACTOR

shall fulfill the Agreements according to the terms and conditions specified therein, obtain Purchase Orders and install the respective equipment and materials, and make payment to the suppliers as provided. CONTRACTOR shall also pay sales taxes as indicated in respective Memorandums of Agreement (MOA). Bidder shall include its cost for administering and accomplishing intent of the Memorandums of Agreement in its Lump Sum Bid. Such costs shall include but not be limited to administration, handling, bonds and insurance, profit, offloading, storage, installation, startup and all other costs required to complete the WORK.

Schedule A excludes WORK on the Grit Handling Facility and site piping and improvement related to the Grit Handling Facility. In addition Schedule A excludes the WORK in Additive Schedule C for bioreactor trench drains, online water quality analyzers, grit removal/dewatering train #3 equipment and piping, and the biofilter odor control system.

C. Schedule B contains prices for the WORK on the Grit Handling Facility including all site piping and site improvements related thereto shown in South Valley Water Reclamation Facility Project 5 Contract Documents including, but not limited to, earthwork, underground piping, structural components, piping, architectural components, HVAC, pumps, valves, controls, controls integration, and electrical improvements. It includes pre-selected equipment & pre-negotiated pricing for such equipment for this project for which the CONTRACTOR shall be assigned the existing Memorandum of Agreement between the OWNER and the suppliers. The CONTRACTOR shall fulfill the Agreements according to the terms and conditions specified therein, obtain Purchase Orders and install the respective equipment and materials, and make payment to the suppliers as provided. CONTRACTOR shall also pay sales taxes as indicated in respective Memorandums of Agreement. Bidder shall include its cost for administering and accomplishing intent of the Memorandums of Agreement in its Lump Sum Bid. Such costs shall include but not be limited to administration, handling, bonds and insurance, profit, off-loading, storage, installation, startup and all other costs required to complete the WORK.

Schedule B excludes WORK on Bioreactors 2, 3, & 4 that is to be included in Schedule A. In addition Schedule B excludes the WORK in Additive Schedule C for bioreactor trench drains, online water quality analyzers, grit removal/dewatering train #3 equipment and piping, and the biofilter odor control system.

D. Additive Schedule C contains prices for line items of specific portions of the WORK shown in South Valley Water Reclamation Facility Project 5 Contract Documents related to both Bioreactors 2, 3, & 4 and the Grit Handling Facility. Line Items 3 & 4 include pre-selected equipment & pre-negotiated pricing for such equipment for this project for which the CONTRACTOR shall be assigned the existing Memorandum of Agreement between the OWNER and the suppliers for equipment to provide a third train of grit capturing, removal and dewatering. The CONTRACTOR shall fulfill the Agreements according to the terms and conditions specified therein, obtain Purchase Orders and install the respective equipment and materials, and make payment to the suppliers as provided. CONTRACTOR shall also pay sales taxes as indicated in respective Memorandums of Agreement. Bidder shall include its cost for administering and accomplishing intent of the Memorandums of Agreement in its Lump Sum Bid. Such costs shall include but not be limited to administration, handling, bonds and insurance, profit, off-loading, storage, installation, startup and all other costs required to complete the WORK.

E. Bid Prices: Bidder will complete the WORK in accordance with the Contract Documents for the Lump Sum Bid Prices indicated in the Bid Schedules hereafter.

F. BID SCHEDULES:

SCHEDULE A

Line Item No.	Description	Amount
1.	Contractor Administration	
2.	Mobilization and Demobilization	
3.	**Purchase Order Agreement Price** for OWNER pre-selected equipment and pre-negotiated price for six Aqua Aerobics DDM surface floating mixers	By Addendum
4.	**Purchase Order Agreement Price** for OWNER pre-selected equipment and pre-negotiated price for six 99" replacement impellers for existing Enviropax vertical shaft mixers	By Addendum
5.	**LUMP SUM PRICE –** WORK on Bioreactors 2, 3, & 4 for construction of South Valley Water Reclamation Facility Project 5, not including Line Items 3 & 4 above and excepting the WORK contained in Schedule B and Additive Schedule C.	
Schedule A TOTAL for all Line Items (Sum of Line Items 1-5)		
(Schedule A Total in Words)		

SCHEDULE B

Line Item No.	Description	Amount
1.	Contractor Administration	
2.	Mobilization and Demobilization	
3.	**Purchase Order Agreement Price** for OWNER pre-selected equipment and pre-negotiated price for two trains of Hydro International Headcell Grit Removal Systems excluding Additive Schedule C Line Item 3.	$481,342
4.	**Purchase Order Agreement Price** for OWNER pre-selected equipment and pre-negotiated price for two trains of Huber Coanda Fine Grit Washer/Dewatering Units excluding Additive Schedule C Line Item 3.	$531,418
5.	**LUMP SUM PRICE –** WORK on Grit Handling Facility including all site piping and site improvements related thereto for construction of South Valley Water Reclamation Facility Project 5, not including Line Items 3 & 4 above and excepting the WORK contained in Schedule A and Additive Schedule C.	
Schedule B TOTAL for all Line Items (Sum of Line Items 1-5)		
(Schedule B Total in Words)		
Schedule A plus Schedule B TOTAL for all Line Items in both Schedules		
(Schedule A plus Schedule B Total in Words)		

ADDITIVE SCHEDULE C

Line Item No.	Description	Amount
1.	**Additive Bid Item #1** - Bioreactor Trench Drains for Bioreactors 2, 3, & 4: Construct bioreactor trench drains within Bioreactors 2, 3, & 4. Trench drain collection boxes for Bioreactors 2, 3, & 4. All associated valves and yard piping related to trench drains and the collection boxes to existing sewer interceptors as shown in the Contract Drawings.	
2.	**Additive Bid Item #2** - Online Water Quality Analyzers for Bioreactors 2, 3, & 4: ~~Single online ammonia/nitrate probe per bioreactor as specified in Section 17519 - Analyzers: Ammonia~~ Single MLSS probe per bioreactor as specified in Section 17518 - Analyzers: Mixed Liquor Suspended Solids (MLSS) 2 ORP probes per bioreactor as specified in Section 17502 – Analyzers: ORP	
3.	**Additive Bid Item #3** - Grit Removal/Dewatering Train # 3: Grit Basin #3 Equipment as specified in Section 11323 - Grit Removal System for the bid alternate price listed in the MOA. Grit Pumps #5 and #6 as specified in Section 11312C - Horizontal Recess Impeller Centrifugal Pumps. Grit Washer/Dewatering Unit #3 as specified in Section 11324 - Grit Washer/Dewatering Units for the bid alternate price listed in the MOA. Grit chutes and diverter gate for Grit Washer/Dewatering Unit #3 as specified in Section 14592 - Grit Chutes and Storage Bins. All appurtenant piping, fittings, controls, valves, wiring, instruments, and control panels required for the equipment specified for Additive Bid Item #3 as indicated in the Contract Drawings and Specifications.	
4.	**Additive Bid Item #4** - Biofilter Odor Control System: Biofilter Odor Control System as specified in Section 13251 - Biofilter Odor Control System and as indicated on the Contract Drawings. All Foul Air (FA) discharge piping related to the Biofilter Odor Control System and other yard piping as indicated on the Contract Drawings.	
Additive Schedule C TOTAL for all Line Items (Sum of Line Items 1-4)		
(Additive Schedule C Total in Words)		

3/11/2019 DELETE AMMONIA ION SELECTIVE PROBES FROM THIS BID ITEM

G. ATTACHMENTS TO THIS BID

a. The following documents are attached to and made a condition of this Bid:

i. Required Bid security in the form of a certified or cashier's check, or a Bid Bond as specified in Document 00300 - Bid Forms.

ii. Document 00300 - Bid Forms, and other individuals and entities required to be identified in this Bid.

iii. Document 00436 - List of Equipment Manufacturers.

iv. Document 00444 - Experience Modification Rate.

v. Document 00453 - Bid Preference.

vi. Document 00454 - Bid Certification of the Payment of State and Local Taxes.

vii. Document 00458 - Certification of Drug-Free Workplace Requirements

- END OF BID SCHEDULES -

DOCUMENT 00436

LIST OF EQUIPMENT MANUFACTURERS

ARTICLE 1 - SELECTED MANUFACTURER/SUPPLIER

1.01 Bidder shall edit Table 1 List of Selected Equipment Manufacturers by adding the manufacturer or supplier that will furnish the respective item of equipment for the Work.

1.02 Manufactures that are already listed are for Owner pre-selected equipment. Existing Contracts between Owner and Supplier for Owner pre-selected equipment will be assigned to the CONTRACTOR.

1.03 Acceptance of a manufacturer or supplier listed by the Bidder shall not constitute a waiver of any provision of the Contract Documents.

Table 1. List of Selected Equipment Manufacturers

Section	Equipment	Manufacturer/Supplier
11224A	Surface Mounted Mixers	Aqua Aerobics
11224B	Vertical Mixer Replacment Impellers	Enviropax
11312P	Axial Wall Pumps	
11292A	Flap Gates	
11294C	Slide Gates	
11312C	Grit Pumps	
11312P	Mixed Liquor Return Pumps	
11323	Grit Removal Equipment	Hydro International, Inc.
11324	Grit Washing Equipment	Huber Technology, Inc.

BIDDER

_____

(Signature)

_____

(Date)

END OF DOCUMENT

DOCUMENT 00444

EXPERIENCE MODIFICATION RATE

ARTICLE 1 - CONTRACTOR'S SAFETY PERFORMANCE AND PROGRAM

1.01 WORKERS' COMPENSATION INSURANCE - EXPERIENCE MODIFICATION RATE (EMR)

A. Provide the following data:

	Policy Year	Modification Rate
Most Recent Policy Year	_____	_____
1 year previously	_____	_____
2 years previously	_____	_____

B. Answer the following questions.
1. Are the above rates interstate or intrastate? _____.
2. If intrastate, which state? _____.
3. If your EMR is exactly 1.0 for any policy year, it is because your firm is (or was) too new or too small to have an EMR calculated?

Yes _____ No _____

C. Provide documentation by one of the following methods:
1. Furnish a letter from your insurance agent, insurance carrier, or state fund (on their letterhead) verifying the EMR data for the last 3 rating periods.
   a. If you do not have an interstate rating, obtain your intrastate EMR's.
2. Furnish a copy of the last 3 years' Experience Rating Calculation Sheets from your insurance carrier.
3. If you are in a "state fund", such as Ohio or West Virginia, furnish a copy of the state's last 3 years annual statement page that shows the modification rate and the coverage period.

END OF DOCUMENT

DOCUMENT 00453

BID PREFERENCES

1. Did you claim a bid preference under Utah Procurement Code 63G-6-404 - Preference for Providers of State Products?

   [ ] Yes [ ] No

   If so, are you submitting proof that the goods, supplies, equipment, materials, or printing offered are produced, manufactured, mined, grown or performed in Utah?

   [ ] Yes [ ] No

2. Did you claim a bid preference under Utah Procurement Code 63G-6-405 - Preference for Resident Contractors?

   [ ] Yes [ ] No

   If so, are you submitting proof of qualifications as a Resident Contractor?

   [ ] Yes [ ] No

3. Did you claim a bid preference under Utah Procurement Code 63G-6-406 - Preference for Recycled Paper and Paper Products?

   [ ] Yes [ ] No

   If so, are you submitting proof of entitlement under this Code section?

   [ ] Yes [ ] No

BIDDER

_____
(Signature)

_____
(Date)

END OF DOCUMENT

DOCUMENT 00454

BID CERTIFICATION FOR THE PAYMENT OF UTAH STATE AND LOCAL TAXES

KNOW ALL MEN BY THESE PRESENTS, THAT the Bidder does hereby stipulate and certify that the Bidder has paid Utah state and local taxes for 5 successive years before submitting this Bid to Owner.

[ ] Yes [ ] No

BIDDER

_____

(Signature)

_____

(Date)

END OF DOCUMENT

DOCUMENT 00458

CERTIFICATION OF DRUG-FREE WORKPLACE REQUIREMENTS

ARTICLE 1 - BIDDER CERTIFICATIONS

1.01 The Bidder certifies that it will or will continue to provide a drug-free work place by:

A. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the Bidder's work place and specifying the actions that will be taken against employees for violation of such prohibition.
   1. Making it a requirement that each employee to be engaged in the performance of the contract be given a copy of the statement.
   2. Notifying the employee in the statement that, as a condition of employment under the Contract, the employee will:
      a. Abide by the terms of the statement.
      b. Notify the employer in writing of his or her conviction for a violation of a criminal drug statute occurring in the work place no later than 5 calendar days after such conviction.
         1) Notifying the Owner in writing within 10 calendar days after receiving notice from an employee or otherwise receiving actual notice of such conviction.
         2) Taking 1 of the following actions, within 30 calendar days of receiving notice, with respect to any employee who is so convicted:
            a) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of Federal and State law.
            b) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purpose by a Federal, State or local health, law enforcement, or other appropriate agency.
      c. Notify the employee that in the event of a major accident/incident resulting in loss of life, injury or damage to the facility, or equipment, all personnel involved shall be required to submit to substance testing as soon as possible after the incident, but not more than 4 hours after the incident.

B. Establishing an ongoing drug-free awareness program to inform employees about:
   1. The dangers of drug abuse in the work place.
   2. The Bidder's policy of maintaining a drug-free work place.
   3. Any available drug counseling, rehabilitation, and employee assistance programs.
   4. The penalties that may be imposed upon employees for drug abuse violations occurring in the work place.

C. Making a good faith effort to continue to maintain a drug-free work place through implementation of the requirements stated in this Document.

ARTICLE 2 - WORK LOCATIONS

2.01 The Bidder may insert in the space provided below the site(s) for the performance of work done in connection with this Contract:

A. Place(s) of Performance: (Street address, city, county, state, zip code):

_____

_____

_____

BIDDER

_____
(Signature)

_____
(Date)

END OF DOCUMENT

SECTION 00500 – AGREEMENT

THIS AGREEMENT is dated as of the _____day of _____ in the year 2019 by and between South Valley Water Reclamation Facility (hereinafter called OWNER) and _____ _____(Hereinafter called CONTRACTOR).

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

CONTRACTOR shall complete the WORK as specified or indicated in the OWNER's Contract Documents entitled "South Valley Water Reclamation Facility – Project 5". The WORK is generally described in Specification Section 01110 - Summary of Work.

ARTICLE 2. CONTRACT TIMES

COMPLETION OF WORK: The WORK shall be completed as follows:

1. Contractor shall begin WORK as soon as the Notice to Proceed is issued following award of WORK. Notice to Proceed is planned for June 11, 2019. Work shall be substantially complete by April 30, 2021.

ARTICLE 3. LIQUIDATED DAMAGES

OWNER and the CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal proceeding the actual loss suffered by the OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and the CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay the OWNER $2,500.00, or as otherwise specified in the Supplementary General Conditions for each day that expires after the deadlines specified in Article 2 herein.

ARTICLE 4. CONTRACT PRICE

OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in current funds the amount set forth in the Bid Schedule(s).

ARTICLE 5. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by OWNER as provided in the General Conditions.

ARTICLE 6. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK consist of this Agreement (pages 00500-1 to 00500-6, inclusive) and the following attachments to this Agreement:

- Notice Inviting Bids (pages 00030-1 to 00030-2, inclusive).
- Instructions to Bidders (pages 00100-1 to 00100-5, inclusive).
- Bid Forms including the Bid, Bid Schedule(s), information required of Bidder, Bid Bond, and all required certificates and affidavits (pages 00300-1 to 00300-9 and 00310-1 to 00310-2, inclusive).
- Performance Bond (pages 00610-1 to 00610-1, inclusive).
- Payment Bond (pages 00620-1 to 00620-1, inclusive).
- General Conditions (pages 00700-1 to 00700-36, inclusive).
- Supplementary General Conditions (pages 00800-1 to 00800-7, inclusive).
- Supplementary General Conditions (Utah) (pages 00810-1 to 00810-4, inclusive).
- Technical Specifications consisting of Divisions and pages, as listed in the Table of Contents.
- Drawings, as listed in the Table of Contents/List of Drawings.
- Any such Addenda issued during the bidding process.
- Notice to Proceed.
- Change Orders which may be delivered or issued after Effective Date of this Agreement and are not attached hereto.

There are no Contract Documents other than those listed in this Article 6. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.03 of the General Conditions.

ARTICLE 7. ASSIGNMENTS

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

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have caused this Agreement to be executed the day and year first above written.

OWNER:
South Valley Water Reclamation Facility
By _____
(Jerry Knight, Board Chairman)

Attest _____

Address for giving notices:
South Valley Water Reclamation Facility
7495 South 1300 West
West Jordan, Utah 84084

Approved as to Form:

_____
(Signature)

_____
(Facility Attorney)

CONTRACTOR:
_____
By_____

[CORPORATE SEAL]

Attest_____

Address for giving notices:
_____
_____
_____

Agent for service of process: _____
_____

Telephone No. for Agent
_____

AGREEMENT CERTIFICATE

(if Corporation)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Board of Directors of the _____

_____

_____

a corporation existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of this Corporation, be and is hereby authorized to execute the Agreement dated _____, 20___, to the South Valley Water Reclamation Facility by this Corporation and that his/her execution thereof, attested by the Secretary of this Corporation, and with the Corporate Seal affixed, shall be the official act and deed of this Corporation."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the official seal of the corporation this _____, day of _____, 20___.

_____

Secretary

(SEAL)

AGREEMENT CERTIFICATE

(if Partnership)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Partners of the _____

_____

_____

a partnership existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____ of the Partnership, be and is hereby authorized to execute the Agreement dated_____, 20___, by and between this Partnership and South Valley Water Reclamation Facility by this Partnership and that his/her execution thereof, attested by the _____ shall be the official act and deed of this Partnership."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20___.

_____

AGREEMENT CERTIFICATE

(if Joint Venture)

STATE OF)

) SS:

COUNTY OF)

I HEREBY CERTIFY that a meeting of the Principals of the _____

_____

_____

a joint venture existing under the laws of the State of _____, held on _____, 20 _____, the following resolution was duly passed and adopted:

"RESOLVED, that _____, as _____of the Joint Venture, be and is hereby authorized to execute the Agreement dated_____, 20___, by and between this Joint Venture and South Valley Water Reclamation Facility and that his/her execution thereof, attested by the _____ shall be the official act and deed of this Joint Venture."

I further certify that said resolution is now in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand this _____, day of _____, 20___.

_____

DOCUMENT 00510

NOTICE OF AWARD

Issue Date:	MM/DD/YYYY	**Owner's Contract No.:**	**Project 5**
Owner:	South Valley Water Reclamation Facility	**Contractor's Project No.:**	Enter ##
Engineer:	Carollo Engineers, Inc.		
Project:	Project 5		
Bidder:	Click here to enter text.		
Bidder's Address:	Click here to enter text.		

Notice of Award To Bidder

You are notified that Owner has accepted your Bid dated , 2019, for the above Contract, and that you are the Successful Bidder and are awarded a contract for:

_____

(describe Work awarded)

The Contract Price of the awarded Contract is: $_____

Two unexecuted counterparts of the Document 00500 - Agreement accompany this Notice of Award, and the Contract Documents have been made available to Bidder electronically.

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 two counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security 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: _____

Authorized Signature: _____

By: _____ Title: _____

Copy: Engineer

END OF DOCUMENT

DOCUMENT 00550

NOTICE TO PROCEED

Owner:	South Valley Water Reclamation Facility		
Owner's Contract No.:	Project 5	**Effective Date of Contract:**	Click here to enter a date.
Contractor:	Click here to enter text.	**Contractor's Project No.:**	Click here to enter text.
Project Name:	Project 5		
Contract Name:	Click here to enter text.		
Engineer:	Carollo Engineers, Inc.	**Engineer's Project No.:**	10548A.10

To Contractor

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on
Enter Notice To Proceed Date.

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 Contract, the date of Substantial Completion is _____, and the date of readiness for final payment is_____ *or* the number of days to achieve Substantial Completion is _____, and the number of days to achieve readiness for final payment is _____.

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

- A Preconstruction conference to be held at **() on** _____ at South Valley Water Reclamation Facility. Representatives of Owner and Engineer will be present to discuss project. Contractor is required to attend and participate in the conference.

Owner Authorized Signature: _____

Printed Name: _____

Title: _____

Date Issued: _____

Copy: Engineer

END OF SECTION

DOCUMENT 00602

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

This escrow agreement is made and entered into by and between

_____

whose address is _____ hereinafter called “Owner,”

_____

whose address is _____hereinafter called “Contractor,” and

_____

whose address is _____ hereinafter called “Escrow Agent.”

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to Section 13-8-5 of Utah Code Annotated, the Contractor has the option to deposit securities with the Escrow Agent as a substitute for retention earnings required to be withheld by the Owner pursuant to the construction contract entered into between the Owner and Contractor for South Valley Water Reclamation Facility Project 5 in the amount of $_____ dated _____ (hereafter referred to as the "contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for the contract earnings, the Escrow Agent shall notify the Owner within ten days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the contract between the Owner and Contractor. Securities shall be held in the name of the _____and shall designate the Contractor as the beneficial owner.

2. The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the contract provision, provided that the Escrow Agent holds securities in the form and amount specified above.

3. When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until such time as the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

4. The Contractor shall be responsible for paying all fees for the expenses incurred by the Escrow Agent in administering the escrow account. These expenses and payment terms shall be determined by the Contractor and Escrow Agent.

5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on the interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.

6. The Contractor shall have the right to withdraw all or any part of the principal in the escrow account only by written notice to the Escrow Agent accompanied by written authorization from the Owner to the Escrow Agent that the Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

7. The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

8. Upon receipt of written notification from the Owner certifying that the contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the contract, the Escrow Agent shall release to the Contractor all securities and interest on deposit less escrow fees and charges of the escrow account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

9. The Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections above, inclusive, of this Agreement and the Owner and Contractor shall hold the Escrow Agent harmless from the Escrow Agent's release, conversion, and disbursement of the securities and interest as set forth above.

10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of the Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of the Owner:	On behalf of the Contractor:
Title	Title
Name	Name
Signature	Signature
Address	Address

On behalf of the Escrow Agent:

Title

Name

Signature

Address

At the time the escrow account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date first set forth above.

Owner	Contractor
Title	Title
Name	Name
Signature	Signature

END OF DOCUMENT

DOCUMENT 00610

SURETY'S AGREEMENT TO ASSIGNMENT

Surety hereby acknowledges and agrees the Assignment of Procurement Contract dated _____ by and between _____ (Supplier) and _____ (Owner) assigning and transferring to _____, the Contractor for General Construction Work, in accordance with the Contract Documents.

Surety further agrees that, upon assignment of the Procurement Contract, the Contractor for General Construction Work shall have all the rights previously conferred upon the Owner under the Procurement Performance Bond and Warranties therein contained.

(Corporate Seal) Surety

Company: _____

Signature: _____

Name/Title: _____

END OF DOCUMENT

SECTION 00620 – PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That _____ as

DESIGN-BUILDER,

and _____ as Surety,

are held and firmly bound unto South Valley Water Reclamation Facility hereinafter called "OWNER," in the sum of _____ dollars, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that said DESIGN-BUILDER has been awarded and is about to enter into the annexed Agreement with said OWNER to perform the WORK as specified or indicated in the Contract Documents entitled "South Valley Water Reclamation Facility – Project 5 - Phosphorus and Grit Removal Improvements".

NOW THEREFORE, if said DESIGN-BUILDER, or subcontractor, fails to pay for any materials, equipment, or other supplies, or for rental of same, used in connection with the performance of work contracted to be done, or for amounts due under applicable State law for any work or labor thereon, said Surety will pay for the same in an amount not exceeding the sum specified above, and, in the event suit is brought upon this bond, reasonable attorney's fees to be fixed by the court. This bond shall inure to the benefit of any persons, companies, or corporations entitled to file claims under applicable State law so as to give a right of action to them or their assigns in any suit brought upon this bond.

PROVIDED, that any alterations in the WORK to be done or the materials to be furnished, or changes in the time of completion, which may be made pursuant to the terms of said Contract Documents, shall not in any way release said DESIGN-BUILDER or said Surety thereunder, nor shall any extensions of time granted under the provisions of said Contract Documents release either said DESIGN-BUILDER or said Surety, and notice of such alterations or extensions of the Agreement is hereby waived by said Surety.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this_____ day of _____, 20____.

_____(SEAL)	_____(SEAL)
(DESIGN-BUILDER)	(Surety)
By: _____	By: _____
(Signature)	(Signature and SEAL)

(SEAL AND NOTARIAL ACKNOWLEDGEMENT OF SURETY)

- END OF BID FORMS -

DOCUMENT 00632

REQUEST FOR INFORMATION OR INTERPRETATION (RFI)

Owner:	Click here to enter text.	**Date:**	XX/XX/XXXX
Contractor:	Click here to enter text.	**Project No.:**	00000.00
Project Name:	Click here to enter text.	**RFI No.:**	000
RFI Title:	Click here to enter text.	**Spec/Dwg. Reference:**	00000

Information or Interpretation and Reason Requested		
Click here to enter text.		
Authored By: Click here to enter text.	**Date Submitted:**	XX/XX/XXXX

Response to Request:		
Click here to enter text.		
In the event, Contractor believes the RFI response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
Firm Name: Click here to enter text.	**Date Returned:**	XX/XX/XXXX
Signature:	**Printed Name:**	

END OF DOCUMENT

SECTION 00700
GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents and printed with initial or all capital letters, the following terms have the meanings indicated:

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the OWNER and the CONTRACTOR for the performance of the WORK pursuant to the Contract Documents. Documents incorporated into the contract by reference become part of the contract and of the Agreement.

Application for Payment - The form furnished by the ENGINEER and completed by the CONTRACTOR to request progress or final payment including supporting documentation to substantiate the amounts for which payment is requested.

Bid - The offer or proposal of a Bidder, submitted on the prescribed form, setting forth the price or prices for the WORK to be performed.

Bidder - Any person, firm or corporation submitting a Bid for the WORK.

Bonds - Bid, Performance and Payment Bonds and other instruments which protect the OWNER against loss due to inability or refusal of the CONTRACTOR to perform pursuant to the Contract Documents.

Change Order - A document recommended by the OWNER'S REPRESENTATIVE, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The documents which comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK, consisting of the Drawings, Technical Specifications, General Conditions, Supplementary General Conditions, Notice Inviting Bids, Instructions to Bidders, Addenda, CONTRACTOR's Bid, Information Required of Bidder, Agreement, Performance Bond, Payment Bond, Notice To Proceed and Change Orders. Only printed or hard copies of the documents listed above are Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR for completion of the WORK under the terms and conditions of the Contract Documents.

Contract Time - The number of successive Days or the date stated in the Contract Documents for Substantial Completion of the WORK. The Contract Time begins to run on the date specified in the Notice to Proceed.

CONTRACTOR - The person, firm, or corporation with whom the OWNER has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.

Defective Work - Work that: is unsatisfactory, faulty, or deficient; does not conform to the Contract Documents; does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; has been damaged prior to the ENGINEER's recommendation of final payment.

Drawings - The drawings, plans, maps, profiles, diagrams, and other graphic representations which show the character, location, nature, extent, and scope of the WORK.

Effective Date of the Agreement - The date indicated in the Agreement on which it was executed.

ENGINEER - The person, firm or corporation named as such in the Contract Documents.

Field Order - A written order issued by the OWNER which requires minor changes in the WORK, but which does not involve a change in the Contract Price or Contract Time.

General Requirements - Division 1 of the Technical Specifications.

Laws and Regulations; Laws or Regulations - Includes any and all applicable state, federal and local statutes, common law, rules, regulations, ordinances, codes, and/or orders.

Notice of Award - The OWNER's written notice to the apparent successful Bidder stating that upon compliance with the conditions precedent enumerated therein by the apparent successful Bidder within the time specified, the OWNER will enter into the Agreement.

Notice to Proceed - The OWNER's written notice to the CONTRACTOR authorizing the CONTRACTOR to proceed with the work and establishing the date of commencement of the Contract Time.

OWNER - SOUTH VALLEY WATER RECLAMATION FACILITY.

OWNER'S REPRESENTATIVE - The authorized representative of the OWNER who is assigned to the site or any part thereof.

Partial Utilization - Placing a portion of the WORK in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion of the WORK.

Project - A unit of total construction of which the WORK to be provided under the Contract Documents, may be the whole, or a part thereof.

Shop Drawings - All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR to illustrate some portion of WORK and all illustrations, brochures, standard schedules, performance charts, instruction, and diagrams to illustrate material or equipment for some portion of the WORK.

Specifications - (Same definition as for Technical Specifications hereinafter).

Subcontractor - An individual, firm, or corporation having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a part of the WORK.

Substantial Completion - That state of construction when the WORK has progressed to the point where, in the opinion of the OWNER as evidenced by the Notice of Substantial Completion, it is

sufficiently complete, in accordance with the Contract Documents, so that the WORK can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to any work refer to substantial completion thereof.

Supplementary General Conditions - The part of the Contract Documents which makes additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman, or vendor.

Technical Data - The factual information contained in reports describing physical conditions, including: exploration method, plans, logs, laboratory test methods and factual data. Technical Data does not include conclusions, interpretations, interpolations, extrapolations or opinions contained in reports or reached by the CONTRACTOR.

Technical Specifications - Those portions of the Contact Documents consisting of the General Requirements and written technical descriptions of products and execution of the WORK.

Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments and any encasements containing such facilities which have been installed under ground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK - The entire construction required to be furnished under the Contract Documents. WORK is the result of performing services, furnishing labor and supervision, and furnishing and incorporating materials and equipment into the construction, all as required by the Contract Documents.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 DELIVERY OF BONDS/INSURANCE CERTIFICATES

A. The CONTRACTOR shall deliver to the OWNER the Bonds and insurance certificates required by the Contract Documents within ten (10) days after receiving the Notice of Award from the OWNER.

2.02 COPIES OF DOCUMENTS

A. The OWNER shall furnish the CONTRACTOR five copies of the Contract Documents (Specifications and reduced Drawings), together with two sets of full-scale Drawings. Additional quantities of the Contract Documents will be furnished at reproduction cost.

2.03 STARTING THE PROJECT

A. The CONTRACTOR shall begin construction of the WORK within 10 days after the commencement date stated in the Notice to Proceed, but shall not commence construction prior to the commencement date.

2.04 BEFORE STARTING CONSTRUCTION

A. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents to check and verify pertinent figures and dimensions shown thereon with all applicable field measurements. The CONTRACTOR shall promptly report in writing to the OWNER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the OWNER before proceeding with any work affected thereby.

B. The CONTRACTOR shall submit to the OWNER for review those documents called for under the Section entitled “Contractor Submittals” in the General Requirements.

2.05 PRECONSTRUCTION CONFERENCE

A. The CONTRACTOR shall attend a preconstruction conference with the OWNER, the ENGINEER and others as appropriate to discuss the construction of the WORK in accordance with the Contract Documents.

2.06 FINALIZING SCHEDULES

A. At least 7 days before the CONTRACTOR's submittal of its first Application for Payment, the CONTRACTOR, the OWNER, and others as appropriate will meet to finalize the schedules submitted in accordance with the General Requirements.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 INTENT

A. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the WORK. The Contract Documents are complementary, what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

B. It is the intent of the Contract Documents to describe the WORK, as completely as possible and in a functional manner. The WORK is intended to be constructed in accordance with the Contract Documents. All work, materials, or equipment that may be reasonably inferred from the Contract Documents as being required to produce the completed work shall be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials, or equipment such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals, or codes or any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.

C. If, during the performance of the WORK, the CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, the CONTRACTOR shall immediately report it to the OWNER in writing and before proceeding with the work affected thereby. The OWNER shall then make a written interpretation, clarification, or correction.

3.02 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. In resolving issues resulting from conflicts, errors, or discrepancies in any of the Contract Documents, or the order of precedence shall be as follows:

1. Change Orders
2. Agreement
3. Addenda
4. Supplementary General Conditions
5. General Conditions
6. Technical Specifications
7. Referenced Standard Specifications
8. Drawings
9. Contractor's Bid (Bid Form).

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail drawings govern over general drawings

3. Addenda/change order drawings govern over general drawings

4. Contract Drawings govern over standard drawings.

3.03 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS

A. The Contract Documents may be amended by a Change Order (pursuant to Article 10) to provide for additions, deletions or revisions in the WORK or to modify terms and conditions.

3.04 REUSE OF DOCUMENTS

A. Neither the CONTRACTOR, Subcontractor, Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without the written consent of the OWNER and the ENGINEER.

ARTICLE 4 - AVAILABILITY OF LANDS: PHYSICAL CONDITIONS, REFERENCE POINTS

4.01 AVAILABILITY OF LANDS

A. The OWNER shall furnish the lands, rights-of-way and easements upon which the WORK is to be performed and for access thereto, together with other lands designated for the use of the CONTRACTOR in the Contract Documents. Easements for permanent structures or permanent changes in existing major facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment. The CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement agreement has been executed by the CONTRACTOR and the property owner, and a copy of the easement furnished to the ENGINEER prior to its use. Neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any properties.

4.02 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES

A. Explorations and Reports: The Supplementary General Conditions may identify exploration reports and subsurface conditions tests at the site that have been utilized by the OWNER in the preparation of the Contract Documents. The CONTRACTOR may rely upon the accuracy of the Technical Data contained in these reports. The CONTRACTOR is responsible for the interpretation, extrapolation or interpolation of all technical as well as nontechnical data and its reliance on the completeness, opinions and interpretation of the reports.

B. Existing Structures: The Supplementary General Conditions identify the drawings of physical conditions in or relating to existing surface and subsurface structures (except

Underground Utilities referred to in Paragraph 4.04 herein) which are at or contiguous to the site that have been utilized by the OWNER in the preparation of the Contract Documents. The CONTRACTOR is responsible for the interpretation, extrapolation or interpolation of all technical as well as nontechnical data and its reliance on the completeness, opinions and interpretation of the reports.

4.03 DIFFERING SITE CONDITIONS

A. The CONTRACTOR shall notify the OWNER upon encountering any of the following unforeseen conditions, hereinafter called "differing site conditions," during the prosecution of the WORK. The CONTRACTOR's notice to the OWNER shall be in writing and delivered before the differing site conditions are disturbed, but in no event later than 14 days after their discovery.

1. Subsurface or latent physical conditions at the site of the WORK which could not reasonably have been discovered through diligent inspection by CONTRACTOR before his Bid was submitted which differs materially from those indicated, described, or delineated in the Contract Documents including those reports and documents discussed in Paragraph 4.02; and

2. Physical conditions at the site of the WORK of an unusual nature which could not reasonably have been discovered through diligent inspection by CONTRACTOR before his Bid was submitted and which differ materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents including those reports and documents discussed in Paragraph 4.02.

B. The OWNER will review the alleged differing site conditions; determine the necessity of obtaining additional explorations or tests with respect to verifying their existence and extent.

C. If the OWNER concludes that because of newly discovered conditions a change in the Contract Documents is required, a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the differing site conditions.

D. In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to the differing site conditions. If the OWNER and the CONTRACTOR are unable to agree as to the amount or length of the Change Order, a claim may be made as provided in Articles 11 and 12.

E. The CONTRACTOR's failure to give written notice of differing site conditions within 14 days of their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith, whether direct or consequential in nature.

4.04 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER by the owners of Underground Utilities or by others. Unless it is expressly provided in the Supplementary General

Conditions, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any Underground Utilities information or data. The CONTRACTOR's responsibility relating to underground utilities are: review and check all information and data, locate all Underground Utilities shown or indicated in the Contract Documents, coordinate the WORK with the owners of Underground Utilities during construction, safeguard and protect the Underground Utilities, and repair any damage to Underground Utilities resulting from the WORK. The cost of all these activities will be considered as having been included in the Contract Price.

B. Not Shown or Indicated: If an Underground Utility not shown or indicated in the Contract Documents is uncovered or revealed at or contiguous to the site and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of the Underground Utility, give written notice of the location to that owner and notify the OWNER.

4.05 REFERENCE POINTS

A. The OWNER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the CONTRACTOR in laying out the WORK. Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.

B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks. In case of their removal or destruction by its own employees or by its subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of reference points by professionally qualified personnel at no additional cost to the OWNER.

ARTICLE 5 - BONDS AND INSURANCE

5.01 PERFORMANCE, PAYMENT AND OTHER BONDS

A. The CONTRACTOR shall furnish Performance and Payment Bonds, each in the amount of 100% of the Contract Price as security for the faithful performance and payment of all the CONTRACTOR's obligations under the Contract Documents. The Performance Bond shall remain in effect at least until one year after the date of Notice of Completion, except as otherwise provided by Law or Regulation or by the Contract Documents. After the OWNER issues the Notice of Completion, the amount of the Performance Bond may be reduced to 10 percent of the Contract Price, or $1,000, whichever is greater. The CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary General Conditions.

B. If the surety on any Bond furnished by the CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days after written approval by the OWNER of a substitute Bond and Surety substitute the approved Bond and Surety.

5.02 INSURANCE

A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. This insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever is greater. The CONTRACTOR's liabilities under the Agreement shall not be deemed limited in any way to the insurance coverage required.

B. The CONTRACTOR shall furnish the OWNER with certificates indicating the type, amount, class of operations covered, effective dates and expiration dates of all policies. All insurance policies purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 30 days' prior written notice has been given to the OWNER by certified mail. Contract or certificate terms which state that reasonable efforts will be made to notify the OWNER prior to cancellation, change or renewal of the policy are not acceptable. All insurance shall remain in effect until the OWNER issues the Notice of Final Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing defective work in accordance with Paragraph 13.01B or completing punch list items required by the Notice of Substantial Completion. In addition, the insurance required herein (except for Worker's Compensation and Employer's Liability) shall name the OWNER, the ENGINEER, and their officers, agents, and employees as "additional insured" under the policies. All liability insurance policies shall be occurrence and not claims made policies.

1. Workers' Compensation and Employer's Liability: This insurance shall protect the CONTRACTOR against all claims under applicable state workers' compensation laws. The CONTRACTOR shall also be protected against claims for injury, disease, or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" endorsement. The CONTRACTOR shall require each subcontractor similarly to provide Workers' Compensation Insurance for all of the latter's employees to be engaged in the WORK unless its employees are covered by the protection afforded by the CONTRACTOR's Workers' Compensation Insurance. In the event a class of employees is not protected under the Workers' Compensation Statute, the CONTRACTOR or Subcontractor, as the case may be, shall provide adequate employer's liability insurance for the protection of its employees not protected under the statute.

2. Comprehensive General Liability: This insurance shall be written in comprehensive form and shall protect the CONTRACTOR against all claims arising from injuries to persons other than its employees and damage to property of the OWNER or others arising out of any act or omission of the CONTRACTOR or its agents, employees or subcontractors. The policy shall include the following endorsements: (1) Protective Liability endorsement to insure the contractual liability assumed by the CONTRACTOR under the indemnification provisions in these General Conditions; (2) Broad Form Property Damage endorsement; (3) Personal Injury endorsement to cover personal injury liability for intangible harm. The Comprehensive General Liability coverage shall contain no exclusion relative to blasting, explosion, collapse of building, or damage to underground structures.

3. Comprehensive Automobile Liability: This insurance shall be written in comprehensive form. The policy shall protect the CONTRACTOR against all claims for injuries to employees, members of the public and damage to property of others arising from the use of CONTRACTOR's motor vehicles, whether they are owned, non-owned, or hired, and whether used or operated on or off the site. The motor vehicle insurance required under this paragraph shall include: (a) motor vehicle liability coverage; (b) personal injury protection coverage and benefits; (c) uninsured motor vehicle coverage; and (d) underinsured motor vehicle coverage.

4. Subcontractor's Insurance: The CONTRACTOR shall require each of its subcontractors to procure and to maintain Comprehensive General Liability Insurance and Comprehensive Automobile Liability Insurance of the type and in the amounts specified in the Supplementary General Conditions or insure the activities of its subcontractors in the CONTRACTOR's own policy, in like amount.

5. Builder's Risk: This insurance shall be of the "all risk" type, shall be written in completed value form, and shall protect the CONTRACTOR, the OWNER, and the ENGINEER against damage to buildings, structures, materials and equipment. The amount of this insurance shall not be less than the insurable value of the WORK at completion. Builder's risk insurance shall provide for losses to be payable to the CONTRACTOR, the OWNER, and the ENGINEER as their interests may appear. The policy shall contain a provision that in the event of payment for any loss under the coverage provided, the insurance company shall have no rights of recovery against the CONTRACTOR, the OWNER, or the ENGINEER. The Builder's Risk policy shall insure against all risks of direct physical loss or damage to property from any external cause including flood and earthquake. Allowable exclusions, if any, shall be as specified in the Supplementary General Conditions.

ARTICLE 6 - CONTRACTOR RESPONSIBILITIES

6.01 SUPERVISION AND SUPERINTENDENCE

A. The CONTRACTOR shall supervise and direct the WORK competently and efficiently, devoting the attention and applying the skills and expertise necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the finished WORK complies accurately with the Contract Documents.

B. The CONTRACTOR shall employ the superintendent named in "Information Required of Bidder" on the work site at all times during the progress of the WORK. The superintendent shall not be replaced without the OWNER's written consent. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER.

C. The CONTRACTOR's superintendent, or OWNER approved representative shall be present at the site of the WORK at all times while work is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until the superintendent is again present at the site.

6.02 LABOR, MATERIALS, AND EQUIPMENT

A. The CONTRACTOR shall provide skilled, competent and suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall at all times maintain good discipline and order at the site.

B. Except in connection with the safety or protection of persons at the WORK, or property at the site or adjacent thereto, all work at the site shall be performed during regular working hours (7:00 a.m. - 6:00 p.m., Monday through Friday), and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday observed by the OWNER without the OWNER's written consent given after prior written notice to the OWNER. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the OWNER in writing. Additional compensation will be paid the CONTRACTOR for overtime work in the event extra work is ordered by the OWNER and the Change Order specifically authorizes the use of overtime work, but only to the extent that the CONTRACTOR pays overtime wages on a regular basis being paid (>40 hours per week) for overtime work of a similar nature in the same locality.

C. All costs of inspection and testing performed during overtime work approved solely for the convenience of the CONTRACTOR shall be borne by the CONTRACTOR. The OWNER shall have the authority to deduct the costs of all inspection and testing from any partial payments otherwise due to the CONTRACTOR.

D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish, erect, maintain and remove the construction plant, and temporary works and assume full responsibility for all materials, equipment, labor, transportation, construction equipment, machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities and all other facilities and incidentals necessary for the furnishing, performance testing, start-up and completion of the WORK.

E. All materials and equipment incorporated into the WORK shall be of new and good quality, except as otherwise provided in the Contract Documents. If required by the OWNER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. The CONTRACTOR shall apply, install, connect, erect, use, clean, and condition all material and equipment in accordance with the instructions of the manufacturer and Supplier except as otherwise provided in the Contract Documents.

6.03 ADJUSTING PROGRESS SCHEDULE

A. The CONTRACTOR shall submit any adjustments in the progress schedule to the OWNER for acceptance in accordance with the provisions for "Contractor Submittals" in the General Requirements.

6.04 SUBSTITUTES AND "OR-EQUAL" ITEMS

A. The CONTRACTOR shall submit proposed substitutes and "or-equal" items in accordance with the provisions for "Contractor Submittals" in the General Requirements.

6.05 SUBCONTRACTORS, SUPPLIERS, AND OTHERS

A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its subcontractors and their employees to the same extent as the CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this paragraph shall create any contractual relationship between any subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the Agreement.

6.06 PERMITS

A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including furnishing the insurance and bonds required by such agencies. The costs incurred by the CONTRACTOR in compliance with this paragraph shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids, including all utility connection charges for utilities required by the WORK.

B. The CONTRACTOR shall pay all license fees and royalties and assume all costs when any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others when issued in the construction of the WORK or incorporated into the WORK. If a particular invention, design, process, product, or device is specified in the Contract Documents for incorporation into or use in the construction of the WORK and if to the actual knowledge of the OWNER or the 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 these rights shall be disclosed by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents.

6.07 LAWS AND REGULATIONS

A. The CONTRACTOR shall observe and comply with all Laws and Regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in the Contract Documents in relation to any Laws or Regulations, the CONTRACTOR shall report the same in writing to the OWNER. Notwithstanding any immunity otherwise provided by applicable workers' compensation statutes, the CONTRACTOR shall indemnify, defend and hold harmless the OWNER, the ENGINEER and their officers, agents, and employees against all claims arising from violation of any Laws or Regulations, by CONTRACTOR or by its employees or subcontractors. This indemnity provision is intended to provide the greatest protection of the OWNER and ENGINEER allowed by law. Any particular law or regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations.

6.08 EQUAL OPPORTUNITY

A. The CONTRACTOR agrees not to discriminate against anyone because of race, national origin, ancestry, color, religion, sex, age, or disability. The CONTRACTOR agrees to abide by all applicable civil rights Laws and Regulations.

6.09 TAXES

A. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES

A. The CONTRACTOR shall confine construction equipment, stored materials and equipment, and other operations of workers to (1) the Project site, (2) the land and areas identified for the CONTRACTOR's use in the Contract Documents, and (3) other lands whose use is acquired by Laws and Regulations, rights-of-way, permits, and easements. The CONTRACTOR shall be fully responsible to the owner and occupant of such lands for any damage to the lands or areas contiguous thereto, resulting from the performance of the WORK or otherwise. Should any claim be made against the OWNER or the ENGINEER by owner or occupant of lands because of the performance of the WORK, the CONTRACTOR shall promptly settle the claim by agreement, or resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers, architects, attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any owner or occupant of land against the OWNER or the ENGINEER to the extent the claim is based or arises out of the CONTRACTOR's performance of the WORK.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The 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 or near the work site and other persons and organizations who may be affected by activities on or near the work site.

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, and utilities not designated for removal, relocation, or replacement in the course of construction.

B. The CONTRACTOR shall comply with all applicable Laws and Regulations (whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Unless the CONTRACTOR otherwise designates in writing a different individual as the responsible individual, the CONTRACTOR's superintendent shall be CONTRACTOR's representative at the site whose duties shall include providing all persons on the work site with a reasonably safe environment and the prevention of accidents.

6.12 SHOP DRAWINGS AND SAMPLES

A. After checking and verifying all field measurements and after complying with the applicable procedures specified in the General Requirements, the CONTRACTOR shall submit all shop drawings to the OWNER for review and approval in accordance with the approved schedule for shop drawing submittals specified in the General Requirements.

B. The CONTRACTOR shall also submit to the OWNER for review and approval all samples in accordance with the approved schedule of sample submittals specified in the General Requirements.

C. Before submitting shop drawings or samples, the CONTRACTOR shall determine and verify all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and review or coordinate each shop drawing or sample with other shop drawings and samples and with the requirements of the WORK and the Contract Documents. The CONTRACTOR shall stamp each shop drawing, certifying his review. If the same shop drawings require re-submittal more than two times, the CONTRACTOR shall pay for the costs of ENGINEER’s and OWNER’s subsequent review(s).

6.13 CONTINUING THE WORK

A. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any dispute or disagreement, except as the CONTRACTOR and the OWNER may otherwise mutually agree in writing.

6.14 INDEMNIFICATION

A. To the fullest extent permitted by Laws and Regulations, and notwithstanding any immunity the CONTRACTOR might otherwise have under applicable workers' compensation statutes, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, and their officers, agents, and employees, against and from all claims and liability arising under or by reason of, or claimed by others to arise under or by reason of, the Agreement or any performance of the WORK, but not from the sole negligence or willful misconduct of the OWNER and/or the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:

1. Liability or claims resulting in whole or in part, directly or indirectly from, or claimed by others to result in whole or in part, directly or indirectly from, the negligence, carelessness or other fault of the CONTRACTOR or its employees, Subcontractors, Suppliers or agents in the performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction;

2. Liability or claims arising in whole or in part, directly or indirectly, from or based on, or claimed by others to arise in whole or in part, directly or indirectly, from or based on, the violation of any Laws or Regulations by the CONTRACTOR or its employees, Subcontractors, Suppliers or agents;

3. Liability or claims arising in whole or in part, directly or indirectly, from, or claimed by others to arise in whole or in part, directly or indirectly from, the use or manufacture by the CONTRACTOR, or its Subcontractors, Suppliers or agents in the performance of this Agreement of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliance, unless otherwise specifically stipulated in this Agreement.

4. Liability or claims arising in whole or in part, directly or indirectly, from, or claimed by others to arise in whole or in part, directly or indirectly from, the breach of any warranties, whether express or implied, made by the CONTRACTOR or its Subcontractors, Suppliers or agents;

5. Liabilities or claims arising in whole or in part, directly or indirectly, from, or claimed by others to arise in whole or in part, directly or indirectly from, the willful misconduct of the CONTRACTOR or its Subcontractors, Suppliers or agents; and,

6. Liabilities or claims arising in whole or in part, directly or indirectly, from, or claimed by others to arise in whole or in part, directly or indirectly from, any breach of the obligations assumed herein by the CONTRACTOR or its Subcontractors, Suppliers or agents.

7. If for any reason the OWNER is required to pay damages in proportion to the fault of the OWNER notwithstanding the above indemnity provisions, CONTRACTOR shall, notwithstanding any workers' compensation immunity, indemnify and hold OWNER harmless from the payment of any increased damages OWNER is required to pay which result from a reapportionment of the fault of the CONTRACTOR, or any of its employees, Subcontractors or Suppliers pursuant to Utah Code Annotated section 78b-5-818, Comparative negligence.

B. The CONTRACTOR shall reimburse the OWNER, and the ENGINEER for all costs and expense, (including but not limited to fees and charges of engineers, architects, attorneys, and other professional and court costs) incurred by the OWNER, and the ENGINEER in enforcing the provisions of this Paragraph.

C. The indemnification obligation under this Paragraph shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

6.15 CONTRACTOR'S DAILY REPORTS

A. The CONTRACTOR shall complete a daily report indicating manpower, major equipment, subcontractors, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms prepared by the CONTRACTOR and acceptable to the OWNER, and shall be submitted to the OWNER at the conclusion of each workday.

6.16 ASSIGNMENT OF CONTRACT

A. The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the Agreement or any portion thereof, or its right, title, or interested therein, or obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the Agreement may be terminated at the option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

ARTICLE 7 - OTHER WORK

7.01 RELATED WORK

A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts for the performance of the other work which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents written notice thereof will be given to the CONTRACTOR prior to commencing any other work.

B. The CONTRACTOR shall afford each utility owner and other contractor who is a party to a direct contract (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the

execution of the other work. The CONTRACTOR shall properly connect and coordinate the WORK with the other work. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to make its several parts come together properly and integrate with the other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and shall only cut or alter their work with the written consent of the OWNER and the others whose work will be affected.

C. If the proper execution or results of any part of the CONTRACTOR's work depends upon the integration of work with the completion of other work by any other contractor or utility owner (or the OWNER), the CONTRACTOR shall inspect and report to the OWNER in writing all delays, defects, or deficiencies in the other work that renders it unavailable or unsuitable for proper integration with the CONTRACTOR's work. Except for the results or effects of material latent defects and deficiencies in the other work which could not reasonably have been discovered by the CONTRACTOR, the CONTRACTOR's failure to report will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's work and as a waiver of any claim for additional time or compensation associated with the integration of the CONTRACTOR's work with the other work.

7.02 COORDINATION

A. If the OWNER contracts with others for the performance of other work on the Project at the site, a coordinator will be identified to the extent that the coordinator can be identified at this time, in the Supplementary General Conditions and delegated the authority and responsibility for coordination of the activities among the various contractors. The specific matters over which the coordinator has authority and the extent of the coordinator's authority and responsibility will be itemized in the Supplementary General Conditions or in a notice to the CONTRACTOR at such time as the identity of the coordinator is determined.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 COMMUNICATIONS

A. The OWNER shall issue all its communications directly to the CONTRACTOR.

8.02 PAYMENTS

A. The OWNER shall make payments to the CONTRACTOR as provided in Article 14.

8.03 LANDS, EASEMENTS, AND SURVEYS

A. The OWNER's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. The OWNER shall identify and make available to the CONTRACTOR copies of exploration reports and subsurface conditions tests at the site and in existing structures which have been utilized in preparing the Drawings and Technical Specifications as set forth in Paragraph 4.02

8.04 CHANGE ORDERS

A. The OWNER shall execute approved Change Orders for the conditions described in Paragraph 10.01D.

B. When funds are not budgeted to support continuation of performance in a subsequent fiscal period, the contract shall be canceled and the contractor shall be reimbursed for the reasonable value of any non-recurring costs incurred but not amortized in the price of the supplies or services delivered under the contract.

8.05 INSPECTIONS AND TESTS

A. The OWNER's responsibility with respect to inspection, tests, and approvals is set forth in Paragraph 13.03B.

8.06 SUSPENSION OF WORK

A. In connection with the OWNER's right to stop work or suspend work, see Paragraphs 13.04 and 15.01, Paragraphs 15.02 and 15.03 deal with the OWNER's right to terminate services of the CONTRACTOR under certain circumstances.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 OWNER'S REPRESENTATIVE

A. The OWNER will designate a representative during the construction period. The duties, responsibilities and the limitations of authority of the OWNER's representative during construction are summarized hereafter.

9.02 VISITS TO SITE

A. The ENGINEER will make visits to the site during construction to observe and inspect the progress and quality of the WORK and to determine, in general if the WORK is proceeding in accordance with the Contract Documents.

9.03 PROJECT REPRESENTATIVE

A. The OWNER'S Representative will observe and inspect the performance of the WORK. The Owner's Representative and/or other authorized agents of the OWNER shall serve as the primary contact(s) with the Contractor during the construction phase. All submittals shall be delivered to, and communications between the OWNER and the CONTRACTOR shall be handled by, the Owner's Representative and/or other authorized agents. The Owner's Representative shall be the primary authorized representative of the OWNER in all on-site relations with the CONTRACTOR.

9.04 CLARIFICATIONS AND INTERPRETATIONS

A. The OWNER will issue, with reasonable promptness written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the OWNER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents.

9.05 AUTHORIZED VARIATIONS IN WORK

A. The OWNER may authorize minor variations in the WORK as described in the Contract Documents when such variations do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These variations shall be accomplished by issuing a Field Order. The issuance of a Field Order requires the CONTRACTOR to perform the work described in the order promptly. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Article 11 and 12.

9.06 REJECTION OF DEFECTIVE WORK

A. The OWNER is authorized to reject work which the OWNER believes to be defective and require special inspection or testing of the WORK as provided in Paragraph 13.03G, whether or not the WORK is fabricated, installed, or completed.

9.07 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

A. The OWNER will review for approval all CONTRACTOR submittals, including shop drawings, samples, substitutes, and "or equal" items, etc., in accordance with the procedures set forth in the General Requirements.

B. In connection with the OWNER’s REPRESENTATIVE responsibilities as to Change Orders, see Articles 10, 11, and 12.

C. In connection with the OWNER responsibilities as to Applications for Payment, see Article 14.

9.08 DISPUTES, CLAIMS AND OTHER MATTERS

A. All claims, disputes, and other matters concerning the acceptability of the WORK, the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK, and claims for changes in the Contract Price or Contract Time under Articles 11 and 12 will be referred to the OWNER in writing with a request for formal decision in accordance with this paragraph. The OWNER will render a decision in writing within 30 days of receipt of the request. Written notice of each claim, dispute, or other matter will be delivered by the CONTRACTOR to the OWNER promptly (but in no event later than 30 days) after the occurrence of the event. Written supporting data will be submitted to the OWNER with the written claim unless the OWNER allows an additional period of time to ascertain more accurate data in support of the claim.

B. When reviewing the claim or dispute, the OWNER’S REPRESENTATIVE will not show partiality to the OWNER or the CONTRACTOR and will incur no liability in connection with any interpretation or decision rendered in good faith. The OWNER’S REPRESENTATIVE rendering of a decision with respect to any claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 14.12) shall be a condition precedent to the OWNER's or the CONTRACTOR's exercise of their rights or remedies under the

Contract Documents or by Law or Regulations with respect to the claim, dispute, or other matter.

9.09 LIMITATION ON ENGINEER'S RESPONSIBILITIES

A. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the OWNER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the OWNER any duty or authority to supervise or direct the performance of the WORK.

B. Neither the OWNER nor the ENGINEER will be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction not specified in the Contract Documents. Neither the OWNER nor the ENGINEER shall have any responsibility for safety precautions or programs on site or for the safety of CONTRACTOR'S employees, Subcontractors, employees of Subcontractors, Suppliers, employees of Suppliers or others on site.

C. Neither the OWNER nor the ENGINEER will be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, Supplier, or any other person or organization performing any of the WORK to the extent that such acts or omissions are not reasonably discoverable considering the level of observation and inspection required by the ENGINEER's agreement with the OWNER.

ARTICLE 10 - CHANGES IN THE WORK

10.01 GENERAL

A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the OWNER. Upon receipt of any of these documents, the CONTRACTOR shall promptly proceed with the work involved pursuant to the applicable conditions of the Contract Documents.

B. If the OWNER and the CONTRACTOR are unable to agree upon the increase or decrease in the Contract Price or an extension or shortening of the Contract Time, if any, that should be allowed as a result of a Field Order, a claim may be made therefor as provided in Articles 11 and 12.

C. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work provided in the Paragraph 13.03G.

D. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:

1. Changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.01A;

2. Changes required because of acceptance of defective work under Paragraph 13.06;

3. Changes in the Contract Price or Contract Time which are agreed to by the parties; or

4. Any other changes agreed to by the parties.

5. Any construction contract change order which increases the contract amount shall have the prior written certification of the District's controller that the expenditure of the change order amount is properly authorized by the District's board of trustees consistent with the District's budget and financial management policies and the instructions of the board of trustees.

E. If the provisions of any Bond require notice of any change to be given to a surety, the giving of these notices will be the CONTRACTOR's responsibility. The CONTRACTOR shall provide for the amount of each applicable Bond to be adjusted accordingly.

10.02 ALLOWABLE QUANTITY VARIATIONS

A. Whenever a unit price and quantity have been established for a bid item in the Contract Documents, the quantity stated may be increased or decreased to a maximum of 25 percent with no change in the unit price. An adjustment in the quantity in excess of 25 percent will be sufficient to justify a change in the unit price. All changes in the quantities of bid items shall be documented by Change Order.

B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover the eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, the price shall be determined in accordance with the provisions of Article 11.

ARTICLE 11 - CHANGE OF CONTRACT PRICE

11.01 GENERAL

A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. Except as directed by Change Orders, all duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR shall be at its expense without change in the Contract Price.

B. The Contract Price may only be changed by a Change Order. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the OWNER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the

amount of the claim with supporting data shall be delivered with the claim, unless the OWNER allows an additional period of time to ascertain more accurate data in support of the claim, and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of the occurrence of the event. If the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved, all claims for adjustment in the Contract Price shall be determined by the OWNER in accordance with Paragraph 9.08A. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph.

C. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved.

2. Mutual acceptance of a lump sum, which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.

3. On the basis of the cost of work (determined as provided in Paragraphs 11.02 and 11.03) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.04).

11.02 COST OF WORK (BASED ON TIME AND MATERIALS)

A. General: The term "cost of work" means the sum of all costs necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project.

B. Labor: The cost of labor used in performing work by the CONTRACTOR, a Subcontractor, or other forces will be the sum of the following:

1. The actual wages paid plus any employer payments to, or on behalf of workers for fringe benefits including health and welfare, pension, vacation, and similar purposes. The cost of labor may include the rates paid to foremen when determined by the OWNER that the services of foremen do not constitute a part of the overhead allowance.

2. All payments imposed by state and federal laws including, but not limited to, compensation insurance, and social security payments.

3. The amount paid for subsistence and travel required by collective bargaining agreements, or in accordance with the regular practice of the employer.

4. At the beginning of the extra work and as later requested by the OWNER, the CONTRACTOR shall furnish the OWNER proof of labor compensation rates being paid.

C. Materials: The cost of materials used in performing work will be the cost to the purchaser, whether CONTRACTOR or Subcontractor, from the Supplier thereof, except as the following are applicable:

1. Trade discounts available to the purchase shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.

2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual Supplier as determined by the OWNER. Markup except for actual costs incurred in the handling of such materials will not be allowed.

3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from these sources on extra work items or current wholesale price for the materials delivered to the work site, whichever is lower.

4. If, in the opinion of the OWNER, the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of the material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned, delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be made by the CONTRACTOR for costs and profit on such materials.

D. Equipment: The CONTRACTOR will be paid for the use of equipment at the rental rate listed for the equipment specified in the Rental Rate Blue Book published by Dataquest, Inc. The rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the Owner for the total period of use.

1. All equipment shall, in the opinion of the OWNER, be in good working condition and suitable for the purpose for which the equipment is to be used.

2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the OWNER, in duplicate, a description of the equipment and its identifying number.

3. Unless otherwise specified, manufacturers' ratings and manufacturer-approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

4. Individual pieces of equipment or tools having a replacement value of $100 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefore.

5. Rental time will not be allowed while equipment is inoperative due to breakdowns.

E. Equipment on the Work: The rental time to be paid for equipment used on the WORK shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location that requires no more moving time than that required to return it to its original location. Moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power. However, no payment will be made for loading and transporting costs when the equipment is used on other than the extra work even though located at the site of the extra work. The following shall be used in computing the rental time of equipment on the WORK.

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.

2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraph (3), (4), and (5), following.

3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.02D, herein.

4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the WORK, or in the absence of such labor, established by collective bargaining agreements for the type of workmen and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.02B, herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all payments made to on behalf of workers other than actual wages.

5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.04, herein.

11.03 SPECIAL SERVICES

A. Special work or services are defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following may be considered by the OWNER in making estimates for payment for special services:

1. When the OWNER and the CONTRACTOR, by agreement, determine that a special service or work is required which cannot be performed by the forces of the CONTRACTOR or those of any of its Subcontractors, the special service or work may be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the OWNER, invoices for special services or work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental cost.

2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may by agreement, be accepted as a special service and accordingly, the invoices from the work may be accepted without detailed itemization.

3. All invoices for special services will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.04, herein, an allowance of 5 percent will be added to invoices for special services.

B. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference hereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.04 CONTRACTOR'S FEE

A. Work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the OWNER, plus allowances for overhead and profit. For extra work involving a combination of increases and decreases in the WORK, the actual necessary cost will be the arithmetic sum of the additive and deductive costs. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, office expenses, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraphs 11.02B, C, and D herein, including extended overhead and home office overhead. The allowance for overhead and profit will be made in accordance with the following schedule:

OVERHEAD AND PROFIT ALLOWANCE

Labor ……	10 percent
Materials ……..	10 percent
Equipment ……...	10 percent

B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by a Subcontractor, and that the allowance specified herein shall be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost of work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent markup may be applied one time only for each separate work transaction.

ARTICLE 12 - CHANGE OF CONTRACT TIME

12.01 GENERAL

A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract time shall be based on written notice delivered by the CONTRACTOR to the OWNER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 30 days after such occurrence (unless the OWNER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. Claims for adjustment in the Contract Time shall be determined by the OWNER in accordance with Paragraph 9.08 if the OWNER's representative and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph.

B. The Contract Time will be extended in an amount equal to time lost if the CONTRACTOR makes a claim as provided in Paragraph 12.01A and the OWNER determines that the delay was caused by events beyond the control of the CONTRACTOR. Examples of events beyond the control of the CONTRACTOR include acts or neglect by the OWNER or others performing additional work as contemplated by Article 7, or by acts of God or of the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, labor disputes, sabotage, or freight embargoes.

C. All time limits stated in the Contract Documents are of the essence.

D. None of the aforesaid time extensions shall entitle the CONTRACTOR to any adjustment in the Contract Price or any damages for delay. Furthermore, the CONTRACTOR hereby indemnifies and holds harmless the OWNER and ENGINEER, their officers, agents and employees from and against all claims, damages, losses and expenses (including lost property and attorney's fees) arising out of or resulting from the temporary suspension of work whether for the OWNER's convenience as defined in Article 15.01A or for whatever other reasons including the stoppage of work by the OWNER for the CONTRACTOR's failure to comply with any order issued by the OWNER.

12.02 EXTENSIONS OF THE TIME FOR DELAY DUE TO INCLEMENT WEATHER

A. "Inclement weather" is any weather condition or conditions resulting immediately therefrom, causing the CONTRACTOR to suspend construction operations or preventing the CONTRACTOR from proceeding with at least 75 percent of the normal labor and equipment force engaged on the WORK.

B. Should the CONTRACTOR prepare to begin work at the regular starting time at the beginning of any regular work shift on any day on which inclement weather, or its effects on the condition of the WORK prevents work from beginning at the usual starting time and the crew is dismissed as a result thereof, the CONTRACTOR will not be charged for a working day whether or not conditions change thereafter during the day and the major portion of the day could be considered to be suitable for construction operations.

C. The CONTRACTOR shall base its construction schedule upon the inclusion of the number of days of inclement weather specified in the Supplementary General Conditions. No extension of the Contract Time due to inclement weather will be considered until after the stated number of days of inclement weather has been reached. However, no reduction in Contract Time will be made if the number of inclement weather days is not reached.

12.03 EXTENSIONS OF TIME FOR OTHER DELAYS

A. If the CONTRACTOR is delayed in completion of the WORK beyond the Contract Time, by acts of God or of the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, labor disputes, industry-wide shortage of raw materials, sabotage or freight embargoes, the CONTRACTOR shall be entitled to an adjustment in the Contract Time. No such adjustment will be made unless the CONTRACTOR shall notify the OWNER in writing of the causes of delay within 15 calendar days from the beginning of any such delay. The OWNER shall ascertain the facts and the extent of the delay. No adjustment in time shall be made for delays resulting from noncompliance with the Contract Documents, accidents, failure on the part of the CONTRACTOR to carry out the provisions of the Contract Documents including failure to provide materials, equipment or workmanship meeting the requirements of the Contract Documents; the occurrence of such events shall not relieve the CONTRACTOR from the necessity of maintaining the required progress.

B. If the CONTRACTOR is delayed in completing the WORK beyond the Contract Time by reason of shortages of raw materials required for CONTRACTOR-furnished items, the CONTRACTOR shall be entitled to an adjustment in the Contract Time in like manner as if the WORK had been suspended for the convenience and benefit of the OWNER; provided, however, that the CONTRACTOR shall furnish documentation acceptable to the OWNER that he placed or attempted to place firm orders with Suppliers at a reasonable time in advance of the required date of delivery of the items in question, that such shortages shall have developed following the date such orders were placed or attempts made to place same, that said shortages are general throughout the affected industry, that said shortages are shortages of raw materials required to manufacture CONTRACTOR furnished items and not simply failure of CONTRACTOR's Suppliers to manufacture, assemble or ship items on time, and that the CONTRACTOR shall, to the degree possible, have made revisions in the sequence of his operations, within the terms of the Contract Documents, to offset the expected delay. The CONTRACTOR shall notify the OWNER, in writing, concerning the cause of delay, within 15 calendar days of the beginning of such delay. The validity of any claim by the CONTRACTOR to an adjustment in the Contract Time shall be determined by the OWNER, and his findings thereon shall be based on the OWNER’s knowledge and observations of the events involved and documentation submitted by the CONTRACTOR, showing all applicable facts relative to the foregoing provisions. Only the physical shortage of raw materials will be considered under these provisions as a cause for adjustment of time and no consideration will be given to any claim that items could not be obtained at a reasonable, practical, or economical cost or price, unless it is shown to the satisfaction of the OWNER that such items could have been obtained only at exorbitant prices entirely out of line with current rates taking into account the quantities involved and the usual practices in obtaining such quantities.

C. If the CONTRACTOR is delayed in completion of the WORK by any act of the OWNER not authorized by the Contract Documents, an adjustment in the Contract Time will be made by the OWNER in like manner as if the WORK had been suspended for the convenience and benefit of the OWNER. In the event of such delay, the CONTRACTOR shall notify the OWNER in writing of the causes of delay within 15 calendar days from the beginning of any such delay.

ARTICLE 13 - WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.01 WARRANTY, GUARANTEE AND CORRECTION PERIOD

A. The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work, equipment, materials and workmanship are in accordance with the Contract Documents and are not defective. Reasonably prompt notice of defects discovered by the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.

B. If within one (1) year after the date of final completion, as set by the Contractor's Certificate of Final Completion, or a longer period of time prescribed by Laws or Regulations or by the terms of any applicable special guarantee or specific provisions of the Contract Documents, any part of the WORK is found to be defective, the OWNER shall notify the CONTRACTOR in writing and the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with the OWNER's written notification, either correct the defective work, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work. In the event the CONTRACTOR does not promptly comply with the notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the defective work corrected or rejected work removed and replaced. All direct, indirect, and consequential costs of the removal and replacement including but not limited to fees and charges of engineers, architects, attorneys and other professionals will be paid by the CONTRACTOR. This paragraph shall not be construed to limit nor diminish the CONTRACTOR's absolute guarantee to complete the WORK in accordance with the Contract Documents.

13.02 ACCESS TO WORK

A. The ENGINEER, other representatives of the OWNER, testing agencies, and governmental agencies with jurisdictional interests shall have access to the work at reasonable times for their observation, inspections, and testing. The CONTRACTOR shall provide proper and safe conditions for their access.

13.03 TESTS AND INSPECTIONS

A. The CONTRACTOR shall give the OWNER timely notice of readiness of the WORK for all required inspections, tests, or approvals.

B. If Laws or Regulations of any public body other than the OWNER, with jurisdiction over the WORK require any work to be specifically inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or

testing required in connection with the OWNER's acceptance of a Supplier of materials or equipment proposed as a substitution or "or-equal" to be incorporated in the WORK and of materials or equipment submitted for review prior to the CONTRACTOR's purchase for incorporation in the WORK. The cost of all inspections, tests, and approvals, with the exception of the above which are required by the Contract Documents, shall be paid by the OWNER (unless otherwise specified).

C. The OWNER will make, or have made, such inspections and tests as the OWNER deems necessary to see that the WORK is being accomplished in accordance with the Contract Documents. The CONTRACTOR, without additional cost to the OWNER, shall provide the labor and equipment necessary to make the WORK available for inspections. Unless otherwise specified in the Supplementary General Conditions, all other costs of inspection and testing will be borne by the OWNER. In the event the inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the OWNER, as well as the cost of subsequent re-inspection and retesting. Neither observations by the OWNER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by properly licensed organizations selected by the OWNER.

E. If any work (including the work of others) that is to be inspected, tested, or approved is covered without the OWNER’s written authorization, it must, if requested by the OWNER, be uncovered for testing, inspection, and observation. The uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR timely notified the OWNER of the CONTRACTOR's intention to cover the same and the OWNER failed to act with reasonable promptness in response to the notice.

F. If any work is covered contrary to the written request of the OWNER, it must, if requested by the OWNER, be uncovered for the OWNER’s observation at the CONTRACTOR's expense.

G. If the OWNER considers it necessary or advisable that covered work be observed, inspected or tested by the OWNER or others, the OWNER shall direct the CONTRACTOR to uncover, expose, or otherwise make available for observation, inspection, or testing that portion of the work in question. The CONTRACTOR shall comply with the OWNER’s direction and furnish all necessary labor, material, and equipment. If the work is defective, the CONTRACTOR shall bear all direct, indirect and consequential costs of uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction of the work, including, but not limited to, fees and charges for engineers, architects, attorneys, and other professionals. However, if the work is not defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both. The increase in Contract Time and Contract Price shall be the CONTRACTOR's actual time and costs directly attributable to uncovering and exposing the work. If the parties are unable to agree as to the amount or extent of the changes, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

13.04 OWNER MAY STOP THE WORK

A. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for the order has been eliminated. This right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.05 CORRECTION OR REMOVAL OF DEFECTIVE WORK

A. When directed by the OWNER, the CONTRACTOR shall promptly correct all defective work, whether or not fabricated, installed, or completed, or, if the work has been rejected by the OWNER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and consequential costs of correction or removal, including but not limited to fees and charges of engineers, architects, attorneys, and other professionals made necessary thereby. If the CONTRACTOR does not correct the defective work within 30 days, the OWNER may correct the WORK and charge the CONTRACTOR for the cost of correcting the defective WORK.

13.06 ACCEPTANCE OF DEFECTIVE WORK

A. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the work, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept the defective work. If any acceptance of defective work occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

ARTICLE 14 - PAYMENTS TO CONTRACTOR, LIQUIDATED DAMAGES AND COMPLETION

14.01 LUMP SUM BID

A. A schedule of values or lump sum price breakdown will serve as the basis for progress payments for a lump sum Bid and will be incorporated into the form of Application for Payment included in the Contract Documents.

14.02 UNIT PRICE BID

A. Progress payments for a unit price Bid will be based on the number of units completed.

14.03 APPLICATION FOR PROGRESS PAYMENT

A. Unless otherwise prescribed by the OWNER, on the 25th of each month, the CONTRACTOR shall submit to the OWNER for review and approval, an Application for Payment completed and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as required by the Contract Documents.

B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR's Total Earnings to Date, plus the Net Value of Materials On-site which have not yet been incorporated in the WORK.

C. The Net Payment Due to the CONTRACTOR shall be the above-mentioned sub-total, from which shall be deducted the retainage amount and the total amount of all previous payments made to the CONTRACTOR.

D. The OWNER may retain five percent of the amount otherwise due to the Contractor as retainage. Monies retained shall be placed in an interest-bearing account for the benefit of the CONTRACTOR.

E. Except as otherwise provided in the Supplementary General Conditions, the value of materials stored at the site shall be valued at 95 percent of the value of the materials. This amount shall be based upon the value of all acceptable materials and equipment stored at the site or at another location agreed to in writing by the OWNER; provided, each individual item has a value of more than $5000 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that the CONTRACTOR has received the materials and equipment free and clear of all liens, charges, security interests, and encumbrances (which are hereinafter referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER.

14.04 CONTRACTOR'S WARRANTY OF TITLE

A. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of final payment, free and clear of all liens.

14.05 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

A. The OWNER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the OWNER’s reasons for refusing to recommend payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the Application. Thirty days after presentation of the Application for Payment with the OWNER’s REPRESENTATIVE recommendation, the amount recommended will (subject to the provisions of Paragraph 14.05B) become due and when due will be paid by the OWNER to the CONTRACTOR.

B. The OWNER may refuse to make payment of the full amount recommended by the OWNER’s REPRESENTATIVE to compensate for claims made by the OWNER on account of the CONTRACTOR's performance of the WORK or other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days stating the reasons for such action.

14.06 PARTIAL UTILIZATION

A. The OWNER may utilize or place into service any item of equipment or other usable portion of the WORK at any time prior to completion of the WORK. The OWNER shall notify the CONTRACTOR in writing of its intent to exercise this right. The notice will identify the equipment or specific portion or portions of the WORK to be utilized or otherwise placed into service.

B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all items or portions of the WORK to be partially utilized shall be borne by the CONTRACTOR. Upon the issuance of a notice of partial utilization, the OWNER's REPRESENTATIVE will deliver to the OWNER and the CONTRACTOR a written recommendation as to division of responsibilities between the OWNER and the CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities and insurance.

C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER, and the CONTRACTOR's one-year correction period shall commence only after the date of Final Completion for the WORK.

14.07 DAMAGES

A. The CONTRACTOR shall pay to the OWNER the amount specified in the Supplementary General Conditions, not as a penalty but as liquidated damages, if he fails to complete the WORK or specified parts of the WORK within the Contract Time. The periods for which these damages shall be paid shall be the number of Days from the Contract Time as contained in the Agreement, or from the date of termination of any extension of time approved by the OWNER, to the date or dates on which the OWNER issues the Notice of Substantial Completion as provided in Article 14.08, herein. The OWNER may deduct the amount of said damages from any monies due or to become due the CONTRACTOR. After Substantial Completion, if the CONTRACTOR fails to complete the remaining WORK within 45 days or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER the amount stated in the Supplementary General Conditions as liquidated damages for each day that expires after the 45 days, until readiness for final payment.

B. The said amount is fixed and agreed upon by and between the CONTRACTOR and the OWNER because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the OWNER would sustain; and said amount is agreed to be the amount of damages which the OWNER would sustain.

C. If actual damages are assessed, they will include all costs incurred by the OWNER as a result of a delay in the completion time of the work beyond the contract time.

D. All times specified in the Contract Documents are hereby declared to be of the essence.

14.08 SUBSTANTIAL COMPLETION

A. When the CONTRACTOR considers the WORK ready for its intended use, the CONTRACTOR will notify the OWNER in writing that the WORK is Substantially

Complete. Within a reasonable time thereafter, the OWNER and the CONTRACTOR, shall make an inspection of the WORK to determine the status of completion. If the OWNER does not consider the WORK Substantially Complete, the OWNER will notify the CONTRACTOR in writing giving the reasons therefor. If the OWNER considers the WORK Substantially Complete, the OWNER will execute the Notice of Substantial Completion signed by the CONTRACTOR, which shall fix the date of Substantial Completion.

B. The Notice of Substantial Completion shall be a release by the CONTRACTOR of the OWNER and its agents from all claims and liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act or neglect of the OWNER or of any person relating to or affecting the WORK, to the date of Substantial Completion, except demands against the OWNER for the remainder of the amounts kept or retained from progress payments and excepting pending, unresolved claims filed in writing prior to the date of Substantial Completion. At the time of delivery of the Notice of Substantial Completion, the OWNER's REPRESENTATIVE will deliver to the OWNER and the CONTRACTOR, if applicable, a written recommendation as to division of responsibilities between the OWNER and the CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities and insurance. Upon the OWNER's acceptance of these recommendations, the recommendation will be binding on the OWNER and the CONTRACTOR until final payment.

C. The OWNER, upon written notice to the CONTRACTOR, shall have the right to exclude the CONTRACTOR from the WORK after the date of Substantial Completion, and complete all or portions of the WORK at the CONTRACTOR's expense.

14.09 COMPLETION AND FINAL PAYMENT

A. Upon written certification from the CONTRACTOR that the WORK is complete (if a Notice of Substantial Completion has been issued this certification must occur within 45 days of that date), the OWNER will make a final inspection with the CONTRACTOR. If the OWNER does not consider the WORK complete, the OWNER will notify the CONTRACTOR in writing of all particulars in which this inspection reveals that the WORK is incomplete or defective. The CONTRACTOR shall immediately take the measures necessary to remedy these deficiencies. If the OWNER considers the WORK complete, the CONTRACTOR may proceed to file its application for final payment pursuant to this Article. At the request of the CONTRACTOR, the OWNER's REPRESENTATIVE may recommend to the OWNER that certain minor deficiencies in the WORK that do not prevent the entire WORK from being used by the OWNER for its intended use, and the completion of which will be unavoidably delayed due to no fault of the CONTRACTOR, be exempted from being completed prerequisite to final payment. These outstanding items of pickup work, or "punch list items", shall be listed on the Notice of Substantial Completion, together with the recommended time limits for their completion, and extended warranty requirements for those items and the value of such items.

B. After the issuance of the Notice of Completion and after the CONTRACTOR has completed corrections that have not been exempted to the satisfaction of the OWNER and delivered to the OWNER all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, marked-up record documents and other documents, all as required by the Contract Documents; and after the OWNER has

indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final application for payment shall be accompanied by all documentation called for in the Contract Documents and other data and schedules as the OWNER may reasonably require, including an affidavit of the CONTRACTOR that all labor, services, material, equipment and other indebtedness connected with the WORK for which the OWNER or his property might in any way be responsible, have been paid or otherwise satisfied, and a consent of the payment bond surety to final payment, all in forms approved by the OWNER.

14.10 FINAL APPLICATION FOR PAYMENT

A. If, on the basis of the OWNER's observation of the WORK during construction and final inspection, and the OWNER's review of the final application for payment and accompanying documentation, all as required by the Contract Documents, the OWNER is satisfied that the WORK has been completed and the CONTRACTOR has fulfilled all of his obligations under the Contract Documents, the OWNER's REPRESENTATIVE will, within ten days after receipt of the final application for payment, indicate in writing his recommendation of payment and present the application to the OWNER for payment. Thereupon, the OWNER's REPRESENTATIVE will give written notice to the OWNER and the CONTRACTOR that the WORK is acceptable by executing the Notice of Completion. Otherwise, the OWNER will return the application to the CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case the CONTRACTOR shall make the necessary corrections and resubmit the application.

B. Within 45 calendar days after the Notice of Completion, the OWNER will make final payment including all deducted retainage and interest to the CONTRACTOR. The OWNER's remittance of final payment shall be the OWNER's acceptance of the WORK if formal acceptance of the WORK is not indicated otherwise. The final payment shall be that amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract, including the following items:

1. Liquidated or actual damages, as applicable.

2. Two times the value of any outstanding items of pickup work or "punch list items", indicated on the OWNER's Notice of Completion as being yet uncompleted.

14.11 CONTRACTOR'S CONTINUING OBLIGATIONS

A. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the OWNER, nor the issuance of a Notice of Substantial Completion or Notice of Completion, nor payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a shop drawing or sample submittal, will constitute an acceptance of work or materials not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER

A. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less deductions listed in Paragraph 14.10B herein. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.10 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the work or for any act or neglect of the OWNER or of any person relating to or affecting the work, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.10 herein; and excepting pending, unresolved claims filed prior to the date of the Notice of Substantial Completion.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 SUSPENSION OF WORK BY OWNER

A. The OWNER may, by written notice to the Contractor, temporarily suspend the WORK, in whole or in part, for a period or periods of time, but not to exceed 90 days, for the convenience and benefit of the OWNER upon the occurrence of any one or more of the following: (1) unsuitable weather; (2) delay in delivery of OWNER- furnished equipment or materials, or such other conditions as are considered unfavorable for prosecution of the work; (3) Shortfall in construction funds; (4) Constraints imposed by public entities, public utilities, property owners or legal proceedings; (5) Failure or delay in acquisition of easements or right-of-way by the OWNER; or (6) Other conditions which, in the opinion of the OWNER, warrant a delay in the WORK. Suspended WORK shall be resumed by the CONTRACTOR within 10 calendar days of receipt from the OWNER of written notice to resume work. Whenever the OWNER temporarily suspends work for any conditions enumerated in this Article, the CONTRACTOR shall be entitled to an adjustment in the Contract Time as specified in Article 12.03 C.

B. The suspension of work shall be effective upon receipt by the CONTRACTOR of a written order suspending the work and shall be terminated upon receipt by the Contractor of a written order terminating the suspension.

C. The CONTRACTOR hereby indemnifies and holds harmless the OWNER, their officers, agents and employees, from and against all claims, damages, losses and expenses, including lost profits and attorney's fees, arising out of or resulting from the temporary suspension of the WORK, whether for the OWNER's convenience described in this Article or for whatever other reasons, including the stoppage of work by the OWNER for the CONTRACTOR's failure to comply with any order issued by the OWNER.

15.02 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)

A. In the event of default by the CONTRACTOR, the OWNER may give written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement. The notice shall state the event of default and the time allowed to remedy the default. It shall be considered a default by the CONTRACTOR whenever the CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or workmanship meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or OWNER's instructions, (4) fail to prosecute the WORK according to the approved progress

schedule; or, (5) fail to provide a qualified superintendent, competent workmen, or materials or equipment meeting the requirements of the Contract Documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue a Notice of Termination.

B. In the event the Agreement is terminated in accordance with Paragraph 15.02A, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall have no claim to the difference.

15.03 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE)

A. The OWNER may terminate the Agreement at any time if it is found that reasons beyond the control of either the OWNER or CONTRACTOR make it impossible or against the OWNER's interests to complete the WORK. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of the work, as determined by the OWNER, performed by the Contractor up to the date the Agreement is terminated; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated, which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the OWNER in accordance with the procedure prescribed from making the final application for payment and final payment under Paragraphs 14.09 and 14.10.

15.04 TERMINATION OF AGREEMENT BY CONTRACTOR

A. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: (1) the WORK has been suspended under the provisions of Paragraph 15.01, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the agreement has not been received from the OWNER within this time period; or, (2) the OWNER should fail to pay the CONTRACTOR any monies due him in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefore, unless within said 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.03, and as determined in accordance with the requirements of that paragraph.

ARTICLE 16 - NOTICE

16.01 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 delivered in person to the individual or to a

member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

16.02 TITLE TO MATERIALS FOUND ON THE WORK

A. The OWNER reserves the right to retain title to all soils, stone, sand, gravel, and other materials developed and obtained from excavations and other operations connected with the WORK. Unless otherwise specified in the Contract Documents, neither the CONTRACTOR nor any Subcontractor shall have any right, title, or interest in or to any such materials. The CONTRACTOR will be permitted to use in the WORK, without charge, any such materials which meet the requirements of the Contract Documents.

16.03 RIGHT TO AUDIT

A. If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon subcontractors. The right to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.

16.04 HAZARDOUS MATERIALS

A. If the CONTRACTOR during the course of work observes the existence of hazardous material, the CONTRACTOR shall promptly notify the OWNER. The OWNER shall consult with others regarding removal or encapsulation of the hazardous material and the CONTRACTOR shall not perform any work pertinent to the hazardous material prior to receipt or special instruction from the OWNER.

ARTICLE 17 - SUBCONTRACT LIMITATIONS

17.01 SUBCONTRACT LIMITATIONS

A. In addition to the provisions of Paragraph 6.05 of the General Conditions, the CONTRACTOR shall perform not less than 30 percent of the WORK with its own forces (i.e., without subcontracting). The 30 percent requirement shall be understood to refer to the WORK, the value of which totals not less than 30 percent of the Contract Price.

ARTICLE 18 - PATENTS AND COPYRIGHTS

18.01 PATENTS AND COPYRIGHTS

A. The CONTRACTOR shall indemnify and save harmless the OWNER, the ENGINEER, and their officers, agents, and employees, against all claims or liability arising from the use of any patented or copyrighted design, device, material, or process by the CONTRACTOR or any of his subcontractors in the performance of the WORK.

-END OF SECTION-

SECTION 00800
SUPPLEMENTARY GENERAL CONDITIONS

PART 1 - GENERAL

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

SGC-1 DEFINITIONS

Add the following definitions to Article 1:

OWNER - The OWNER is further defined as South Valley Water Reclamation Facility, 7495 South 1300 West, West Jordan, Utah 84084. Telephone No.: (801) 566-7711.

OWNER'S REPRESENTATIVE - The OWNER'S REPRESENTATIVE is defined in SGC - 9.03 on page 00800-5. The OWNER'S REPRESENTATIVE for this project shall be Taigon Worthen.

BIDDER - The person, firm, or corporation, partnership or joint venture or LLC submitting a Bid for the Work.

CONTRACTOR - The person, firm, or corporation, partnership or joint venture or LLC with whom the OWNER has executed the Agreement.

ENGINEER - Defined as Carollo Engineers, Inc. 7090 South Union Park Avenue, Suite 600, Midvale, Utah 84047.

SGC-2.02 COPIES OF DOCUMENTS

The OWNER shall furnish to the CONTRACTOR 5 copies of the Contract Documents which may include bound reduced drawings, if any, together with 2 sets of full-scale Drawings if requested. Additional quantities of the Contract Documents will be furnished at reproduction cost plus mailing costs if copies are mailed.

SGC-4.02 REPORTS OF PHYSICAL CONDITIONS

In the preparation of the Contract Documents, the OWNER has relied upon:

A. The following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground utilities) which are at or contiguous to the site of the WORK.

1. Drawings dated May 28, 1982, prepared by James M. Montgomery, Consulting Engineers, Inc. entitled "SVWRF - Project 2A."

2. Drawings dated May 8, 1984, prepared by James M. Montgomery, Consulting Engineers, Inc. entitled "SVWRF - Project 2B."

3. Drawings dated January 23, 1992, prepared by James M. Montgomery, Consulting Engineers, Inc. entitled “SVWRF - Project 3.”

4. Drawings dated November 2011 prepared by Carollo Engineers, Inc., entitled “2011 Headworks VFD Replacement.”

5. Drawings dated January 2006 prepared by James M. Montgomery, Consulting Engineers, Inc., entitled “SVWRF - Project 4C.”

6. Drawings dated January 2008 prepared by Bowen Collins & Associates, Inc., entitled “SVWRF - Project 4D.”

B. Copies of these drawings may be examined at the office of the OWNER, during regular business hours. As provided in Paragraph 4.02 of the General Conditions and as identified and established above, the CONTRACTOR may rely upon the accuracy of the technical data contained in such reports and drawings, except for such physical dimensions that can be field verified; however, the interpretation of such technical data, including any interpolation or extrapolation thereof, and opinions contained in such reports and drawings are not to be relied on by the CONTRACTOR.

SGC-5.01 BONDS

Delete the first sentence of Paragraph 5.1A and add the following:

The CONTRACTOR shall furnish a satisfactory Performance Bond in the amount of 100 percent of the Contract Price and a satisfactory Payment Bond in the amount of 100 percent of the Contract Price as security for the faithful performance and payment of all the CONTRACTOR’s obligations under the Contract Documents.

SGC-5.02 INSURANCE

A. Substitute for Paragraph 5.02.B. the following:

All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed, admitted, and authorized to issue insurance policies for the limits and coverage so required in the State in which the Project is located. Such insurance companies shall have a current Best’s Rating of at least an “A” (Excellent) general policy holder’s rating and a Class VIII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

B. Add the following to Paragraph 5.02.B.5:

If the OWNER finds it necessary to occupy or use a portion or portions of the project prior to Substantial Completion, the OWNER shall provide notice of occupancy without the need for mutual agreement between the OWNER and the CONTRACTOR and to which the insurance company providing the Builder’s Risk Insurance has consented by endorsement to the policy or policies.

C. The limits of liability for the insurance required by Paragraph 5.2 of the General Conditions shall provide coverage for not less than the following amounts or greater

where required by Laws and Regulations. Limits may be provided by a combination of primary and excess liability policies or through a single policy. If the limits are provided by a combination of primary and excess liability policies, then the excess or umbrella liability coverages shall include commercial general, comprehensive automobile, and employer's liability and shall provide coverage at least as broad as the underlying policies.

1. Workers' Compensation:

a.	State:	Statutory
b.	Applicable Federal (e.g. USHL&H):	Statutory
c.	Employer's Liability:	$1,000,000

2. Comprehensive or Commercial General Liability:

Combined Single Limit:

a. Premises/operations

$ 1,000,000	Each Occurrence
$ 2,000,000	Annual Aggregate

b. Products/completed operations

$ 1,000,000	Each Occurrence
$ 2,000,000	Annual Aggregate

c. Personal Injury

$ 1,000,000	Each Occurrence
$ 2,000,000	Annual Aggregate

d. Policies shall include premises/operations, products, completed operations, independent contractors, owners' and contractors' protective, explosion, collapse, underground hazards, broad form contractual, personal injury with employment contractual exclusions deleted, and broad form property damage.

e. If policies are written on a Commercial General Liability form, the General Aggregate shall be at least two times the each occurrence limit or be written on a "per project" basis.

f. All policies shall be written on an occurrence basis. If the CONTRACTOR would like to substitute any "claims made" liability policies, then these must be pre-approved in writing according to the terms and conditions they may impose.

g. If policies are written for split limits, limits shall be equal for bodily injury and property damage liability.

3. Comprehensive Automobile Liability (including owned, hired, and non-owned vehicles):

   Combined Single Limit:

   a. Bodily Injury and Property Damage: $2,000,000 each accident.

   b. If policies are written for split limits, limits shall be equal for bodily injury per person, bodily injury per accident and property damage.

4. Excess Liability Insurance:

   a. $4,000,000 over all underlying coverage lines.

5. Builder's Risk Insurance:

   a. In an amount equal to the replacement cost of the completed value of the project or $4,000,000 whichever is greater.

   b. Any deductibles of self-insured retentions shall be as agreed to by the OWNER and CONTRACTOR.

   c. The CONTRACTOR shall include flood and earthquake coverage in the Builder's Risk Insurance requirements under Paragraph 5.02.B.5 of the General Conditions, with a minimum limit of $4,000,000 per event or occurrence.

D. All policies shall provide that the CONTRACTOR agrees to waive all rights of subrogation against the OWNER, the ENGINEER, and their subconsultants, employees, officers and directors, for WORK performed under the Agreement. Endorsements shall be provided with certificates of insurance.

E. All policies shall also specify that the insurance provided by the CONTRACTOR will be considered primary and not contributory to another insurance available to the OWNER or ENGINEER.

F. All policies except Workers' Compensation and Builders Risk shall name the OWNER, including their officers, directors or board members, employees agents or any others associated with the management or operations of South Valley Water Reclamation Facility; Engineer, their consultants, subconsultants, shall be additional insureds on the Auto Liability and Commercial General Liability policies. The Builders Risk insurance shall name the CONTRACTOR, OWNER, and ENGINEER as named insureds and subcontractors and additional insureds. The Workers' Compensation policy shall name the OWNER as additional insured by means of an alternative employer endorsement, with respect to the employer's liability coverage only.

G. All policies shall provide for 60 days' notice prior to any cancellation, reduction in coverage or nonrenewal.

H. The deductible or self-insured retention on Comprehensive or Commercial General Liability shall not be greater than $25,000. All deductibles are the responsibility of the CONTRACTOR.

SGC-6.05 SUBCONTRACT LIMITATIONS

Add the following as paragraph 6.05.B of the General Conditions

B. The CONTRACTOR shall perform not less than 30 percent of the WORK with its own forces (i.e., without subcontracting). The 30 percent requirement shall be understood to refer to the WORK, the value of which totals not less than 30 percent of the Contract Price.

SGC-6.06 PERMITS

A. The CONTRACTOR shall acquire and comply with the following permits if applicable:

1. State permits to construct and/or operate sources of air pollution.

2. Certificates and permits are required for sources such as, but not limited to, the following:

a. Fuel burning equipment.
b. Gasoline and petroleum distillate storage containers.
c. Land disturbing activities.
d. Processing equipment (sand, gravel, concrete batch plant, etc.).
e. Odors.

3. Permit-Required Confined Space: The workspace in which the WORK is to be performed may contain permit-required confined spaces (permit spaces) as defined in 29 CFR 1910.146. Permit space entry is allowed in such spaces only through compliance with a confined space entry program meeting the requirements of 29 CFR 1910.146.

4. Encroachment Permit.

B. The CONTRACTOR shall comply with OWNER requirements for a “Hot Work Permit” as described in Section 01520 - Security/Process Safety Management.

SGC-9.03 PROJECT REPRESENTATION

A. The OWNER’s Representative, will act as directed by and under the supervision of the OWNER and will confer with the OWNER regarding its actions. The OWNER’s REPRESENTATIVE dealings in matters pertaining to the WORK shall, in general, be only with the OWNER and the CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of the CONTRACTOR.

B. The OWNER’s REPRESENTATIVE shall have the duties and responsibilities set forth in this paragraph.

1. Review the progress schedule of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability, as applicable.

2. Attend preconstruction conferences. Arrange a schedule of progress meetings and other job conferences as required and notify in advance those expected to attend.
Attend meetings and maintain and circulate copies of minutes thereof.

3. Serve as the OWNER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents.

4. Receive Shop Drawings and samples furnished by the CONTRACTOR.

5. Conduct on-site observations of the WORK in progress to assist the OWNER in determining if the WORK is proceeding in accordance with the Contract Documents.

6. Transmit to the CONTRACTOR the OWNER's or ENGINEER's clarifications and interpretations of the Contract Documents.

7. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the OWNER.

8. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the OWNER, noting particularly their relation to the schedule of values, work completed, and materials and equipment delivered at the Site but not incorporated in the WORK.

9. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed.

10. Before the OWNER prepares a Notice of Completion, as applicable, submit to the CONTRACTOR a list of observed items requiring completion or correction.

11. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a punch list of items to be completed or corrected.

12. Verify that all items on the punch list have been completed or corrected and make recommendations concerning acceptance.

SGC-11.03D EQUIPMENT

The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication:

A. "Rental Rate Blue Book for Construction Machinery" as published by the Machinery Information Division of the K-III Directory Corporation, telephone number (800) 669-3282.

SGC-12.02 WEATHER DELAYS

The CONTRACTOR's construction schedule shall anticipate 30 days of delay due to unusually severe weather.

SGC-14.03C AMOUNT OF RETENTION

Add the following to Paragraph 14.03C of the General Conditions:

> Unless otherwise prescribed by law, the OWNER may retain a portion of the amount otherwise due to the CONTRACTOR, as follows:
>
> 1. Retention of 5 percent of each approved progress payment until the WORK is certified as having reached substantial completion.

SGC-14.03D VALUE OF MATERIALS STORED AT THE SITE

Unless otherwise prescribed by law or prescribed in Assigned Purchase Order Agreements, the value of materials stored at the SVWRF shall be 95 percent of the value of such materials.

SGC-14.05.A REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

Replace the last sentence with the following: "Forty-Five days after presentation of the Application for Payment with the ENGINEER'S recommendation, the amount recommended will (subject to the provisions of Paragraph 14.05B) become due and when due will be paid by the OWNER to the CONTRACTOR."

SGC-14.07.A DAMAGES

Add the following sentence: "The amount of liquidated damages shall be $2,500 per calendar day."

-END OF SECTION-

SECTION 00810

SUPPLEMENTARY GENERAL CONDITIONS (UTAH)

SGC-18 UTAH STATE REQUIREMENTS

A. Retainage of Compensation to CONTRACTOR: Pursuant to Utah Code Ann. 13-8-5, any retainage of CONTRACTOR's compensation hereunder shall be placed in an interest-bearing escrow account and the interest which accrues thereon shall do so for the benefit of CONTRACTOR and Subcontractors. Release of the retainage shall be as contemplated by the General Conditions and Supplementary General Conditions, Article 14 – Payments to Contractor, Liquidated Damages and Completion. Any interest which has accrued on the retainage and which is released to the CONTRACTOR shall be promptly disbursed by CONTRACTOR to itself and/or to Subcontractors on a pro rata basis.

B. Certification of Change Orders: Pursuant to Utah Code Ann. Section 63G-6-602, no change order shall be authorized without a written certification, signed by an official representative of the OWNER responsible for monitoring and reporting the status of the costs of the total Project or the contract budget, stating that funds are available for the subject change order.

C. Adjustments in Price: Pursuant to Utah Code Ann. Section 63G-6-601, any adjustment in compensation due CONTRACTOR under this agreement shall be computed in one or more of the following ways:

1. By agreement on a fixed-price adjustment before commencement of the pertinent performance or as soon as practicable;

2. By unit prices specified in the contract or subsequently agreed upon;

3. By the costs attributable to the events or situations with adjustment of profit or fee, all as specified in the contract or subsequently agreed upon;

4. In any other manner as OWNER and CONTRACTOR may mutually agree;

5. In the absence of agreement between CONTRACTOR and OWNER, by a unilateral determination by OWNER of the costs attributable to the events or situations with adjustment of profit or fee, all as computed by the OWNER in accordance with Utah Code Ann. Section 63G-6-415 and/or the rules and regulations promulgated thereunder.

D. Cost Principles: CONTRACTOR shall comply in all respects with applicable provisions of Utah Code Ann. Section 63G-6-415, and the rules and regulations promulgated thereunder. To the extent that such provisions are inconsistent with the other terms and conditions of this agreement, the former shall prevail. OWNER may, at reasonable times and places, audit the books and records of CONTRACTOR, any Subcontractor, or any other person who has submitted cost or pricing data pursuant to said section. The books and records of CONTRACTOR shall be maintained for 3 years following the end of the fiscal year in which final payment is made under the Contract. The books and records of the Subcontractor and all other persons shall be maintained for 3 years following the end of the fiscal year in which final payment is made under the subcontract and/or to the person, unless a shorter period is otherwise authorized in writing.

E. Project Safety: CONTRACTOR shall comply in all respects with the Utah Occupational Safety and Health Act, Utah Code Ann. Sections 34A-6-101 et seq., and the rules, regulations and standards promulgated thereunder by the Utah State Industrial Commission, as such act, rules, regulations or standards now exist or may be amended during the term of this agreement. Specifically, but not in limitation, CONTRACTOR shall comply with Construction Standards, Rules and Regulations, promulgated by the Utah Occupation and Safety and Health Division, Utah State Industrial Commission.

F. Protection of Underground Utility Facilities: CONTRACTOR shall comply in all respects with Utah Code Ann. Section 54 Chapter 8a et seq. and the rules and regulations promulgated thereunder, as it now exists or may be amended during the term of this agreement, with regard to the protection of underground utility facilities. Specifically, but not in limitation, CONTRACTOR shall notify the appropriate public utility(s) when making an excavation with power equipment. CONTRACTOR shall further refrain from proceeding with excavation until such time as the appropriate public utility(s) have advised CONTRACTOR of the location of any underground facilities in the area proposed for excavation by marking such facilities with stakes, paint, or other customary way, indicating horizontal location within 24 inches of the outside dimensions of both sides of the underground facility.

G. Review of Construction by OWNER: OWNER may, at its option, assign a field representative to review the construction of the Project in progress. Said representative will cooperate with the ENGINEER/OWNER in attempting to note deviations from, or necessary adjustments to, the Contract Documents or deficiencies or defects in the construction. Said representative's presence on the Project, however, shall in no way relieve CONTRACTOR of its primary responsibility for construction of the Project in accordance with the Contract Documents.

H. OWNER Inspection: Pursuant to Utah Code Ann. Section 63G-6-418, OWNER may, at reasonable times, inspect the plant or place of business of the CONTRACTOR or any Subcontractor which is related to the performance of this contract or any subcontract entered into hereunder.

I. Code Requirements: The provisions of the latest editions of the International Building Code, National Electric Code, and Utah Plumbing Code, as adopted or followed in Utah, including standards adopted in relation thereto, as supplemented or amended, shall apply to the Project except as specific variances may be expressly authorized by the OWNER. If the Contract Documents fail to meet the minimum standards of the referenced codes, CONTRACTOR shall be responsible to bring such information to the attention of the architect/OWNER associated with the Project. Subcontractors shall also inform CONTRACTOR of any infractions of the above-referenced codes regarding their own particular trades. In the event that workmanship or incidental materials are not specified or indicated, they shall at least conform to the above-referenced codes and shall be incorporated into the Work without any additional cost to the OWNER. If the Contract Documents call for items or workmanship which exceed code requirements, the Contract Documents shall take precedence over such requirements.

J. Workers Compensation: CONTRACTOR shall comply in all respects with Utah Code Ann. Section 34A-2-101, et seq. and the rules and regulations promulgated thereunder by the Utah State Industrial Commission, as such law, rules or regulations now exist or may be amended during the term of this agreement.

K. Archaeological, Anthropological, or Paleontological Findings: CONTRACTOR shall comply with Utah Code Ann. Section 9-8-301 et seq., with respect to the discovery of archaeological, anthropological, or paleontological findings at or on the Project site.

Specifically, but not in limitation, CONTRACTOR shall promptly notify the Utah Division of State History of any such findings.

L. Nondiscrimination Equal Employment Opportunity: CONTRACTOR shall comply in all respects with the Utah Anti-Discrimination Act of 1965, Utah Code Ann. Section 34A-5-101 et seq., and the rules and regulations promulgated thereunder by the Utah State Industrial Commission and/or its Anti-Discrimination Division, as such act, rules or regulations now exist or may be amended during the term of this agreement, specifically:

1. CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, color, sex, religion, ancestry or national origin.

2. In all solicitations or advertisements for employees, CONTRACTOR shall state that all qualified applicants shall receive consideration without regard to race, color, sex, religion, ancestry or national origin.

3. CONTRACTOR shall send to each labor union or worker's representative notices to be provided, stating the CONTRACTOR's responsibilities under the statute.

4. CONTRACTOR shall furnish such information or reports as are requested by the Utah State Industrial Commission and/or its Anti-Discrimination Division, for the purpose of determining compliance with the statute.

5. CONTRACTOR shall include the provisions of paragraphs 1 through 4 above in all subcontracts for this Project.

6. Failure of the CONTRACTOR to comply with the statute, the rules and regulations promulgated thereunder, and this provision, shall be deemed a breach of contract entitling OWNER, in its discretion, to cancel, terminate, or suspend this agreement in whole or in part.

M. Affirmative Action: CONTRACTOR shall take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex or national origin. Such action shall include, but shall not be limited to: employment; upgrading; demotion or transfer; recruitment or recruitment advertising; layout or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

At its discretion, OWNER may perform a compliance review at CONTRACTOR's place of business and/or the Project site to verify CONTRACTOR's compliance with this provision. Such compliance verifications may be conducted with such frequency as is needed to assure CONTRACTOR's compliance with this provision.

N. Citizens Preferred: Pursuant to Utah Code Ann. Section 34-30-1, CONTRACTOR shall give preference in hiring to citizens of the United States or those having declared their intention to become citizens; failure to comply may render this contract null and void at the discretion of OWNER.

O. Veterans' Preference: Pursuant to Utah Code Ann. Section 71-10-2, CONTRACTOR shall give preference in hiring to honorable discharged veterans who have served in the Armed Forces of the United States during a period of conflict, war, or other national emergencies as defined by Congress, and to any un-remarried surviving spouse of an honorably discharged veteran, if they possess qualifications for that employment and if the honorably discharged veteran is or, if deceased, was a resident of the State of Utah.

P. Specific OWNER Requirements: CONTRACTOR shall comply with the specific rules and regulations promulgated by OWNER pursuant to authority granted or retained under the Utah Procurement Code, Utah Code Ann. Section 63G-6-101, et seq.

-END OF SECTION-

DOCUMENT 00823

ESCROW BID DOCUMENTS

ARTICLE 1 - SCOPE

1.01 The 3 lowest Bidders shall submit, within the specified time after receipt of Bids, 1 copy of all documentary information generated in preparation of Bid prices for this Project. This material is hereinafter referred to as "Escrow Bid Documents." The Escrow Bid Documents of the Successful Bidder will be held in escrow for the duration of the contract.

1.02 The Successful Bidder agrees, as a condition of award of the contract, that the Escrow Bid Documents constitute the complete, only, and all documentary information used in preparation of his Bid. No other Bid preparation information shall be considered in resolving disputes.

1.03 Nothing in the Escrow Bid Documents shall change or modify the terms or conditions of the Contract Documents.

ARTICLE 2 - OWNERSHIP

2.01 The Escrow Bid Documents are, and shall always remain, the property of Contractor, subject only to joint review by Owner and Contractor, as provided in this Document.

2.02 Owner stipulates and expressly acknowledges that the Escrow Bid Documents, as defined in this Document, constitute trade secrets. This acknowledgment is based on Owner's express understanding that the information contained in the Escrow Bid Documents is not known outside the Bidder's business, is known only to a limited extent and only by a limited number of employees of the Bidder, is safeguarded while in Bidder's possession, is extremely valuable to Bidder, and could be extremely valuable to Bidder's competitors by virtue of it reflecting Bidder's contemplated techniques of construction. Owner acknowledges that the Bidder expended substantial sums of money in developing the information included in the Escrow Bid Documents and further acknowledges that it would be difficult for a competitor to replicate the information contained therein. Owner further acknowledges that the Escrow Bid Documents and the information contained therein are made available to Owner only because such action is an express prerequisite to award of the contract. Owner further acknowledges that the Escrow Bid Documents include a compilation of information used in the Bidder's business, intended to give the Bidder an opportunity to obtain an advantage over competitors who do not know of or use the contents of the documentation. Owner agrees to safeguard the Escrow Bid Documents, and all information contained therein, against disclosure to the fullest extent permitted by law.

ARTICLE 3 - PROGRAM

3.01 Escrow Bid Documents will be used to assist in the negotiation of price adjustments and Change Orders and in the settlement of disputes, claims, and other controversies. They will not be used for pre-award evaluation of Contractor's anticipated methods of construction or to assess Contractor's qualifications for performing the Work.

ARTICLE 4 - FORMAT AND CONTENTS

4.01 Bidders may submit Escrow Bid Documents in their usual cost-estimating format. It is not the intention of this section to cause the Bidder extra work during the preparation of the Bid, but to ensure that the Escrow Bid Documents will be adequate to enable complete understanding and proper interpretation for their intended use. The Escrow Bid Documents shall be in the language of the Specifications.

4.02 It is required that the Escrow Bid Documents clearly itemize the estimated costs of performing the work of each Bid item contained in the Bid schedule. Bid items should be separated into subitems as required to present a complete and detailed cost estimate and allow a detailed cost review. The Escrow Bid Documents shall include all quantity takeoffs; crew; equipment; calculations of rates of production and progress; copies of quotations from equipment manufacturers, Subcontractors, and Suppliers; and memoranda, narratives, consultants' reports, add/deduct sheets, and all other information used by the Bidder to arrive at the prices contained in the Bid Form. Estimated costs should be broken down into the Bidder's usual estimate categories, such as direct labor, repair labor, equipment operation, equipment ownership, expendable materials, permanent materials, and subcontract costs as appropriate. Plant and equipment and indirect costs should be detailed in the Bidder's usual format. Contractor's allocation of plant and equipment, indirect costs, contingencies, markup, and other items to each Bid item shall be included.

4.03 All costs shall be identified. For Bid items amounting to less than $10,000, estimated unit costs are acceptable without a detailed cost estimate, provided that labor, equipment, materials, and subcontracts, as applicable, are included, and provided that indirect costs, contingencies, and markup, as applicable, are allocated.

4.04 Bidding Documents provided by the Owner should not be included in the Escrow Bid Documents unless needed to comply with the requirements of this section.

ARTICLE 5 - SUBMITTAL

5.01 The Escrow Bid Documents shall be submitted in a sealed container within 72 hours after the time of receipt of Bids. The container shall be clearly marked on the outside with the Bidder's name, date of submittal, project name, and the words "Escrow Bid Documents."

5.02 The Escrow Bid Documents shall be accompanied with the Bid Documentation Certification, signed by an individual authorized by the Bidder to execute the Bid Form, stating that the material in the Escrow Documentation constitutes the complete, only, and all documentary information used in preparation of the Bid and that he has personally examined the contents of the Escrow Bid Documents container and has found that the documents in the container are complete.

5.03 Prior to award, Escrow Bid Documents of the apparent Successful Bidder will be unsealed, examined, organized, and inventoried by representatives of Owner, together with members of Contractor's staff who are knowledgeable in how the Bid was prepared.

5.04 This examination is to ensure that the Escrow Bid Documents are authentic, legible, and complete. It will not include review of, and will not constitute approval of, proposed construction methods, estimating assumptions, or interpretations of Contract Documents. This examination is subject to the condition that, as trade secrets, the Escrow Bid Documents are proprietary and confidential as described in this Document. Examination will not alter any condition(s) or term(s) of the contract.

5.05 If all the documentation required in this Document has not been included in the original submittal, additional documentation shall be submitted, at Owner's discretion, prior to award of the contract. The detailed breakdown of estimated costs shall be reconciled and revised, if appropriate, by agreement between Contractor and Owner before making the award.

5.06 If the contract is not awarded to the apparent Successful Bidder, the Escrow Bid Documents of the Bidder next to be considered for award shall be processed as described above.

5.07 Timely submission of complete Escrow Bid Documents is an essential element of the Bidder's responsibility and a prerequisite to contract award. Failure to provide the necessary Escrow Bid Documents will be sufficient cause for Owner to reject the Bid.

5.08 If the Bidder's proposal is based on subcontracting any part of the Work, each Subcontractor whose total subcontract price exceeds 5 percent of the total Contract Price proposed by the Bidder shall provide separate Escrow Bid Documents to be included with those of the Bidder. These documents will be opened and examined in the same manner and at the same time as the examination described above for the apparent Successful Bidder.

5.09 If Contractor subcontracts any portion of the Work after award, Owner retains the right to require Contractor to submit Escrow Bid Documents from the Subcontractor before the subcontract is approved.

5.10 Escrow Bid Documents submitted by unsuccessful Bidders will be returned unopened, unless opened as provided above, as soon as they are no longer needed by Owner and no later than immediately following award of the contract.

ARTICLE 6 - STORAGE

6.01 The Escrow Bid Documents of the Successful Bidder will be placed in escrow prior to award of the contract, for the life of the contract, in a mutually agreeable institution. The cost of storage will be paid by Owner.

ARTICLE 7 - EXAMINATION AFTER AWARD OF CONTRACT

7.01 The Escrow Bid Documents shall be examined by both Owner and Contractor, at any time deemed necessary after award of the contract by either Owner or Contractor, to assist in the negotiation of price adjustments and Change Orders, or the settlement of disputes.

7.02 Examination of the Escrow Bid Documents after award of the contract is subject to the following conditions:

1. As trade secrets, the Escrow Bid Documents are proprietary and confidential as described in this Document.
2. Owner and Contractor shall each designate, in writing to the other party and a minimum of 10 days prior to examination, representatives who are authorized to examine the Escrow Bid Documents. No other person shall have access to the Escrow Bid Documents.
3. Access to the Escrow Bid Documents will take place only in the presence of duly designated representatives of both Owner and Contractor.

ARTICLE 8 - FINAL DISPOSITION

8.01 The Escrow Bid Documents will be returned to Contractor at such time as the contract has been completed and final settlement has been achieved.

BID DOCUMENTATION

---- CERTIFICATION ----

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THE BID DOCUMENTATION CONTAINED IN THIS DOCUMENT CONSTITUTES THE COMPLETE, ONLY, AND ALL DOCUMENTARY INFORMATION USED IN PREPARATION OF THE BID AND THAT I HAVE PERSONALLY EXAMINED THESE CONTENTS AND HAVE FOUND THAT THIS BID DOCUMENTATION IS COMPLETE.

BY: _____

TITLE: _____

FIRM: _____

DATE: _____

END OF DOCUMENT

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Detailed description of the Work.

1.02 THE WORK

A. The Work consists of the following main elements:
   1. Modifications to existing bioreactors for improved biological phosphorus removal (BPR) including minor modifications to fine bubble diffusers, additional mixing equipment, improvements to the aeration control system, addition of trench drains, improvements to mixed liquor discharge location, and associated appurtenances and yard piping.
   2. Construction of a new multi-level grit removal building, including grit removal basins, grit pumping facilities, grit washing and conveying equipment, and associated appurtenances and yard piping.

1.03 LOCATION OF PROJECT

A. The Work is located at:

South Valley Water Reclamation Facility
7495 South 1300 West
West Jordan, Utah 84084

1.04 OWNER NEGOTIATED EQUIPMENT

A. Owner has pre-negotiated specific equipment for the Project. Contractor is required to contract with listed suppliers for pre-negotiated equipment.
   1. The pre-negotiated equipment is as follows:
      a. Section 11224A - Surface Mounted Floating Propeller Mixers
      b. Section 11224B - Replacement Vertical Mixer Impellers
      c. Section 11323 - Grit Removal System
      d. Section 11324 - Grit Washer/Dewatering Units
   2. Memoranda of Agreements (MOA) are specified in appendices of each pre-negotiated equipment specifications.

B. Contractor's responsibility for pre-negotiated equipment:
   1. Purchase, deliver, and install all pre-negotiated equipment according to the terms and conditions specified in the Memoranda of Agreement with equipment suppliers.

1.05 OWNER-PROVIDED SERVICES

A. Owner will provide SCADA programming and integration as described in Specification 17050 - Common Work Results for Process Control and Instrumentation Systems.

1.06 ACTIVITIES BY OTHERS

A. Activities by others which may affect performance of work include:
   1. Replacement of standby generator.

1.07 PARTIAL USE OR OCCUPANCY

A. Substantial Completion will be required on the following portions of Work for Owner's occupancy including specified testing, training of Owner's personnel, and other preparations necessary for Owner's occupancy or use:
   1. Bioreactors 2, 3, and 4.

B. Following occupancy, Owner will:
   1. Provide power to operate equipment and systems.
   2. Repair damage caused by Owner's occupancy.

1.08 ALTERNATES

A. As specified in Section 01230 - Alternates.

1.09 COORDINATION OF WORK

A. Documentation of existing conditions:
   1. Contractor shall have a preconstruction video made that records the project sites (with the Engineer and Owner present) including all concrete and asphalt pavements, curb and gutter, fencing to remain, structures to be demolished, and existing structures and facilities that are to be modified.
      a. The original and 2 copies of the DVD shall be turned over to Engineer and Owner prior to beginning construction activities.
      b. The format of the video file on the DVD shall be 1 file that can be played on a desktop in the windows media player.
      c. The video shall clearly identify existing site and structural conditions prior to construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01116

CONTRACT DOCUMENT LANGUAGE

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Explanation of arrangement, language, reference standards and format.

1.02 REFERENCES

A. Construction Specifications Institute (CSI):
   1. MasterFormat™.
   2. SectionFormat™.
   3. PageFormat™.

1.03 PROJECT MANUAL ARRANGEMENT

A. Document and Section numbers used in Project Manual, and Project Manual arrangement are in accordance with CSI MasterFormat™, except where departures have been deemed necessary.

B. Sections are written in CSI SectionFormat™, Three-Part Section Format, except where departures have been deemed necessary.

C. Page format for Sections in the Project Manual is in PageFormat™, except where departures have been deemed necessary.

1.04 CONTRACT DOCUMENT LANGUAGE

A. Specification Section Paragraphs entitled "Section Includes" summarize briefly what is generally included in the section.
   1. Requirements of Contract Documents are not limited by "Section Includes" paragraphs.

B. Specifications have been partially streamlined by intentionally omitting words and phrases, such as "the Contractor shall," "in conformity therewith," "shall be" following "as indicated," "a," "an," "the" and "all."
   1. Assume missing portions by inference.

C. Phrase "by Engineer" modifies words such as "accepted," "directed," "selected," "inspected," and "permitted," when they are unmodified.

D. Phrase "to Engineer" modifies words such as "submit," "report," and "satisfactory," when they are unmodified.

E. Colons (:) are used to introduce a list of particulars, an appositive, an amplification, or an illustrative quotation:
   1. When used as an appositive after designation of product, colons are used in place of words "shall be."

F. Word "provide" means to manufacture, fabricate, deliver, furnish, install, complete, assemble, erect in place, test, render ready for use or operation, including necessary related material, labor, appurtenances, services, and incidentals.

G. Words "Contractor shall" are implied when direction is stated in imperative mood.

H. Term "products" includes materials and equipment as specified in Section 01600 - Product Requirements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for sequencing and scheduling the Work affected by existing site and facility, work restrictions, and coordination between construction operations and plant operations.

1.02 SUBMITTALS

A. Baseline Schedule with MOP tasks.

B. Method of Procedure (MOP) Form.

C. Method of Procedure (MOP) Log.

D. Progress Schedule with MOP tasks.

1.03 GENERAL CONSTRAINTS ON WORK AND SCHEDULING OF WORK

A. Perform abandoned pipe Work as specified in Section 01738 - Selective Alterations and Demolition.

B. Wastewater projects:
   1. The South Valley Wastewater Reclamation Facility is an essential treatment facility prior to discharging to the Jordan River. Impairing the operational capabilities of this treatment plant will result in serious environmental damage and monetary fines.
   2. Conduct Work in a manner that will not impair the operational capabilities of essential elements of the treatment process or reduce the capacity of the entire treatment plant below levels sufficient to treat the quality of raw wastewater to the water quality limitations specified in the discharge permit.
   3. Conduct commissioning and process start-up activities as specified in Section 01756 - Commissioning in a manner that will not impair the operational capabilities of essential elements of the treatment process or reduce the capacity of the entire treatment plant below levels sufficient to treat the quality of raw wastewater to the water quality limitations specified in the discharge permit.
   4. The status of the treatment plant shall be defined as "operational" when it is capable of treating the entire quantity of wastewater received to the water quality limits specified in the discharge permit.

C. Instrumentation and controls process performance testing:
   1. After the Process Operational Period, test PCIS system as specified in Section 01756 - Commissioning.

1.04 SHUTDOWN AND CONSTRUCTION CONSTRAINTS

A. General shutdown constraints:
   1. Execute the Work while the existing facility is in operation.
   2. Some activities may be accomplished without a shutdown.
   3. Apply to activities of construction regardless of process or work area.
   4. Activities that disrupt plant or utilities operations must comply with these shutdown constraints.
   5. Organize work to be completed in a minimum number of shutdowns.
   6. Provide thorough advanced planning, including having required equipment, materials, and labor on hand at time of shutdown.
   7. Where required to minimize treatment process interruptions while complying with specified sequencing constraints, provide temporary pumping, power, lighting, controls, instrumentation, and safety devices.
   8. Final determination of the permitting of shutdowns will be the sole judgment of the Owner.
   9. Owner maintains the ability to abort on the day of the scheduled shutdown.
   10. Owner requires 4 weeks' notice prior to any changes to their processes.

B. General maximum plant flow work limitations:
   1. Activities that disrupt plant operations are prohibited during the following flow conditions, unless otherwise approved in writing by the Owner.
      a. Flow condition: 30 mgd.

C. Sequencing Constraints
   1. All new bioreactor electrical upgrades must be online prior to startup of any modified bioreactors.
   2. Bioreactor improvements shall be completed sequentially, such that a maximum of one of the bioreactors 2, 3, 4, in addition to half of Bioreactor 5 is off-line at any given time.
      a. During transition of bioreactor to off-line, allow minimum of 48 hours for Owner to complete necessary control system modifications.
   3. Bioreactor 5 shall not be offline for more than 4 months.
   4. New grit handling facility to constructed and commissioned, ready to treat primary raw wastewater before completing pipe tie-ins to Bioreactor No. 5.
   5. At least one of the existing 54-inch PI lines must be kept in operation at all times until the new Grit Handling Facility is operational.
      a. Potential sequencing for the installation and tie-in of grit piping: (Note: the sequence described below is provided only for informational purposes for to assist the Contractor, and Engineer accepts no liability for feasibility of such. Contractor shall be fully responsible to develop details of final sequence and for all schedule implications of such.)
         1) Complete the improvements to Bioreactors 2 through 4 and put in-service, construct the grit building and all the large-diameter yard piping, and pressure test up to the connection points with existing piping.
         2) Shut down and drain the existing west 54-inch PI and cap it near the splitter box on Bioreactor 5, per Drawing YP-26 (while flow is running through the east 54-inch PI to Bioreactors 1 through 5).
         3) Put the west 54-inch PI back in-service and route all flow to Bioreactors 2 through 4 through the west 54-inch PI.

4) Shut down and drain Bioreactor 5 splitter box, Bioreactor 5, and existing east 54-inch PI.
5) Make all 3 connections to the existing east 54-inch PI, per Drawings YP-18 and YP-19 (while flow is running to Bioreactors 2 through 4 for 1 to 2 months).
6) Fill and visually inspect all connections to existing piping for leaks.
7) Open flow to east 54-inch PI and put new east 63-inch PI, new grit facility, Bioreactor 5 splitter box and Bioreactor 5 in-service.
8) Shut down and re-drain the west 54-inch PI to Bioreactors 2 through 4.
9) Make connection from west 54-inch PI to new west 63-inch PI and install pipe cap on west 54-inch PI, per Drawing YP-18.
10) Fill west 54/63-inch PI and visually inspect new connection for leaks.

D. Unit process availability work limitations:
1. Shutdowns and tie-ins or other activities that disrupt plant operations are prohibited unless the following unit process availability conditions exist and unless otherwise approved in writing by the Engineer.
a. Minimum of 3 bioreactor basins must be in service at all times. Note that Bioreactor No. 1 is not operational. Therefore, all work on the bioreactors must be completed and commissioned one at a time.
b. At least one of the existing 54-inch PI lines (from headworks to Bioreactor 5 splitter box) must be kept in operation at all times until the new Grit Handling Facility is operational.
c. Existing grit removal facilities shall be fully maintained until new grit removal facility is functional.

E. Shutdown activities:
1. Scheduling:
a. Perform between the hours of 4 a.m. and 8 a.m. or as approved by Owner.
2. Unplanned shutdowns due to emergencies are not defined in this Section.

F. Dewatering/cleaning of existing process and disposal of residue:
1. When the Owner has turned the process unit over to the Contractor for modification or temporary use, the Contractor is responsible for costs and procedures required to dewater and dispose of liquid, solids, etc. in the process unit.
a. Drainage and disposal of process unit liquids, solids, etc. into another treatment process unit on the plant site may be allowed if approved in advance by the Engineer and Owner, and is conducted in accordance with Owner's requirements.
1) Handling and disposal of solids removed from the bioreactors as required to accomplish the Work shall be the responsibility of the Contractor.
b. Costs for dewatering, disposal of solids and residuals, and preparation of surfaces for the Work are Contractor's responsibility.
1) Includes tipping fees for the removal and disposal of the grit/debris.
c. Dewatering of grit/debris to meet landfill requirements is the responsibility of the Contractor.
d. Contractor shall provide adequate time in schedules for draining and cleanup of basins and channels.

G. Process area construction constraints:
   1. The following constraints shall be observed while working in and around each of the following process areas.
      a. Bioreactor improvements shall be completed sequentially, such that a maximum of one of the bioreactors involved in this Project is off-line at any given time.
      b. Material hauling operations:
         1) Contractor shall comply with restrictions regarding Contractor's use of site and premises as specified in Section 01110 - Summary of Work.

1.05 METHOD OF PROCEDURE (MOP)

A. MOP Instructions: See Appendix A.

B. Prepare MOP for the following conditions:
   1. Shutdowns, diversions, and tie-ins to the existing facility.
   2. Process start-up activities.
   3. Power interruption and tie-ins.
   4. Switch over between temporary and permanent facilities, equipment, piping, and electrical and instrumentation systems.
   5. Process constraints requiring interruption of operating processes or utilities.

C. Other Work not specifically listed may require MOPs as determined necessary by the Contractor, Owner, or Engineer.

D. Submit Baseline Schedule, as specified in Section 01324A - Progress Schedules and Reports, with proposed MOPs.

E. Submit MOP Log at construction progress meetings.

F. No consideration will be given to claims of additional time and cost associated to preparing MOPs required by the Owner and Engineer to complete this work in a manner that facilitates proper operation of the facility and compliance with effluent discharge criteria.

G. Where required to minimize treatment process interruptions while complying with specified sequencing constraints, provide temporary pumping, power, lighting, controls, instrumentation, and safety devices.

1.06 COMPLIANCE WITH NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

A. The existing facility is operating under the terms of a National Pollutant Discharge Elimination System permit issued by the State of Utah Department of Environmental Quality. This permit specifies the water quality limits that the plant must meet prior to discharge of effluent. A copy of the existing permit is on file for review at the Owner's office.

B. Perform work in a manner that will not prevent the existing facility from achieving the finished water quality requirements established by regulations.

C. Bear the cost of penalties imposed on the Owner for discharge permit violations caused by actions of the Contractor.

1.07 REQUIREMENTS FOR OPERATION OF PLANT AND MAINTAINING CONTINUOUS OPERATION OF EXISTING FACILITIES

A. Conduct the Work and provide temporary facilities required to keep the existing plant continuously operational.

B. Do not remove or demolish existing facilities required to keep the existing plant operational at the capacities specified until the existing facilities are replaced by temporary, new, or upgraded facilities or equipment.
   1. Test replacement facilities to demonstrate operational success prior to removing or demolishing existing facilities.

1.08 OPERATIONS AND MAINTENANCE ACCESS

A. Provide safe, continuous access to process control equipment for plant operations personnel.

B. Provide access on 1-hour advance notice to process control equipment for plant maintenance personnel and associated maintenance equipment.

1.09 UTILITIES

A. Provide advance notice to and utilize services of Blue Stake for location and marking of underground utilities operated by utility agencies other than the Owner.

B. Maintain electrical, telephone, water, gas, sanitary facilities, and other utilities within existing facilities in service. Provide temporary utilities when necessary.

C. New yard utilities were designed using existing facility drawings.
   1. Field verification of utilities locations was not performed during design.
   2. Services crossed or located nearby by new yard utilities may require relocation and possible shutdowns.
   3. Pipe alignments as indicated on the Drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

APPENDIX A
"Method of Procedure" (MOP)
Instructions and Forms

Definition and Purpose

"Method of Procedure" (MOP) is a detailed document submitted by the Contractor to request process shutdown(s), utility tie-in(s), work in areas that may risk unanticipated outages, or flow diversions to accommodate site construction activities during a project. Such activities may include (but are not limited to) new tie-ins to utilities or structures, mechanical modifications to process piping or equipment, demolition, bulkhead installation, and cleaning processes.

The MOP provides a detailed plan to the Owner and Engineer that describes specific aspects of the work including purpose, time of execution, and anticipated impacts on treatment processes. The MOP also includes contingency measures and provisions for rapid closure in the event that shutdown or work progress difficulties are encountered. Information from relevant trades associated with the requested shutdown, diversion, or tie-in is also included.

The Owner should use the information within the MOP to define operational procedures and methods to safely and successfully assist the Contractor.

MOP Process Summary

WHO	STEP	TIMING
Contractor	1. Identify MOPs needed on MOP Log and Baseline Schedule.	No later than 7 days prior to Preconstruction Scheduling Meeting
Contractor, Owner, Engineer	2. Pre-MOP Meeting.	More than 28 days prior to work
Contractor	3. Submits MOP.	No later than 28 days prior to work
Owner	4. Reviews MOP.	
Owner	5. MOP finalized.	No later than 7 days prior to work
Contractor	6. Complete Readiness Checklist.	No later than 5 days prior to work
Contractor	7. Complete Safety Checklist.	Immediately prior to commencing work
Contractor	8. Complete Work.	
Contractor	9. Update MOP Log and Progress Schedules.	Monthly

MOP Process Detail

STEP 1. Identifies MOPs needed on MOP Log and Baseline Schedule.

Contractor submits a preliminary list of anticipated project MOPs on MOP Log. MOPs identified but not limited to those shutdowns, diversions, or tie-ins described in the Contract Documents. Incorporate MOPs as tasks in Baseline Schedule. Date scheduled MOPs to coincide with the appropriate construction activities.

STEP 2. Pre-MOP Meeting.

Contractor requests a Pre-MOP Meeting with the Owner and Engineer to discuss the nature of the shutdown, diversion, or tie-in, and to gather the information necessary to complete the MOP Form. The pre-MOP meeting may be waived by the Owner or Engineer if the work is deemed to be minor.

STEP 3. Submits MOP.

Contractor completes the MOP Form and submit 3 copies for approval to the Owner's Project Manager (OPM).

STEP 4. Reviews MOP.

OPM distributes MOP Form for review by the Owner's Construction Coordinator, O&M Representative, and Engineer's Project Representative. Review MOP Form for completeness, accuracy, compliance with both the construction schedule, constraints defined in contract documents, and to ensure that the requested work does not negatively impact plant operations or other concurrent project activities. Additional information may be requested to better understand the nature of and method for completing the Work.

STEP 5. MOP finalized.

Once the MOP is agreed to by all parties, the MOP will be finalized by signature. Copies are distributed to the Owner, Engineer, and Contractor.

STEP 6. Complete Readiness Checklist.

Contractor verifies everything is ready for the work.

STEP 7. Complete Safety Checklist.

Contractor ensures safety.

STEP 8. Complete work.

Contractor complete work.

STEP 9. Update MOP Log and Progress Schedules.

Contractor updates MOP Log weekly and distributes at the regularly scheduled construction progress meetings.

METHOD OF PROCEDURE (MOP) FORM

Owner: _____ **Date:** _____

Contractor: _____ **Carollo Project No.:** _____

Project Name: _____ **Submittal No.:** _____

Submittal Title: _____ **Spec/Dwg. Reference:** _____

MOP #	Task Title *(Provide <10 word title)*:	Submittal Date: *(No later than 28 days prior to work)*

SCHEDULE OF WORK ACTIVITY START: *(Date/Time)* END: (Date/Time)

REQUESTOR:

PRIMARY POINT OF CONTACT:	PHONE/PAGER:
SECONDARY POINT OF CONTACT:	PHONE/PAGER:

NOTIFY	☐	Control Room, Phone	☐	Security, Phone	

BUILDING:	LOCATION OF WORK FLOOR/LEVEL:

DESCRIPTION OF WORK: *(Provide sufficient details on process isolation, work sequencing, and safety (i.e., control of significant hazards unique to the work) to demonstrate an understanding of the work and how it will be completed within the constraints, and its impact on the processes and facility.)*

Task Summary: _____

Processes Affected: _____

Trades Affected: _____

WORK PLAN:

Work Sequencing: _____

Process Isolation: _____

Spill Prevention Plan: _____

Contingency Plans: _____

CRITICAL EQUIPMENT/TOOLS: *(pumps and discharge hoses with correct fittings, blind flanges and pipe plugs, no-hub fittings, properly sized electrical service components, generators, portable lighting, chlorine for potable water pipe breaks, etc.)*

☐	Acoustic Ceiling/or Walls Access	☐	Excavation Permit	☐	Lock Out/Tag Out
☐	Chemical Use Approval	☐	Fire Sprinkler Impairment	☐	Life Safety Systems
☐	Confined Space Permit	☐	Flammable Materials	☐	Roof Protocol
☐	Critical Lift Plan	☐	Flush / Discharge	☐	Work After Dark
☐	Energized Electrical Work	☐	High Pressure Test	☐	
☐	Elect. Panel Schedules	☐	Hot Work/Open Flame	☐	

EXISTING SERVICE(S) AT RISK:

☐	Breathing Air	☐	Elect Normal	☐	Process Access	☐	Telephones
☐	Chemical Distribution	☐	Fire Protection	☐	Safety Showers	☐	UPS
☐	City Water	☐	HVAC	☐	SCADA	☐	VAX/DATA
☐	Communication	☐	Inert Gas	☐	Security	☐	
☐	Domestic Drain	☐	Instrument - Air	☐	Solvent Drain	☐	
☐	Elect-Bus Duct	☐	Life Safety System	☐	Specialty Gases	☐	
☐	Elect Emergency	☐	Natural Gas	☐	Storm Drain	☐	

REVIEWER'S INSTRUCTIONS / COMMENTS: _____

☐ PREJOB BRIEFING MUST BE COMPLETED PRIOR TO COMMENCING WORK:

	Full Name (printed)	Signature	Phone	Date
Submitted By				
System Owner				
Reviewer (if needed)				

Reviewer (if needed)				
Reviewer (if needed)				
Reviewer (if needed)				

READINESS CHECKLIST
(5 days prior to work)

Checklist provided as a guide but is not all inclusive.

1. Confirm all parts and materials are on site: _____
2. Review work plan: _____
3. Review contingency plan: _____

SAFETY CHECKLIST
(Just prior to commencing work)

Checklist provided as a guide but is not all inclusive.

1. Location awareness:
   a. Emergency exits: _____
   b. Emergency shower and eyewash: _____
   c. Telephones and phone numbers: _____
   d. Shut-off valve: _____
   e. Electrical disconnects: _____
2. Inspect work area:
   a. Take time to survey the area you are working in. Ensure that what you want to do will work. Do you have enough clearance? Is your footing secure? Do you have adequate lighting and ventilation? Are surrounding utilities out of the way for you to perform your work?
3. SDS (Safety Data Sheets):
   a. Understand the chemicals and substances in the area you are working in by reading the SDS.
4. Lockout/Tagout Procedure:
   a. Lockout/tagout energy sources before beginning work.
   b. Make sure all valves associated with the work are locked out and tagged out on each side of the penetration.
   c. Make sure the lines are depressurized.
5. Overhead work:
   a. Use appropriate personal protective equipment; i.e., safety harness, lifeline, etc.
   b. Select appropriate tie-off points; i.e., structurally adequate, not a pipe or conduit, etc.
   c. Spotter assigned and in position.
   d. Pipe rack access; i.e., check design capacity, protective decking or scaffolding in place, exposed valves or electrical switches identified and protected.
6. Safety equipment:
   a. Shepherd's hook.
   b. ARC flash protection.
   c. Fire extinguisher.
   d. Other: _____.
7. Accidents:
   a. Should accidents occur, do not shut off and do not attempt to correct the situation, unless you are absolutely positive that your action will correct the problem and not adversely affect other people or equipment.
8. Review process start-up documents:
   a. In the event the system is shutdown, the Control Center should have a working knowledge of the process start-up procedures in order to deal effectively with unforeseen events.
9. Evacuation procedures:
   a. Do not obstruct evacuation routes.
   b. Take time to survey the area for evacuation routes.

Method of Procedure (MOP) Log
Sample

MOP Number	Task Title	Date Requested	Date Approved	Date Work Planned	Work Completed (yes/no)
001					
002					
003					

SECTION 01230

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Identification and description of Alternates.

1.02 PROCEDURES

A. Alternates will be exercised at Owner's option.

B. Coordinate related work and modify surrounding work as required to complete the Work, including changes under Alternates accepted by Owner in Notice of Award.

C. Refer to the drawings for outlined Additive Bid Items.

1.03 ALTERNATES

A. Additive Bid Item #1 (ABI #1) - Bioreactor Trench Drains:
   1. Base Bid: None.
   2. Additive Bid Item: Bioreactor trench drains within Bioreactors 2 through 4, trench drain collection boxes for Bioreactors 2 through 4, and associated valves and yard piping to drain from the collection boxes to existing sewer interceptors as shown in the drawings, including all necessary excavation, backfill and compaction, bypass pumping, installation, and other construction related to these trenches as shown in the Drawings.

B. Additive Bid Item #2 (ABI #2) - Online Water Quality Analyzers:
   1. Base Bid: None.
   2. Additive Bid Item: Single online ammonia probe per basin as specified in Section 17519 - Analyzers: Ammonia, single MLSS probe per basin as specified in Section 17518 - Analyzers: Mixed Liquor Suspended Solids (MLSS), 2 ORP probes per basin as specified in Section 17502 - Analyzers: ORP to be installed in Bioreactors 2 through 4. Includes installation and all mounting and hardware as defined in the Drawings.

C. Additive Bid Item #3 (ABI #3) - Grit Removal/Dewatering Train No. 3:
   1. Base Bid: 2 Trains of Grit Removal/Dewatering Equipment as specified in Section 11323 - Grit Removal System, 11312C - Horizontal Recess Impeller Centrifugal Pumps, 11324 - Grit Washer/Dewatering Units and 14592 – Grit Chutes and Storage Bins.
   2. Additive Bid Item:
      a. Grit Basin Equipment No. 3 specified in Section 11323 - Grit Removal System.
      b. Grit Pump No. 5 and No. 6 specified in Section 11312C - Horizontal Recess Impeller Centrifugal Pumps.
      c. Grit Washer/Dewatering Unit No. 3 specified in Section 11324 - Grit Washer/Dewatering Units.

d. Grit chutes and diverter gate for Grit Washer No.3 specified in Section 14592 - Grit Chutes and Storage Bins.
e. All appurtenant piping, fittings, controls, valves, wiring, instruments, and control panels required for the alternate equipment specified for Bid Alternate Item #3 and as indicated on the drawings and specifications.

D. Additive Bid Item #4 (ABI #4) - Biofilter Odor Control System:
1. Base Bid: Odor Control Fan, controls and Foul Air ducting in the building.
2. Additive Bid Item:
a. Biofilter Odor Control System specified in Section 13251 - Biofilter Odor Control System and as indicated on the drawings.
b. Foul Air (FA) discharge piping to the Biofilter System and other yard piping as indicated on the drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01260

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for executing a change in the Work.

1.02 PRELIMINARY REQUIREMENTS

A. Change Order Cost Basis Summary Form:
   1. Submit a sample to Engineer for review within 15 calendar days following Notice to Proceed.
      a. Items will be reviewed and their value, percentage, or calculation method mutually agreed to by the Contractor and Owner prior to executing a Change Order on the Project.
   2. Used by the Contractor for pricing each Change Order required for additions, deletions, or revisions in the Work.
   3. Include the following information:
      a. Agreed upon markups, percentages, and procedures for calculating all surcharges, etc. associated with the Cost of the Change Order Work.
      b. References for unit price information and special unit price information.
      c. Attachments with the following information:
         1) Certified labor rates breakdown.
         2) Equipment rates.
         3) Bond and insurance rates (PI&I).

1.03 REQUEST FOR INFORMATION OR INTERPRETATION (RFI)

A. Contractor may issue RFIs to request interpretation of the documents or to request for information that may be missing.

B. General Instructions:
   1. Use RFI Form as specified in Document 00632 - Request for Information or Interpretation (RFI).
      a. Use of other RFI Forms is acceptable if the form includes the information in the form provided in the referenced form, at a minimum.
   2. Number RFIs consecutively.
      a. Add a consecutive letter to the RFI number on modified submittals of the same RFI (i.e., RFI 4B).
   3. Provide RFI for 1 item.
      a. There may be exceptions when multiple items are so functionally related that expediency indicates review of the group of items as a whole.
      b. RFIs with multiple items will be rejected without review.
   4. Contractor sign and date RFIs indicating review and approval.
      a. Contractor’s signature indicates that they have satisfied RFI review responsibilities and constitutes Contractor's written approval of RFI.

b. RFIs without Contractor's signature will be returned to the Contractor unreviewed. Subsequent submittal of this information will be counted as the first resubmittal.

C. Engineer will render a written clarification, interpretation, or decision on the issue submitted or initiate an amendment or supplement to the Contract within 21 days.
   1. In the event the Contractor identifies an RFI as critical to the progress of the project, Engineer will make every effort to reduce the RFI response time.

1.04 PRELIMINARY PROCEDURES

A. Owner or Engineer may initiate changes by submitting a Request for Proposal (RFP) to Contractor including the following information:
   1. Detailed description of the Change, Products, and location of the change in the Project.
   2. Supplementary or revised drawings or specifications.
   3. Projected time span for making the change, and a specific statement if overtime work is authorized.
   4. A specific period of time during which the requested price will be considered valid.
   5. Such request is for information only, and is not an instruction to execute the changes, or to stop work in progress.

B. Contractor may initiate changes by submitting a Change Proposal to Engineer containing the following:
   1. Description of proposed changes.
   2. Reason for making changes.
   3. Specific period of time during which requested price will be considered valid.
   4. Effect on Total Contract Cost and/or Contract Time.
   5. Documentation supporting any change in Total Contract Cost and/or Contract Time, as appropriate.

1.05 WORK CHANGE DIRECTIVE AUTHORIZATION

A. In lieu of a Request for Proposal (RFP), Engineer may issue a Work Change Directive Authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.

B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designation method of determining any change in the Contract Sum and/or the Contract Time, as appropriate.

C. Owner and Engineer will sign and date the Work Change Directive Authorization as authorization for the Contractor to proceed with the changes.

D. Contractor may sign and date the Work Change Directive Authorization to indicate agreement with the terms.

1.06 DOCUMENTATION OF CHANGE PROPOSALS

A. Change proposal:
   1. Support with sufficient substantiating data to allow Engineer to evaluate the quotation.
      a. Lump sum.
      b. Unit prices: Use previously established unit prices.
      c. Time-and-material/force account basis:
         1) Name of the Owner's authorized agent who ordered the work, and date of the order.
         2) Dates and times work was performed, and by whom.
         3) Time record, summary of hours worked, and hourly rates paid.
         4) Receipts and invoices for:
            a) Equipment used, listing dates and times of use.
            b) Products used, listing of quantities.
            c) Subcontracts.
   2. Provide additional data to support time and cost computations:
      a. Labor required.
      b. Equipment required.
      c. Products required:
         1) Recommended source of purchase and unit cost.
         2) Quantities required.
      d. Taxes, insurance, and bonds.
      e. Credit for work deleted from Contract, similarly documented.
      f. Overhead and profit.
      g. Justification for change to Contract Time.

1.07 PREPARATION OF CHANGE ORDERS AND FIELD ORDERS

A. Engineer will prepare each Change Order and Field Order.

B. Change Orders:
   1. Will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
   2. Will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.
   3. Recommendation of Change Proposal is indicated by Engineer's signature.
   4. Upon signature and execution by Owner, the Change Proposal becomes a Change Order altering the Contract Time and Total Contract Cost, as indicated.
      a. Owner's Representative will transmit one signed copy each to Contractor and Engineer.
   5. Contractor may only request payment for changes in the Work against an approved Change Order.
   6. If either Engineer or Owner's Representative disapproves the Change Proposal, the reason for disapproval will be stated.
      a. A request for a revised proposal or cancellation of the proposal will be shown.

C. Field Orders:
   1. Order minor changes in the Work without changes in Contract Price or Contract Times.

1.08 LUMP-SUM/FIXED PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:
   1. Engineer's Proposal Request and Contractor's responsive Change Proposal as mutually agreed between Owner and Contractor.
   2. Contractor's Change Proposal for a change, as recommended by Engineer.

B. Owner and Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time and serve as authorization for the Contractor to proceed with the changes.

C. Contractor will sign and date the Change Order to indicate agreement with the terms.

1.09 UNIT PRICE CHANGE ORDER

A. Content of Change Orders will be based on, either:
   1. Engineer's definition of the scope of the required changes.
   2. Contractor's Change Proposal for a change, recommended by Engineer.
   3. Survey of completed work.

B. The amounts of the unit prices to be:
   1. Those stated in the Contract.
   2. Those mutually agreed upon between Owner and Contractor.

C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
   1. Owner and Engineer will sign and date the Change Order as authorization for Contractor to proceed with the changes.
   2. Contractor will sign and date the Change Order to indicate agreement with the terms.

D. When quantities of the items cannot be determined prior to start of the work:
   1. Engineer or Owner will issue a Work Change Directive authorization directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.
   2. At completion of the change, Engineer will determine the cost of such work based on the unit prices and quantities used.
   3. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.

E. Owner and Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time and serve as authorization for the Contractor to proceed with the changes.

F. Contractor will sign and date the Change Order to indicate their agreement with the terms.

1.10 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/WORK CHANGE DIRECTIVE AUTHORIZATION

A. Engineer will issue a Work Change Directive for the Owner's signature authorizing Contractor to proceed with the changes.

B. At completion of the change, Contractor shall submit itemized accounting and supporting data as specified in this Section.

C. Engineer will determine the allowable cost of such work, as provided in the Contract Documents.

D. Owner and Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time and serve as authorization for the Contractor to proceed with the changes.

E. Contractor will sign and date the Change Order to indicate their agreement.

1.11 CORRELATION WITH CONTRACTOR'S SUBMITTALS

A. Periodically revise Schedule of Values and Applications for Payment forms to record each Change Order as a separate item of Work, and to record the adjusted Contract Sum.

B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise subschedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01292

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for preparation, format, and submittal of Schedule of Values.

1.02 PREPARATION

A. Print out Schedule of Values from accepted Preliminary or Baseline Schedule submitted and accepted under Section 01324A - Progress Schedules and Reports - Large Projects .

B. Schedule of Values shall be a listing of all cost loaded, on- site construction activities from the progress schedule, listed in numerical order, showing that the sum total of all cost loaded activities equals the value of Contract.

C. When the schedule is changed or revised to include added or deleted work, the Schedule of Values shall also be revised such that the sum total of all cost loaded activities continuously equals the current Contract value.

D. Assign prices to Major Items of Work which aggregate the Contract Price. Base prices on costs associated with scheduled activities based on the Project Schedule for each Major Item of Work.

1.03 SUBMITTALS

A. Submit Schedule of Values for the Preliminary Schedule in accordance with the requirements in Article "Preliminary Schedule", Section 01324A - Progress Schedules and Reports.

B. Submit Schedule of Values for the Baseline Schedule in accordance with the requirements in Article "Baseline Schedule", Section 01324A - Progress Schedules and Reports.

C. Submittal of the Schedule of Values is a condition precedent to the issuance of any payment under this Contract.

1.04 SAMPLE SCHEDULE OF VALUES

A. Following is an acceptable form for Schedule of Values:

(SAMPLE ONLY) SCHEDULE OF VALUES		
NO.	DESCRIPTION OF ITEM	LUMP SUM COST
1	LUMP SUM BID ITEM TITLE	
1.A	Mobilization	
1.B	General earthwork and grading	
1.C	Yard piping List Major Items of Work identified in Article 1.02 Paragraph C and number consecutively	
1.D	Bioreactor No. 2 Improvements	
1.E	Bioreactor No. 3 Improvements	
1.F	Bioreactor No. 4 Improvements	
1.G	Grit Facility	
1.H	Electrical work Schedule of Values as specified in Section 16050 - Common Work Results for Electrical	
1.I	General instrumentation work not included on Major Items of Work	
1.J	Commissioning	
1.K	Demobilization	
1.L	Bioreactor Walkways	
1.M	Ashphalt	
1.N	Miscellaneous work items and other prices not included in previous items and necessary to complete the Work	
	TOTAL LUMP SUM BID	

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01294

APPLICATIONS FOR PAYMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Procedures for preparation and submittal of Applications for Payment.

1.02 FORMAT

A. Develop satisfactory spreadsheet-type form generated by downloading cost data from the Progress Schedule.
   1. Submit payment requests using Document 00620 - Payment Bond and attach spreadsheet with cost data related to Progress Schedule.

B. Fill in information required on form.

C. When Change Orders are executed, add Change Orders at end of listing of scheduled activities:
   1. Identify change order by number and description.
   2. Provide cost of change order in appropriate column.

D. After completing, submit Application for Payment.

E. Engineer will review application for accuracy. When accurate, Engineer will transmit application to Owner for processing of payment.

F. Execute application with signature of responsible officer of Contractor.

1.03 SUBSTANTIATING DATA

A. Provide Substantiating Data with cover letter identifying:
   1. Project.
   2. Application number and date.
   3. Detailed list of enclosures.
   4. For stored products with item number and identification on application, description of specific material, and proof of insurance coverage for offsite stored products.
   5. Submit “certified” payroll, if applicable.

1.04 SUBMITTALS

A. Submit 1 electronic copy of Application for Payment and Substantiating Data with cover letter.

1.05 PAYMENT REQUESTS

A. Prepare progress payment requests on a monthly basis. Base requests on the breakdowns of costs for each scheduled activity and the percentage of completion for each activity.

B. Indicate total dollar amount of work planned for every month of the project. Equate sum of monthly amounts to Lump Sum Contract Price.

C. Generate Progress Payment request forms by downloading cost data from the schedule information to a spreadsheet type format.

D. Identify each activity on the Progress Schedule that has a cost associated with it, the cost for each activity, the estimated percent complete for each activity, and the value of work completed for both the payment period and job to date.

E. Prepare summary of cost information for each Major Item of Work listed in the Schedule of Values. Identify the value of work completed for both the payment period and job to date.

F. Payment period:
   1. Monthly Application for Payment period shall begin on the 1st day of each month, and end on the last day of each month.
   2. Submit Application for Payment to Engineer no later than the 5th day of each month for work completed the previous month.
   3. Engineer will finalize and submit recommendation for Application for Payment to Owner by the 15th day of each month to allow time for processing and approval.

1.06 COST SUMMARIES

A. Prepare Summary of Cost Information for each Major Item of Work listed in the Schedule of Values. Identify the Value of Work Completed for both the payment period and job to date.

B. Cash flow summary: Prepare cash flow summary, indicating total dollar amount of work planned for each month of the project. Equate sum of monthly amounts to Lump Sum contract price.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01312

PROJECT MEETINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for conducting conferences and meetings for the purposes of addressing issues related to the Work, reviewing and coordinating progress of the Work and other matters of common interest, and includes the following:
   1. Preconstruction Conference.
   2. Progress Meetings.
   3. Pre-Process Start-up Meetings.
   4. Close-out meeting.

1.02 QUALIFICATIONS OF MEETING PARTICIPANTS

A. Representatives of entities participating in meetings shall be qualified and authorized to act on behalf of entity each represents.

1.03 PRECONSTRUCTION CONFERENCE

A. Upon issuance of Notice to Proceed, or earlier when mutually agreeable, Engineer will arrange preconstruction conference in place convenient for most invitees.

B. Preconstruction Conference invitees: Contractor's project manager and superintendent, Owner, Engineer, representatives of utilities, major subcontractors and others involved in performance of the Work, and others necessary to agenda.

C. Engineer will preside at conference.

D. Purpose of conference: To establish working understanding between parties and to discuss Construction Schedule, shop drawing and other submittals, cost breakdown of major lump sum items, processing of submittals and applications for payment, and other subjects pertinent to execution of the Work.

E. Agenda will include:
   1. Adequacy of distribution of Contract Documents.
   2. Distribution and discussion of list of major subcontractors and suppliers.
   3. Proposed progress schedules and critical construction sequencing.
   4. Major equipment deliveries and priorities.
   5. Project coordination.
   6. Designation of responsible personnel.
   7. Procedures and processing of:
      a. Field decisions.
      b. Proposal requests.
      c. Submittals.
      d. Change Orders.
      e. Request for Information/Interpretations.

f. Applications for Payment.
g. Record Documents.

8. Use of premises:
   a. Office, construction, and storage areas.
   b. Owner's requirements.
9. Construction facilities, controls, and construction aids.
10. Temporary utilities.
11. Safety and first aid procedures.
12. Security procedures.
13. Housekeeping procedures.

F. Engineer will record minutes of meeting and distribute copies of minutes within 7 days of meeting to participants and interested parties.

1.04 PROGRESS MEETINGS

A. Engineer will schedule and administer meetings throughout progress of the Work at maximum weekly intervals.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance required: Owner, Engineer, Contractor, Contractor's Project Manager, superintendent, quality control manager, project scheduler, major subcontractors and suppliers as appropriate to agenda topics for each meeting.

D. Additional invitees: Owner utility companies when the Work affects their interests, and others necessary to agenda.

E. Agenda:
1. Review minutes of previous meeting/minutes.
2. Safety and security.
3. Construction schedule summary.
4. Review of 6 weeks schedule.
5. Review of off-site fabrication and delivery schedules.
6. Review of submittals schedule and status of submittals.
7. Request for information (RFI's) status.
8. MOP's/shutdown coordination.
9. Change order management status.
10. Maintenance of quality standards (QA/QC).
11. Field observations, problems, and conflicts.
12. Commissioning and process start-up.
13. Partnering recognition status (optional).
14. General Items.
15. Action items.
16. Next meeting.

F. Engineer will record minutes and distribute copies within 5 calendar days after meeting to participants, with copies to Contractor, Owner, and those affected by decisions made.

1.05 PRE-PROCESS START-UP MEETINGS

A. All processes and equipment that requires testing and process start-up also requires a pre-startup meeting at Project site before commencing process start-up of specific plant systems.

B. Require attendance of parties directly affecting, or affected by process start-up and testing, including Engineer, specific work crews, Owner's construction operations, and maintenance staff.

C. Notify Engineer no later than 7 calendar days in advance of meeting date.

D. Prepare agenda and preside at meeting:
   1. Review accepted MOP including conditions of process start-up and testing, preparation, and installation procedures.
   2. Review timelines and sequences.
   3. Review responsibilities.
   4. Review dry run plan and schedule, as necessary.
   5. Review coordination with related work.

E. Contractor will record minutes and distribute electronic copies within 5 calendar days after meeting and prior to scheduled process start-up to participants, with copies to Engineer, Owner, and those affected by decisions made.

F. Follow Owner's standard Construction Method of Procedure (MOP). See Appendix A of Section 01140 - Work Restrictions for MOP format.

1.06 CLOSE-OUT MEETING

A. Engineer will schedule close-out meeting.

B. Engineer will make arrangements for meeting, prepare agenda with copies for participants, and preside at meeting.

C. Attendance required: Owner, Engineer, Contractor, Contractor's Project Manager, Superintendent.

D. Agenda:
   1. Review punch list completion.
   2. Transfer of record documents.
   3. Finalize payment.

E. Engineer will record minutes and within 5 calendar days after meeting distribute copies to participants.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01322

WEB BASED CONSTRUCTION DOCUMENT MANAGEMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Requirements for web-based construction document management.

1.02 REQUIREMENTS

A. Owner, Engineer, and Contractor shall utilize EADOC (EADOC is a registered trademark of EADOC LLC). For submission of all data and documents (unless specified otherwise in this Section) throughout the duration of the Contract.
   1. EADOC is a web-based electronic media site hosted by EADOC LLC.
   2. EADOC is available to all Contractor's personnel, subcontractor personnel, suppliers, consultants, Owner, and Engineer at no cost.
   3. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of Contract Documentation.
   4. EADOC shall be the primary means of project information submission and management.

1.03 USER ACCESS LIMITATIONS

A. Provide a list of Contractor's key EADOC personnel for the Engineer's acceptance. The Engineer reserves the right to perform a security check on all potential users. The Contractor will be allowed to add additional personnel and subcontractors to EADOC.

B. The Engineer will grant initial access to EADOC by creating user profiles to accepted Contractor personnel. User profiles will define levels of access into the system; determine assigned function based authorizations and user privileges. Subcontractors and suppliers will be given access to EADOC by and through the Contractor. Contractor is responsible for adding and removing users from the system after the initial setup by the Engineer.

1.04 JOINT OWNERSHIP OF DATA

A. Data entered in a collaborative mode (entered with the intent to share as determined by permissions and workflows within the EADOC system) by Engineer and Contractor will be jointly owned.

1.05 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

A. Review comments made (or lack thereof) by Owner on Contractor submitted documentation shall not relieve Contractor from compliance with requirements of the Contract Documents. Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents.

Owner’s acceptance via automated system notifications or audit logs extends only to the face value of the submitted documentation and does not constitute validation of the Contractor's submitted information.

1.06 COMPUTER REQUIREMENTS

A. Contractor shall use computer hardware and software that meets the requirements of the EADOC system as recommended by EADOC LLC to access and utilize EADOC. As recommendations are modified by EADOC, Contractor will upgrade their system(s) to meet or exceed the recommendations. Upgrading of Contractor's computer systems will not be justification for a cost or time modification to the Contract.

B. Contractor shall ensure that connectivity to the EADOC system is accomplished through DSL, cable, T-1 or wireless communications systems. The minimum bandwidth requirement for using the system is 128 kb/s. It is recommended a faster connection be used when uploading pictures and files into the system.

C. EADOC supports the current and prior 2 major versions of Chrome, Mozilla's Firefox, Microsoft’s Internet Explorer and Apple’s Safari on a rolling basis.
   1. Each time a new version of one of these browsers is released, EADOC will begin supporting the update and stop supporting the fourth-oldest version.

1.07 CONTRACTOR RESPONSIBILITY

A. Contractor shall be responsible for the validity of their information placed in EADOC and for the abilities of their personnel.

B. Entry of information exchanged and transferred between the Contractor and its subcontractors and suppliers on EADOC shall be the responsibility of the Contractor.

C. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs, cad drawing applications, and Adobe Portable Document Format (PDF) document distribution program.

D. Contractor shall utilize the existing forms in EADOC to the maximum extent possible. If a form does not exist in EADOC the Contractor must include a form of their own or provided by Engineer as an attachment to a submittal.

E. Adobe PDF documents will be created through electronic conversion rather than optically scanned whenever possible. Contractor is responsible for the training of their personnel in the use of EADOC (outside what is provided by Owner) and the other programs indicated above as needed.

1.08 TRAINING

A. The Owner will provide web-based training on EADOC for the Contractor.

B. Contractor shall arrange and pay for the facilities and hardware/software required to facilitate Contractor’s training.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. EADOC project management application (no equal). Provided by EADOC LLC, www.EADOCsoftware.com.

PART 3 EXECUTION

3.01 EADOC UTILIZATION

A. EADOC shall be utilized in connection with all document and information management required by these Contract Documents.

3.02 SUBMITTALS

A. Use EADOC for submittals.

B. Content: As specified in Section 01330 - Submittal Procedures.

C. Format: As specified in Section 01330 - Submittal Procedures.

D. Submit Portable Document Format (PDF) documents to the EADOC submittal work flow process and forms.
   1. Consolidate electronic format submittals with multiples pages into a single file.

E. Samples:
   1. Contractor shall enter submittal data information into EADOC.
   2. Attach a copy of the submittal form(s) to the sample.

F. Record And Closeout Submittals:
   1. Operation and maintenance data as specified in Section 01782 - Operation and Maintenance Data.
   2. Extra materials, spare parts, etc.

3.03 REQUESTS FOR INFORMATION/INTERPRETATION (RFI)

A. Use EADOC for RFIs as specified in Section 01260 - Contract Modification Procedures.

3.04 OFFICIAL CORRESPONDENCE

A. Use EADOC for memos, notices, change proposals, or any official correspondence.

3.05 INSPECTION REQUESTS

A. Use EADOC to request inspection for a portion of Work that is ready for inspection and prior to covering up the Work.

3.06 FINANCIAL SUBMITTALS

A. Use EADOC for financial submittals as specified in Section 01330 - Submittal Procedures.

3.07 OTHER

A. Use EADOC for daily reports, meeting agendas and minutes, and other construction documents.

END OF SECTION

SECTION 01324A

PROGRESS SCHEDULES AND REPORTS - LARGE PROJECTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Preparation, submittal, and maintenance of computerized progress schedule and reports, Contract Time adjustments, and payment requests, including the following:
   1. Preliminary Schedule.
   2. Baseline Schedule.
   3. Monthly Schedule Updates.
   4. Weekly Summary Schedule.
   5. Schedule of Submittals.
   6. Manpower Schedule.
   7. Equipment Schedule.
   8. Commissioning and Process Start-up Schedule.
   9. As-built Schedule.

1.02 SCHEDULER

A. Designate, in writing and within 5 calendar days after Notice of Award, person responsible for preparation, maintenance, updating, and revision of all schedules.

B. Qualifications of scheduler:
   1. Authority to act on behalf of Contractor.
   2. 8 years verifiable experience in preparation of complex construction schedules for projects of similar value, size, and complexity.
   3. Knowledge of critical path method (CPM) scheduling utilizing Primavera P6 Professional software.

C. References: Submit written reference of 3 project Owners who have personal experience with this scheduler on previous projects. Identify name, address, telephone number, project name, and cost.

D. Scheduler: Dedicated full time to this project, located on-site. All scheduling software and hardware located on-site. Scheduler will attend all project meetings called for as specified in Section 01312 - Project Meetings.

E. Owner reserves the right to disapprove scheduler when submitted by Contractor if not qualified. Owner reserves the right to remove scheduler from the project if found to be incompetent.

1.03 SCHEDULING FORMAT AND SOFTWARE

A. Schedule format: Utilize CPM format.

B. Prepare computerized schedule utilizing Primavera P6 Professional, most current version.

1. Provide 1 licensed copy of the scheduling software to the engineer, registered in the Engineer's name, for the duration of the project.
2. The provided copy of the software shall be a standalone version for installation on a standalone computer.

1.04 PRECONSTRUCTION SCHEDULING MEETING

A. Engineer will conduct Preconstruction Scheduling Meeting with Contractor's Project Manager, General Superintendent, and scheduler within 7 calendar days after Notice To Proceed. This meeting is separate from the Preconstruction Conference Meeting and is intended to cover schedule issues exclusively.

B. At the meeting, review scheduling requirements. These include schedule preparation, reporting requirements, labor and equipment loading, updates, revisions, and schedule delay analysis. Present schedule methodology, planned sequence of operations, cost and resource loading methodology, and proposed activity coding structure.

C. Coding structure:
1. Submit proposed coding structure, identifying the code fields and the associated code values it intends to use in the project schedule.
2. A minimum, include code fields for Project Segment or Phase, Area of Work, Type of Work, Submittal/Procurement/Construction and Responsibility/Subcontractor. Refer to NETWORK DETAILS AND GRAPHICAL OUTPUT for listing of activity categories to be included in the schedule.

D. Naming convention: Name schedule files with the year, month and day of the data date, revision identifier, and a description of the schedule.
1. Example 1: 2014_07_30 rev 1 draft baseline schedule.xer.
2. Example 2: 2014_09_30 rev 2 sep final update.xer.

E. Filing: Post submitted files to Owner's construction document control system.

1.05 SCHEDULE PREPARATION

A. Preparation and submittal of Progress Schedule represents Contractor's intention to execute the Work within specified time and constraints. Failure to conform to requirement may result in termination for cause as defined in Document 00700 - General Conditions, under Suspension of Work and Termination.

B. Contractor's bid covers all costs associated with the execution of the Work in accordance with the Progress Schedule.

C. During preparation of the preliminary Progress Schedule, Engineer will facilitate Contractor's efforts by being available to answer questions regarding sequencing issues, scheduling constraints, interface points, and dependency relationships.

D. Prepare schedule utilizing Precedence Diagramming Method (PDM).

E. Prepare schedule utilizing activity durations in terms of working days. Do not exceed 15 working day duration on activities except concrete curing, submittal review, and equipment fabrication and deliveries. Where duration of continuous work exceeds

15 working days, subdivide activities by location, stationing, or other sub-element of the Work. Coordinate holidays to be observed with the Owner and incorporate them into the schedule as non-working days.

F. Failure to include an activity required for execution of the Work does not excuse Contractor from completing the Work and portions thereof within specified times and at price specified in Contract. Contract requirements are not waived by failure of Contractor to include required schedule constraints, sequences, or milestones in schedule. Contract requirements are not waived by Owner's acceptance of the schedule. In event of conflict between accepted schedule and Contract requirements, terms of Contract govern at all times, unless requirements are waived in writing by the Owner.

G. Reference schedule to working days with beginning of Contract Time as Day "1".

H. Baseline Schedule and Project Completion: Should Contractor submit a Baseline Schedule showing project completion more than 20 working days prior to Contract completion date, Owner may issue Change Order, at no cost to Owner, revising time of performance of Work and Contract completion date to match Contractor's schedule completion date. Adjust accordingly any Contract milestone dates.

I. Contract float is for the mutual benefit of both Owner and Contractor. Changes to the project that can be accomplished within this available period of float may be made by Owner without extending the Contract Time, by utilizing float. Time extensions will not be granted nor delay damages owed until Work extends beyond currently accepted Contract completion date. Likewise, Contractor may utilize float to offset delays other than delays caused by Owner. Mutual use of float can continue until all available float shown by schedule has been utilized by either Owner or Contractor, or both. At that time, extensions of the Contract Time will be granted by Owner for valid Owner-caused or third party-caused delays which affect the planned completion date and which have been properly documented and demonstrated by Contractor.

J. Resource loading and leveling: Input labor and equipment data on each schedule activity. Manpower data consist of the man-hours estimated to perform each task, categorized by trade. Equipment data consist of equipment hours estimated to perform each task, categorized by piece of equipment. Optimize and level manpower and equipment requirements. Resource leveling reflect a reasonable plan for accomplishing Work. Individual activities may be sequenced within limits of available float. Keep to a minimum critical or near critical paths resulting from use of labor or equipment restraints. Near critical path identified as path with 15 or less working days of float.

K. Schedule logic: Assembled to show order in which Contractor proposes to carry out Work, indicate restrictions of access, availability of Work areas, and availability and use of manpower, materials, and equipment. Form basis for assembly of schedule logic on the following criteria:
   1. Which activities must be completed before subsequent activities can be started?
   2. Which activities can be performed concurrently?
   3. Which activities must be started immediately following completed activities?

4. What major facility, equipment, or manpower restrictions are required for sequencing these activities?

L. Non-sequestering of float: Pursuant to float sharing requirements of Contract, schedule submittals can be rejected for, use of float suppression techniques such as preferential sequencing or logic, special lead or lag logic restraints, extended activity durations or imposed dates.

M. Major subcontractor, parallel prime contractor sign off: Provide written confirmation of concurrence from all major subcontractors and independent prime contractors on site with all schedule submittals. Term “major subcontractor” as used in this Section means any subcontractor, at any tier, with a subcontract worth 5 percent or more of the total cost of the Work.

N. Imposed dates, hidden logic prohibited: Do not use imposed dates or hidden logic in preparation of schedule.

O. Interim milestone dates, operational constraints: In event there are interim milestone dates and/or operational constraints set forth in Contract, show them on schedule. Do not use Zero Total Float constraint or Mandatory Finish Date on such Contract requirements.

P. Schedule windows for Owner-furnished, Contractor-installed equipment or materials: Immediately after Award of Contract, obtain from Engineer anticipated delivery dates of Owner furnished equipment or materials. Show these dates in the schedule in same manner indicated by Engineer.

Q. Cost loading: All schedules:
1. Only on-site construction activities.
2. The sum total of all cost loaded activities equal to the current value of the Contract, including change orders, at all times.
3. Owner acceptance of the Baseline Schedule creates the Schedule of Values required as specified in Section 01292 - Schedule of Values
4. Provide updated Schedule of Values as the monthly Payment Application as specified in Section 01294 - Applications for Payment.
5. Payments will not be made until updated Schedule of Values is accepted.

1.06 NETWORK DETAILS AND GRAPHICAL OUTPUT

A. Produce a clear, legible, and accurate calendar based, time scaled, graphical network diagram. Group activities related to the same physical areas of the Work. Produce the network diagram based upon the early start of all activities.

B. Include for each activity, the description, activity number, estimated duration in working days, total float, and all activity relationship lines.

C. Illustrate order and interdependence of activities and sequence in which Work is planned to be accomplished. Incorporate the basic concept of the precedence diagram network method to show how the start of 1 activity is dependent upon the start or completion of preceding activities and its completion restricts the start of following activities.

D. Indicate the critical path for the project.

E. Delineate the specified contract duration and identify the planned completion of the Work as a milestone. Show the time period between the planned and Contract completion dates, if any, as an activity identified as project float unless a Change Order is issued to officially change the Contract completion date.

F. Identify system shutdown dates, system tie-in dates, specified interim completion or milestone dates and contract completion date as milestones.

G. Include, in addition to construction activities:
   1. Submission dates and review periods for major equipment submittals, shoring submittals, and indicator pile program:
      a. Shoring reviews: Allow 4-week review period for each shoring submittal.
      b. Pile indicator program: Allow 3-week review period for analysis of program.
   2. Any activity by the Owner or the Engineer that may affect progress or required completion dates.
   3. Equipment and long-lead material deliveries over 8 weeks.
   4. Approvals required by regulatory agencies or other third parties.

H. Produce network diagram on 22-inch by 34-inch sheets with grid coordinate system on the border of all sheets utilizing alpha and numeric designations.

I. Identify the execution of the following:
   1. Mobilization.
   2. All required submittals and submittal review times showing 30 calendar day duration for such activities and equal amount of time for re-submittal reviews.
   3. Equipment and materials procurement/fabrication/delivery.
   4. Excavation.
   5. Shoring design and submission of detailed shoring submittals. Identify submission as a milestone.
   6. Shoring review, shoring materials procurement, shoring installation, and shoring removal.
   7. Backfill and compaction.
   8. Dewatering.
   9. Grading, subbase, base, paving, and curb and gutters.
   10. Landscaping.
   11. Concrete, including installation of forms and reinforcement, placement of concrete, curing, stripping, finishing, and patching.
   12. Tests for leakage of concrete structures intended to hold water.
   13. Masonry.
   14. Metal fastenings, framing, structures, and fabrications.
   15. Wood structures, finish carpentry, architectural woodwork, and plastic fabrications.
   16. Waterproofing and dampproofing, insulation, roofing and flashing, and sealants.
   17. Doors and windows, including hardware and glazing.
   18. Finishes including coating and painting, flooring, ceiling, and wall covering.
   19. Building specialties including furnishings, laboratory equipment, and toilet and bath accessories.
   20. Process equipment, including identification of ordering lead-time, factory testing, and installation.

21. Pumps and drives, including identification of ordering lead time, factory testing, and installation.
22. Conveying equipment including hoists and cranes, conveyor systems, and materials handling equipment, including identification of ordering lead-time and installation.
23. Other mechanical equipment including fans and heating, ventilating, and air conditioning equipment.
24. Trenching, pipe laying, and trench backfill and compaction.
25. Piping, fittings, and appurtenances, including identification of ordering and fabrication lead time, layout, installation and testing.
26. Valves, gates, and operators, including identification of order lead-time, installation, and testing.
27. Plumbing specialties.
28. Electric transmission, service, and distribution equipment, including identification of ordering lead-time, and factory testing.
29. Other electrical work including lighting, heating and cooling, and special systems, including identification of ordering lead-time.
30. Instrumentation and controls, including identification of ordering lead-time.
31. Preliminary testing of equipment, instrumentation, and controls.
32. Commissioning Phase:
    a. Source Testing.
    b. Owner Training.
    c. Installation Testing.
    d. Functional Testing.
    e. Clean Water Facility Testing.
33. Process Start-up Phase:
    a. Process Start-up.
    b. Process Operational Period.
    c. Instrumentation and Controls Performance Testing.
34. Substantial completion.
35. Punch list work.
36. Demobilization.

1.07 SUBMITTAL OF PROGRESS SCHEDULES

A. Submit preliminary and baseline schedule.

B. Submit, on a monthly basis, updated schedules as specified.

C. Submit final schedule update as specified.

D. Submit revised schedules and time impact analyses as specified.

E. Submit schedules in the media and number of copies as follows:
1. 3 sets of the CPM network and/or barchart (as specified by the Owner) on D-size sheets. Color-coding to be specified by the Owner.
2. 3 sets of Tabular reports listing all activities sorted numerically identifying duration, early start, late start, early finish, late finish, total float, and all predecessor/successor information.
3. 2 sets of CPM Schedule data electronic files in a native backed-up file (.xer) stored on CD/DVD.

1.08 PRELIMINARY SCHEDULE

A. Submit Preliminary Schedule within 14 calendar days after Notice to Proceed. Include a detailed plan of operations for first 90 calendar days of Work after receipt of Notice to Proceed.

B. Meet with Engineer within 7 calendar days after receipt of Preliminary Schedule to review and make necessary adjustments. Submit revised preliminary schedule within 5 calendar days after meeting.

C. Submit schedule of manpower and costs for all activities with revised Preliminary Schedule. Provide realistic and level manpower and costs so as not to have unusual manpower requirements.

D. Schedule of costs:
   1. Schedule of Values as specified in Section 01292 - Schedule of Values for first 90 calendar days of Work.
   2. Submittal and acceptance of Preliminary Schedule is condition precedent to making of progress payments as specified in Section 01294 - Applications for Payment and payments for mobilization costs otherwise provided for in the Contract.
   3. Proceed with pay item Work after Preliminary Schedule and schedule of costs have been accepted by Owner.

E. Incorporate unchanged, the accepted Preliminary Schedule as first 90 calendar days of activity in Contractor’s Baseline Schedule.

F. Update Preliminary Schedule monthly during first 90 calendar days after Notice to Proceed. Use Preliminary Schedule as the payment application as specified in Section 01294 - Applications for Payment.

1.09 BASELINE SCHEDULE

A. No more than 45 calendar days after Notice to Proceed, submit the Baseline Schedule for all Work of the project. Show sequence and interdependence of all activities required for complete performance of all Work, beginning with date of Notice to Proceed and concluding with date of final completion of Contract.

B. Acceptance of the Baseline Schedule by the Owner is a condition precedent to making payments as specified in Section 01294 - Applications for Payment after the first 90 calendar days after Notice to Proceed.

1.10 WEATHER DAY ALLOWANCE

A. Include as a separate identifiable activity on the critical path, an activity labeled "Weather Days Allowance." Insert this activity at the end of the schedule.

B. Insert an activity in critical path to reflect weather day occurrences when weather days are experienced and accepted by Engineer. Identify this activity as a weather delay.

C. Reduce duration of Weather Days Allowance activity as weather delays are experienced and inserted into the Schedule. Remaining weather days in Weather Day Allowance at completion of project is considered float.

D. Weather conditions that prevent or inhibit the Contractor's performance of the Work and affect the Critical Path indicated on the Schedule shall be referred to as a Weather Day. A Weather Day is defined as the Contractor being unable to perform at least 4 hours of work on the Critical Path. The Contractor shall provide a written notice to the Engineer of the occurrence of a weather day within 2 days after the onset of such weather and shall describe in reasonable detail the type of weather encountered and the Work interfered with or interrupted. A schedule update will not suffice as a written notice. The Engineer will determine if the weather day constitutes a use of a portion of the Weather Day Allowance. After use of all the Weather Day Allowance, the Engineer will determine if the Contractor is entitled to an extension of the Contract Time due to weather conditions. Weather days are considered excusable delay as defined in this Section.

1.11 REVIEW AND ACCEPTANCE OF SCHEDULES

A. Engineer will review Baseline Schedule, Schedule Updates, Schedule Revisions and Time Impact Analyses to ascertain compliance with specified project constraints, compliance with milestone dates, reasonableness of durations and sequence, accurate inter-relationships, and completeness.

B. Engineer and Owner will issue written comments following completion of review of Baseline Schedule within 21 calendar days after receipt.

C. Written comments on review of Schedule Updates and Schedule Revisions and Time Impact Analyses will be returned to Contractor within 14 calendar days after receipt by Engineer.

D. Revise and resubmit schedule in accordance with Engineer's comments within 7 calendar days after receipt of such comments, or request joint meeting to resolve objections.

E. If Engineer requests a meeting, the Contractor and all major subcontractors must participate in the meeting with Engineer.
   1. Revise and resubmit schedule within 7 calendar days after meeting.

F. Use accepted schedule for planning, organizing, and directing the work and for reporting progress.

G. Engineer's submittal review response:
   1. When schedule reflects Owner's and Contractor's agreement of project approach and sequence, schedule will be accepted by Owner.
   2. Engineer's submittal review response for schedule submittal will be "Receipt Acknowledged - Filed for Record" including applicable comments.
   3. Acceptance of the schedules by the Owner is for general conformance with the Contract Documents and for Owner's planning information, and does not relieve the Contractor of sole responsibility for planning, coordinating, and executing the Work within the contract completion dates. Omissions and errors in the accepted schedules shall not excuse performance less than that required by the Contract Documents. Acceptance by the Owner in no way

constitutes an evaluation or validation of the Contractor's plan, sequence or means, methods, and techniques of construction.

1.12 SCHEDULE UPDATES

A. Any update:
   1. Prepare update using most recent accepted version of schedule including:
      a. Actual start dates of activities that have been started.
      b. Actual finish dates of activities that have been completed.
      c. Percentage of completion of activities that have been started but not finished.
      d. Actual dates on which milestones were achieved.
      e. Update activities by inputting percent complete figures with actual dates.
      f. Use retained logic in preparing Schedule Updates.
      g. When necessary, input remaining durations for activities whose finish dates cannot be calculated accurately with a percent complete figure only.
      h. Revisions to the schedule may be included that have been previously approved as specified in this Section under Revisions to Schedule.

B. Monthly updates:
   1. Submit written narrative report in conjunction with each Schedule Update including descriptions of the following:
      a. Activities added to or deleted from the schedule are to adhere to cost and other resource loading requirements.
         1) Identify added activities in manner distinctly different from original activity designations.
      b. Changes in sequence or estimated duration of activities.
      c. Current or anticipated problems and delays affecting progress, impact of these problems and delays and measures taken to mitigate impact.
      d. Assumptions made and activities affected by incorporating change order work into the schedule.
   2. Submit updated schedule and materials specified under Submittal of Progress Schedules, 5 calendar days before the monthly schedule update meeting.
   3. Since Monthly Schedule Update is the application for progress payment required as specified in Section 01294 - Applications for Payment, submittal and acceptance of the monthly Schedule Update is a condition precedent to the making of any progress payments.

C. Weekly progress meeting:
   1. Update the schedule prior to weekly progress meeting.
      a. Identify overall progress of each Major Item of Work in the Summary Schedule.
      b. If there are significant changes to the schedule, submit a written report at the weekly progress meeting.
   2. Should monthly Schedule Update show project completion earlier than current Contract completion date, show early completion time as schedule activity, identified as "Project Float".
   3. Should monthly Schedule Update show project completion later than current Contract completion date, prepare and submit a Schedule Revision in accordance with the Revisions to Schedule.

1.13 REVISIONS TO SCHEDULE

A. Submit Revised Schedule within 5 days:
   1. When delay in completion of any activity or group of activities indicates an overrun of the Contract Time or milestone dates by 20 working days or 5 percent of the remaining duration, whichever is less.
   2. When delays in submittals, deliveries, or work stoppages are encountered making necessary the replanning or rescheduling of activities.
   3. When the schedule does not represent the actual progress of activities.
   4. When any change to the sequence of activities, the completion date for major portions of the work, or when changes occur which affect the critical path.
   5. When Contract modification necessitates schedule revision, submit schedule analysis of change order work with cost proposal.

B. Create a separate submittal for Schedule Revisions.
   1. Comply with schedule updates as specified in this Section.
   2. Do not submit with Schedule Updates.

C. Schedule Revisions will not be reflected in the schedule until after the revision is accepted by the Owner.
   1. This includes Schedule Revisions submitted for the purpose of mitigating a Contractor-caused project delay (Recovery Schedule).

1.14 PAYMENT REQUESTS AND CASH FLOW

A. After Baseline Schedule has been submitted and accepted by the Owner, submit on a monthly basis a tabular and graphic report showing anticipated earnings each month of the Contract period. This tabulation will be based on the summation of the cost-loaded activities each month. Submit an updated payment schedule each month showing actual earned amounts and anticipated remaining earnings.

B. Utilize cost loaded monthly Progress Schedule Updates as the applications for payment specified in Section 01294 - Applications for Payment. List payment application in Excel format of all schedule activities showing cost and percentage completion during the current month for which payment is sought. Progress payments will not be made until monthly Progress Schedule Update is provided.

1.15 WEEKLY SCHEDULE

A. Submit to Engineer, at every weekly progress meeting, a 6-Week Schedule showing the activities completed during the previous week and the Contractor’s schedule of activities for following 5 weeks.

B. Use the logic and conform to the status of the current progress schedule when producing a Weekly Schedule in CPM schedule or a bar chart format.
   1. In the event that the Weekly Schedule no longer conforms to the current schedule, Contractor may be required to revise the schedule as specified in this Section.

C. The activity designations used in the Weekly Schedule must be consistent with those used in the Baseline Schedule and the monthly Schedule Updates.

D. Contractor and Engineer must agree on the format of the Weekly Schedule.

1.16 SCHEDULE OF VALUES

A. Requirements for Schedule of Values are specified in Section 01292 - Schedule of Values.

B. Submit, in conjunction with the Progress Schedule, a Schedule of Values identifying costs of all on-site construction activities as generated by the cost loaded schedule. Equate the aggregate of these costs to the Lump Sum Contract Price.

1.17 ADJUSTMENT OF CONTRACT TIMES

A. Contract Time will be adjusted only for causes specified in Contract Documents.
   1. Non-excusable delay: Non-excusable delays include actions or inactions of the Contractor, or events for which the Contractor has assumed contractual responsibility (including actions or inactions of subcontractors, suppliers, or material manufacturers at any tier) that would independently delay the completion of the Work beyond the current Contract completion date). No time extensions will be granted for non-excusable delays.
   2. Excusable delay: Events which are unforeseeable, outside the control of, and without the fault or negligence of either the Owner or the Contractor (or any party for whom either is responsible), which would independently delay the completion of the Work beyond the current Contract completion date. The Contractor is entitled to a time extension only. No other damages will be approved.
   3. Compensable delay: Actions or inactions of the Owner, or events for which the Owner has assumed contractual responsibility, which would independently delay the completion of the Work beyond the current Contract completion date. The Contractor is entitled to a time extension and delay damages.
   4. Concurrent delay: Concurrent delay is any combination of the above 3 types of delay occurring on the same calendar date.
      a. Exception to concurrent delay: Cases where the combination consists of 2 or more instances of the same type of delay occurring on the same calendar date. When one cause of delay is Owner-caused or caused by an event which is beyond the control and without the fault or negligence of either the Owner or the Contractor and the other Contractor-caused, the Contractor is entitled only to a time extension and no delay damages.

B. If the Contractor believes that the Owner has impacted its work, such that the project completion date will be delayed, the Contractor must submit proof demonstrating the delay to the critical path. This proof, in the form of a Time Impact Analysis, may entitle the Contractor to an adjustment of Contract Time.

C. Time Impact Analysis:
   1. Use the accepted schedule update that is current relative to the time frame of the delay event (change order, third party delay, or other Owner-caused delay). Represent the delay event in the schedule by:
      a. Inserting new activities associated with the delay event into the schedule.
      b. Revising activity logic.
      c. Revising activity durations.
   2. If the project schedule's critical path and completion date are impacted as a result of adding this delay event to the schedule, a time extension equal to the magnitude of the impact may be warranted.

3. The Time Impact Analysis submittal must include the following information:
    a. A fragment of the portion of the schedule affected by the delay event.
    b. A narrative explanation of the delay issue and how it impacted the schedule.
    c. A CD containing the schedule file used to perform the Time Impact Analysis.

D. When a delay to the project as a whole can be avoided by revising preferential sequencing or logic, and the Contractor chooses not to implement the revisions, the Contractor will be entitled to a time extension and no compensation for extended overhead.

E. Indicate clearly that the Contractor has used, in full, all project float available for the work involved in the request, including any float that may exist between the Contractor's planned completion date and the Contract completion date. Utilize the latest version of the Schedule Update accepted at the time of the alleged delay, and all other relevant information, to determine the adjustment of the Contract Time.

F. Adjustment of the Contract Times will be granted only when the Contract Float has been fully utilized and only when the revised date of completion of the Work has been pushed beyond the Contract completion date. Adjustment of the Contract Times will be made only for the number of days that the planned completion of the work has been extended.

G. Actual delays in activities which do not affect the critical path work or which do not move the Contractor's planned completion date beyond the Contract completion date will not be the basis for an adjustment to the Contract Time.

H. If completion of the project occurs within the specified Contract Time, the Contractor is not entitled to job-site or home office overhead beyond the Contractor's originally planned occupancy of the site.

I. Notify Engineer of a request for Contract Time adjustment. Submit request as specified with Contract Documents. In cases where the Contractor does not submit a request for Contract Time adjustment for a specific change order, delay, or Contractor request within the specified period of time, then it is mutually agreed that the particular change order, delay, or Contractor request has no time impact on the Contract completion date and no time extension is required.

J. The Engineer will, within 30 calendar days after receipt of a Contract Time adjustment, request any supporting evidence, review the facts, and advise the Contractor in writing.
    1. Include the new Progress Schedule data, if accepted by the Owner, in the next monthly Schedule Update.
    2. When the Owner has not yet made a final determination as to the adjustment of the Contract Time, and the parties are unable to agree as to the amount of the adjustment to be reflected in the Progress Schedule, reflect that amount of time adjustment in the Progress Schedule as the Engineer may accept as appropriate for such interim purpose. It is understood and agreed that any such interim acceptance by the Engineer shall not be binding and shall be made only for the purpose of continuing to schedule the Work, until such time as a final determination as to any adjustment of the Contract Time acceptable

to the Engineer has been made. Revise the Progress Schedule prepared thereafter in accordance with the final decision.

1.18 SUMMARY SCHEDULE

A. Provide Summary Schedule, which consolidates groups of activities associated with Major Items of Work shown on Baseline Schedule. Summary Schedule is intended to give an overall indication of the project schedule without a large amount of detail.

B. Submit updated Summary Schedule at weekly progress meetings and after each Schedule Update or Schedule Revision.

1.19 SCHEDULE OF SUBMITTALS

A. Schedule of Submittals shall include submittals required in the Contract Documents but not limited to Commissioning and Process Start-up Plans, Training Plans, test procedures, operation and maintenance manuals, shop drawings, samples, record documents, and specifically required certificates, warranties, and service agreements.

B. Preliminary Schedule of Submittals:
   1. Due date: After Preliminary Schedule has been submitted and accepted by Owner.
   2. Format:
      a. Include submittals anticipated in the first 90 calendar days after Notice to Proceed using early start dates.
      b. Indicate week and month anticipated for each submittal.
      c. Indicate “Priority” submittals where review time can impact Contractor’s schedule.
         1) “Priority” indication will not alter review times specified in Section 01330 - Submittal Procedures.
         2) Engineer will endeavor to provide early review of “Priority” submittals where possible.
   3. Submittal of Preliminary Schedule of Submittals shall be a condition precedent to Owner making progress payments during the first 90 calendar days after Notice to Proceed.

C. Final Schedule of Submittals:
   1. Due date: After Baseline Schedule has been submitted and accepted by Owner.
   2. Format:
      a. Include submittals using early start dates.
      b. Include all submittals, including those required in the Preliminary Schedule of Submittals.
      c. Indicate week and month anticipated for each submittal.
      d. Indicate “Priority” submittals where review time can impact Contractor’s schedule.
         1) “Priority” indication will not alter review times specified in Section 01330 - Submittal Procedures.
         2) Engineer will endeavor to provide early review of “Priority” submittals where possible.

3. Submittal of Final Schedule of Submittals shall be a condition precedent to Owner making progress payments after the first 90 calendar days after Notice to Proceed.

D. Provide updated Schedule of Submittals with updated schedules if schedule revisions change listing and timing of submittals.

1.20 MANPOWER SCHEDULES

A. Due date: After Baseline Schedule has been submitted and accepted by Owner.

B. Format:
   1. Schedule histogram depicting total craft manpower and craft manpower for Contractor's own labor forces and those of each subcontractor.
   2. Submit electronically on a computer disk in Excel format, with 1 paper copy.

C. Progress payments after the first 90 calendar days after Notice to Proceed will not be made until manpower schedule is provided.

1.21 EQUIPMENT SCHEDULE

A. Due date: After Baseline Schedule has been submitted and accepted by Owner.

B. Format:
   1. Tabular report listing each major piece of construction equipment to be used in performing the Work.
   2. Include major equipment for Contractor and each subcontractor.
   3. Submit electronically on a computer disk in Excel format with 1 paper copy.

C. Progress payments after the first 90 calendar days after Notice to Proceed will not be made until equipment schedule is provided.

1.22 COMMISSIONING AND PROCESS START-UP SCHEDULE SUBMITTAL

A. Proposed Commissioning and Process Start-up Schedule:
   1. Due date: As specified in Section 01756 - Commissioning.
   2. Schedule requirements: As specified in Section 01756 - Commissioning.
   3. Engineer response due within 20 calendar days of receipt.
   4. Contractor responsible for updating schedule and resubmitting within 10 calendar days of receipt of Engineer and Owner comments.

B. The Commissioning and Process Start-up Schedule may not be combined with the Detailed Schedule until Engineer acceptance of the Proposed Commissioning and Process Start-up Schedule.

C. Commissioning and Process Start-up Schedule monthly update requirements:
   1. Highlight percentages of completion, actual start and finish dates, and remaining durations, as applicable.
   2. Include activities not previously included in the previously accepted detail work plan Commissioning and Process Start-up Schedule.
   3. Change Order required for any change to contractual dates.

4. Reviews of these submittals by Engineer will not be construed to constitute acceptance within the time frames, durations, or sequence of work for each added activity.

1.23 FINAL SCHEDULE SUBMITTAL

A. The final Schedule Update becomes the As-Built Schedule.
   1. The As-Built Schedule reflects the exact manner in which the project was constructed by reflecting actual start and completion dates for all activities accomplished on the project.
   2. Contractor's Project Manager and scheduler sign and certify the As-Built Schedule as being an accurate record of the way the project was actually constructed.

B. Retainage will not be released until final Schedule Update is provided.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01329

SAFETY PLAN

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Development and maintenance of a Construction Safety Plan.

1.02 REFERENCES

A. 29 CFR 1926, Subpart C in Utah.

B. National Fire Protection Association (NFPA):
   1. 70E - Standard for Electrical Safety in the Workplace.

C. Occupational Safety and Health Administration (OSHA).

1.03 CONSTRUCTION SAFETY PLAN

A. Detail the Methods and Procedures to comply with 29 CFR 1926 Subpart C in Utah, NFPA 70E, Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Methods and procedures must also comply with the Owner's Safety Plan. Include the following:
   1. Identification of the Certified or Licensed Safety Consultant who will prepare, initiate, maintain and supervise safety programs, and procedures.
   2. Procedures for providing workers with an awareness of safety and health hazards expected to be encountered in the course of construction.
   3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, safety equipment used in multi-level structures, personal protective equipment (PPE) as required by NFPA 70E.
   4. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
   5. Procedures for reporting safety or health hazards.
   6. Procedures to follow to correct a recognized safety and health hazard.
   7. Procedures for investigation of accidents, injuries, illnesses, and unusual events that have occurred at the construction site.
   8. Periodic and scheduled inspections of general work areas and specific workstations.
   9. Training for employees and workers at the jobsite.
   10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
   11. Provision of a site specific emergency action and evaluation plan.
   12. Verify safety plan includes reference to and compliance with latest Owner safety policies.

B. Assume sole responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of subcontractors, suppliers, and other persons on the jobsite:
   1. Forward available information and reports to the Safety Consultant who shall make the necessary recommendations concerning worker health and safety at the jobsite.
   2. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.

C. Transmit to Owner and Engineer copies of reports and other documents related to accidents or injuries encountered during construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements and procedures for submittals.

1.02 REFERENCES

A. NSF International:
   1. NSF 61 - Drinking Water System Components - Health Effects.

1.03 DEFINITIONS

A. Certificates: Describe certificates that document affirmations by the Contractor or other entity that the work is in accordance with the Contract Documents.

B. Extra stock materials: Describe extra stock materials to be provided for the Owner's use in facility operation and maintenance.

C. Maintenance material submittals: Use this article to categorize maintenance materials submittals requiring no Engineer action other than confirmation of receipt under an explanatory heading.

D. Manufacturer's instructions: Instructions, stipulations, directions, and recommendations issued in printed form by the manufacturer of a product addressing handling, installation, erection, and application of the product; manufacturer's instructions are not prepared especially for the Work.

E. Product data: Product data usually consists of manufacturers' printed data sheets or catalog pages illustrating the products to be incorporated into the project.

F. Samples: Samples are full-size actual products intended to illustrate the products to be incorporated into the project. Sample submittals are often necessary for such characteristics as colors, textures, and other appearance issues.

G. Spare parts: Describe spare parts necessary for the Owner's use in facility operation and maintenance; identify the type and quantity here, but include the actual characteristics of the spare parts in Product as part of the specification of the product.

H. Shop drawings: Shop drawings are prepared specifically for the project to illustrate details, dimensions, and other data necessary for satisfactory fabrication or construction that are not shown in the contract documents. Shop drawings could include graphic line-type drawings, single-line diagrams, or schedules and lists of products and their application.

I. Submittals: Submittals are samples, product data, shop drawings, and others that demonstrate how Contractor intends to conform with the Contract Documents.

J. Tools: Tools are generally defined as items such as special wrenches, gauges, circuit setters, and other similar devices required for the proper operation or maintenance of a system that would not normally be in the Owner's tool kit.

1.04 GENERAL INSTRUCTIONS

A. Certification: Contractor is responsible to determine and verify all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and check and coordinate each item with other applicable approved shop drawings and all Contract requirements.

B. Provide submittals that are specified or reasonably required for construction, operation, and maintenance of the Work.

C. Where multiple submittals are required, provide a separate submittal for each specification section.
   1. 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:
      a. The only exception to this requirement is when 1 specification section covers the requirements for a component of equipment specified in another section.
      b. For example, circuit breakers are a component of switchgear. The switchgear submittal must also contain data for the associated circuit breakers, even though they are covered in a different specification section.

D. Edit all submittals so that the submittal specifically applies to only the equipment furnished. 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.

E. Prepare submittals in the English language. Do not include information in other languages.

F. Present measurements in customary American units (feet, inches, pounds, etc.).

G. Must be clear and legible, and of sufficient size for presentation of information.

H. Minimum page size will be 8 1/2 inches by 11 inches:
   1. Maximum page size will be 11 inches by 17 inches.

I. Show dimensions, construction details, wiring diagrams, controls, manufacturers, catalog numbers, and all other pertinent details.

J. Provide submittal information from only 1 manufacturer for a specified product. Submittals with multiple manufacturers for 1 product will be rejected without review.

K. Indicate project designated equipment tag numbers from P&IDs for submittal of devices, equipment, and assemblies.

1.05 SUBMITTAL ORGANIZATION

A. Fully indexed with bookmarks for every section.

B. Sequentially number pages within the tabbed sections:
   1. Submittals that are not fully indexed and tabbed with sequentially numbered pages, or are otherwise unacceptable, will be returned without review.

C. Organize submittals in exactly the same order as the items are referenced, listed, and/or organized in the specification section.

D. 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 used.

E. Attachments:
   1. Specification section: Include with each submittal a copy of the relevant specification section.
      a. Indicate in the left margin, next to each pertinent paragraph, either compliance with a check (√) or deviation with a consecutive number (1, 2, 3).
      b. Provide a list of all numbered deviations with a clear explanation and reason for the deviation.
   2. Drawings: Include with each submittal a copy of the relevant Drawing, including relevant addendum updates.
      a. Indicate either compliance with a check (√) or deviation with a consecutive number (1, 2, 3).
      b. Provide a list of all numbered deviations with a clear explanation and reason for the deviation.
      c. Provide field dimensions and relationship to adjacent or critical features of the Work or materials.

F. Contractor: Prepare submittal information in sufficient detail to show compliance with specified requirements.
   1. Determine and verify quantities, field dimensions, product dimensions, specified design and performance criteria, materials, catalog numbers, and similar data.
   2. Coordinate submittal with other submittals and with the requirements of the Contract Documents.
   3. Check, verify, and revise submittals as necessary to bring them into conformance with Contract Documents and actual field conditions.

1.06 SUBMITTAL METHOD AND FORMAT

A. As specified in Section 01322 - Web Based Construction Document Management.

B. Submittals in electronic media format:
   1. General: Provide all information in PC-compatible format using Windows® operating system as utilized by the Owner and Engineer.
   2. Text: Provide text documents and manufacturer's literature in Portable Document Format (PDF).
   3. Graphics: Provide graphic submittals (drawings, diagrams, figures, etc.) utilizing Portable Document Format (PDF).

4. Contractor using other software shall be required to provide to the Engineer conclusive evidence of 100 percent data transfer compatibility.

1.07 SUBMITTAL PROCEDURE

A. Engineer: Review submittal and provide response:
   1. Review description:
      a. Engineer will be entitled to rely upon the accuracy or completeness of designs, calculations, or certifications made by licensed professionals accompanying a particular submittal whether or not a stamp or seal is required by Contract Documents or Laws and Regulations.
      b. Engineer's review of submittals shall not release Contractor from Contractor's responsibility for performance of requirements of Contract Documents. Neither shall Engineer's review release Contractor from fulfilling purpose of installation nor from Contractor's liability to replace defective work.
      c. Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents.
      d. Engineer's review does not extend to:
         1) Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
         2) Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.
         3) Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.
      e. Engineer can Approve or Not Approve any exception at their sole discretion.
   2. Review timeframe:
      a. Except as may be provided in technical specifications, a submittal will be returned within 30 days.
      b. When a submittal cannot be returned within the specified period, Engineer will, within a reasonable time after receipt of the submittal, give notice of the date by which that submittal will be returned.
      c. Engineer’s acceptance of progress schedule containing submittal review times less than those specified or agreed to in writing by Engineer will not constitute Engineer’s acceptance of review times.
      d. Critical submittals:
         1) Contractor will notify Engineer in writing that timely review of a submittal is critical to the progress of Work.
   3. Schedule delays:
      a. No adjustment of Contract Times or Contract Price will be allowed due to Engineer’s review of submittals, unless all of the following criteria are met:
         1) Engineer has failed to review and return first submission within the agreed upon time frame.
         2) Contractor demonstrates that delay in progress of Work is directly attributable to Engineer’s failure to return submittal within time indicated and accepted by Engineer.

4. Review response will be returned to Contractor with one of the following dispositions:
    a. Approved:
        1) No Exceptions:
            a) There are no notations or comments on the submittal and the Contractor may release the equipment for production.
        2) Make Corrections Noted - See Comments:
            a) The Contractor may proceed with the work, however, all notations and comments must be incorporated into the final product.
            b) Resubmittal not required.
        3) Make Corrections Noted - Confirm:
            a) The Contractor may proceed with the work, however, all notations and comments must be incorporated into the final product.
            b) Submit confirmation specifically addressing each notation or comment to the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.
    b. Not Approved:
        1) Correct and resubmit:
            a) Contractor may not proceed with the work described in the submittal.
            b) Contractor assumes responsibility for proceeding without approval.
            c) Resubmittal of complete submittal package is required within 30 calendar days of the date of the Engineer's submittal review response.
        2) Rejected - See Remarks:
            a) Contractor may not proceed with the work described in the submittal.
            b) The submittal does not meet the intent of the Contract Documents. Resubmittal of complete submittal package is required with materials, equipment, methods, etc. that meet the requirements of the Contract Documents.
    c. Receipt Acknowledged - Filed for Record:
        1) This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc.
    d. Receipt Acknowledged with Comments - Resubmit:
        1) This is used in acknowledging receipt of informational submittals that address means and methods of construction such as schedules and work plans, conformance test reports, health and safety plans, etc. Feedback regarding missing information, conflicting information, or other information that makes it incomplete can be made with comments.

B. Contractor: Prepare resubmittal, if applicable:
    1. Clearly identify each correction or change made.
    2. Include a response in writing to each of the Engineer's comments or questions for submittal packages that are resubmitted in the order that the comments or questions were presented throughout the submittal and numbered consistent with the Engineer's numbering.

a. Acceptable responses to Engineer's comments are listed below:
    1) "Incorporated" Engineer's comment or change is accepted and appropriate changes are made.
    2) "Response" Engineer's comment not incorporated. Explain why comment is not accepted or requested change is not made. Explain how requirement will be satisfied in lieu of comment or change requested by Engineer.
b. Reviews and resubmittals:
    1) Contractor shall provide resubmittals which include responses to all submittal review comments separately and at a level of detail commensurate with each comment.
    2) Contractor responses shall indicate how the Contractor resolved the issue pertaining to each review comment. Responses such as "acknowledged" or "noted" are not acceptable.
    3) Resubmittals which do not comply with this requirement may be rejected and returned without review.
    4) Contractor shall be allowed no extensions of any kind to any part of their contract due to the rejection of non-compliant submittals.
    5) Submittal review comments not addressed by the Contractor in resubmittals shall continue to apply whether restated or not in subsequent reviews until adequately addressed by the Contractor to the satisfaction of the reviewing and approving authority.
c. Any resubmittal that does not contain responses to the Engineer's previous comments shall be returned for Revision and Resubmittal. No further review by the Engineer will be performed until a response for previous comments has been received.

3. Resubmittal timeframe:
    a. Contractor shall provide resubmittal within 15 days.
    b. When a resubmittal cannot be returned within the specified period, Contractor shall notify Engineer in writing.
4. Review costs:
    a. Costs incurred by Owner as a result of additional reviews of a particular submittal after the second time it has been reviewed shall be borne by Contractor.
    b. Reimbursement to Owner will be made by deducting such costs from Contractor's subsequent progress payments.

1.08 SHOP DRAWINGS

A. Contractor to field verify elevation, coordinates, and pipe material for pipe tie-in to pipeline or structure prior to the preparation of shop drawings.

B. Details:
1. Fabrication drawings: Drawn to scale and dimensioned.
2. Front, side, and, rear elevations, and top and bottom views, showing all dimensions.
3. Locations of conduit entrances and access plates.
4. Component layout and identification.
5. Weight.
6. Finish.
7. Temperature limitations, as applicable.
8. Nameplate information.

C. Minor or incidental products and equipment schedules:
   1. Details:
      a. Shop Drawings of minor or incidental fabricated products will not be required, unless requested.
      b. Submit tabulated lists of minor or incidental products showing the names of the manufacturers and catalog numbers, with Product Data and Samples as required to determine acceptability.

1.09 PRODUCT DATA

A. Details:
   1. Supplier name and address.
   2. Subcontractor name and address.

B. Include:
   1. Catalog cuts.
   2. Bulletins.
   3. Brochures.
   4. Manufacturer's Certificate of Compliance: Signed by product manufacturer along with supporting reference data, affidavits, and tests, as appropriate.
   5. Manufacturer's printed recommendations for installation of equipment.
   6. Quality photocopies of applicable pages from manufacturer's documents.

C. Motor Data Sheet:
   1. Provide completed Motor Data Sheet as specified in Section 16222 - Low Voltage Motors Up to 500 Horsepower, for every motor furnished as part of the associated equipment submittal.

D. Test reports including the following information:
   1. Test description.
   2. List of equipment used.
   3. Name of the person conducting the test.
   4. Date and time the test was conducted.
   5. Ambient temperature and weather conditions.
   6. All raw data collected.
   7. Calculated results.
   8. Clear statement if the test passed or failed the requirements stated in Contract Documents.
   9. Signature of the person responsible for the test.

E. Certificates:
   1. As specified in technical sections.
   2. For products that will be in contact with potable water, submit evidence from a nationally recognized laboratory that the products comply with the requirements of the NSF 61 standard.

1.10 SAMPLES

A. Details:
   1. Submit labeled samples.
   2. Samples will not be returned.
   3. Provide samples from manufacturer's standard colors, materials, products, or equipment lines.

a. Clearly label samples to indicate any that represent non-standard colors, materials, products, or equipment lines and that if selected, will require an increase in Contract Time or Contract Price.

4. Provide number of sample submittals as below:
   a. Total: 2 minimum.
      1) Owner: 1.
      2) Engineer: 1.
      3) Contractor: None.

B. Field samples:
   1. As specified in technical sections.

1.11 DESIGN CALCULATIONS

A. Defined in technical sections:
   1. Calculations must bear the original seal and signature of a Professional Engineer licensed in the state where the project is located and who provided responsible charge for the design.

1.12 SCHEDULES

A. Progress schedules: As specified in Section 01324A - Progress Schedules and Reports - Large Projects.
   1. Each schedule submittal specified in these Contract Documents shall be submitted as a native backed-up file (.xer) of the scheduling program as specified in Section 01324A - Progress Schedules and Reports - Large Projects.
   2. The schedule and all required reports shall also be submitted as a PDF file.
   3. Schedule of values: As specified in Section 01292 - Schedule of Values.
   4. Schedule of submittals: As specified in Section 01324A - Progress Schedules and Reports - Large Projects.

B. Progress reports and quantity charts:
   1. As specified in Section 01324A - Progress Schedules and Reports - Large Projects.

1.13 REQUESTS FOR SUBSTITUTIONS (RFS)

A. As specified in Section 01600 - Product Requirements.

1.14 REQUESTS FOR INFORMATION (RFI)

A. As specified in Section 01260 - Contract Modification Procedures.

1.15 CONTRACTOR'S PROFESSIONAL ENGINEER (P.E.) CERTIFICATION FORM

A. Submit a completed Contractor's P.E. Certification Form, provided in this Section, to comply with technical sections requirement for a professional engineer's certification from an engineer licensed in the state the project is located.

1.16 CLOSEOUT SUBMITTALS

A. Provide closeout submittals as specified in Section 01770 - Closeout Procedures.

B. Operation and Maintenance Manuals: final documents shall be submitted as specified in Section 01782 - Operation and Maintenance Data.

C. Extra materials, spare parts, etc.: Submittal forms shall indicate when actual materials are submitted.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

APPENDIX A

CONTRACTOR'S P.E. CERTIFICATION FORM

DOCUMENT 01330
CONTRACTOR'S P.E. CERTIFICATION FORM

Owner:	Click here to enter text.	**Date:**	MM/DD/YYYY.
Contractor:	Click here to enter text.	**Registration State:**	Click here to enter text.
Project Name:	Click here to enter text.	**Project No.:**	00000.00.
Responsibilities:	Click here to enter text.		
Spec Section:	Click here to enter text.		

Statement of Certification

The undersigned hereby certifies that he/she is a professional engineer registered in the State of and that he/she has been employed by

The undersigned further certifies that he/she has performed the said design in conformance with all applicable local, state, and federal codes, rules, and regulations; and, that his/her signature and P.E. stamp have been affixed to all calculation and drawings used in, and resulting from, the design.

The undersigned hereby agrees to make all original design drawings and calculations available to:

Click here to enter text.

(Name of Owner, or Owner's representative within 7 days of receiving a written request by the Owner.)

Prof. Engineer Signature: _____ **Date:** _____

Printed Name: _____ **Company Name:** _____

Contractor's Signature: _____ **Date:** _____

Printed Name: _____

APPENDIX B

CONTRACTOR SUBMITTAL TRANSMITTAL FORM

DOCUMENT 01330
CONTRACTOR SUBMITTAL TRANSMITTAL FORM

Owner:	Click here to enter text.	**Date:**	MM/DD/YYYY
Contractor:	Click here to enter text.	**Project No.:**	XXXXX.XX
Project Name:	Click here to enter text.	**Submittal Number:**	000
Submittal Title:	Click here to enter text.		
To:	Click here to enter text.		
From:	Click here to enter text.	Click here to enter text.	
	Click here to enter text.	Click here to enter text.	

Specification No. and Subject of Submittal / Equipment Supplier			
Spec ##:	Spec ##.	**Subject:**	Click here to enter text.
Authored By:	Click here to enter text.	**Date Submitted:**	XX/XX/XXXX

Submittal Certification
Check Either (A) or (B):
☐ (A) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.
☐ (B) We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.
General Contractor's Reviewer's Signature:
Printed Name:
In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.
Firm: Click here to enter text. **Signature:** **Date Returned:** XX/XX/XXXX

PM/CM Office Use	
Date Received GC to PM/CM:	
Date Received PM/CM to Reviewer:	
Date Received Reviewer to PM/CM:	
Date Sent PM/CM to GC:	

SECTION 01340

PHOTOGRAPHIC AND VIDEOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes requirements for photographs and videos.

B. The purpose of the photographs and videos is to document the condition of the facilities prior to the Contractor beginning work at the Project site, the progress of the Work, and the Project site after Substantial Completion of the Work.

C. The scope of the photographic and videographic documentation shall be the sole responsibility of the Contractor, but shall be acceptable to the Engineer.

1.02 SUBMITTALS

A. Photographer qualifications.

B. Pre-construction photographs and videos: Submit prior to beginning work at the Project site or prior to the Preconstruction Conference specified in Section 01312 - Project Meetings, whichever occurs earlier.

C. Construction photographs and videos: Submit with each application for payment.

D. Post-construction photographs and videos: Submit with project closeout documents as specified in Section 01770 - Closeout Procedures.

1.03 PHOTOGRAPHER

A. Photographer qualified and equipped to photograph either interior or exterior exposures, with lenses ranging from wide angle to telephoto.

B. Submit example work of previous photographs and video recording meeting the requirements of this Section.
   1. Provide to Engineer no later than the pre-construction conference.
   2. Provide photographs used for site examination.
   3. Provide video of site examination.
   4. Provide samples that used same camera and lighting equipment proposed for the Work.
   5. Engineer will review work examples to determine if the quality of the images is acceptable.
   6. Contractor is responsible for modifications to equipment and/or inspection procedures to achieve report material of acceptable quality.
   7. Do not commence Work prior to approval of the material by the Engineer.
   8. Once accepted, the standard report material shall serve as a standard for the remaining work.

1.04 KEY PLAN

A. Submit key plan of Project site with notation of vantage points marked for location and direction of each photograph.

B. Include the same label information as the corresponding set of photographs.

1.05 PHOTOGRAPHS

A. Provide prints of each photograph for each area of Work.

B. Provide a digital copy of each photograph for each area of Work.
   1. Monthly: Indexed digital CD.
   2. Project record documents:
      a. Catalog and index prints in chronological sequence.
      b. Include typed table of contents.

1.06 PRE-CONSTRUCTION PHOTOGRAPHS AND VIDEOS

A. Provide photographs and video of the condition entire site including each area of Work prior to the start of Work.
   1. Areas to be photographed and videoed shall include the site of the Work and all existing facilities, either on or adjoining the Project site, including the interior of existing structures that could be damaged as a result of the Contractor's Work.
   2. Include general condition, structures, vegetation, staging, storing, working, parking areas and excavation areas.

1.07 CONSTRUCTION PHOTOGRAPHS AND VIDEOS

A. Provide photographs and videos of construction in each area of Work throughout progress of Work including a key plan designating where each photograph was taken.

B. Take site and interior photographs and videos from differing directions of building demolition, pre-excavation, footing excavation, soil testing, utility crossings, installation of bypass piping, excavation of access pits, installation of lining system in pipes, rehabilitation of manholes, building modifications, utilities, electrical and instrumentation modifications, and other applicable activities indicating relative progress of the work.

C. Take photos a maximum of 7 calendar days prior to submittal.

1.08 POST-CONSTRUCTION PHOTOGRAPHS AND VIDEOS

A. Provide photographs of the entire site including each area of Work at the completion of Work.
   1. Include general condition, structures, vegetation, staging, storing, working, parking areas and excavation areas.
   2. Take photos and video from same points in same direction as pre-construction examination.

B. Submittal of photos and videos is a condition of final payment.

PART 2 PRODUCTS

2.01 MEDIA

A. Paper media:
   1. Commercial grade, glossy surface, acid-free photographic paper.
   2. Submit 3 prints of each photographic view within 7 days of taking photographs.
   3. Format:
      a. Ground photos: Color, matte finish, 8-1/2-inch by 11-inch size, mounted on soft card stock.
      b. Aerial photos: Color, matte finish, 11-inch by 17-inch size, mounted on soft card stock.
      c. Mount each print in a separate, archival type, non-glare, 3-hole punched protector.
   4. Identification: On photograph, provide the following information:
      a. Name of project.
      b. Date stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
      c. Description of vantage point, indicating location and direction by compass point.
   5. Provide a suitably sized 3-ring binder for each set of prints.
      a. Furnish binders in sufficient quantities to hold entire set of prints taken for the duration of the Contract.
      b. Label binder spine and front with project name.

B. Digital media:
   1. 120 millimeters, 700-MB, 80-minute CD compatible with current Microsoft Windows.
   2. Provide photos as individual, indexed JPG files with the following characteristics:
      a. Compression shall be set to preserve quality over file size.
      b. Highest resolution JPG images shall be submitted. Resizing to a smaller size when high resolution JPGs are available shall not be permitted.
      c. JPG image resolution shall be 5 megapixels at 2,400 by 1,800 or higher.
      d. Images shall have rectangular clean images. Artistic borders, beveling, drop shadows, etc., are not permitted.
   3. Identification: On photograph, provide the following information:
      a. Name of project.
      b. Date stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
      c. Description of vantage point, indicating location and direction by compass point.

C. Videos:
   1. DVD compatible, 120 millimeters, formatted for use with PC systems.
   2. Video quality shall be 720p HD or greater in MPG, AVCHD, AVI, or MP4 format.
   3. Digital color video format.
   4. Provide audio portion of the composite CD sufficiently free from electrical interference and background noise to provide complete intelligibility of oral report.

5. Identification: On each copy provide a label with the following information:
    a. Name of project.
    b. Date video was recorded.
6. Submit 4 copies of each video within 7 days of recording.

PART 3 EXECUTION

3.01 GENERAL

A. Videos:
    1. Display continuous running time.
    2. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.

END OF SECTION

SECTION 01353

SPECIAL PROCEDURES FOR LOCATING AND VERIFYING CONCEALED EXISTING UTILITIES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Special procedures for locating and verifying concealed existing utilities.

1.02 CONCEALED EXISTING UTILTITIES

A. Verify locations of utilities which may exist by consulting with the Owner, utility companies, and Blue Stake or other service available in area of Project:
   1. Abide by easement and right-of-way restrictions.

B. Perform exploratory vacuum excavation potholing, as necessary to more accurately identify location, depth, configuration, and utility service in congested utility areas prior to preparation of shop drawings and subsequent excavation.
   1. Potholing shall be backfilled immediately after purpose has been satisfied and the surface restored and maintained in a manner satisfactory to Engineer.
   2. Adjustments in construction methods shall be made to accommodate utility location information gained from potholing as necessary to protect existing utilities and maintain plant in operations.
   3. Note that installation of all underground yard piping and utilities in this project are considered to be installed in congested utility areas.
   4. Some variation from the conditions indicated on the Drawings is to be expected.

C. Notify the Owner, owners of facilities when the Work will be in progress.

D. Make arrangements for potential emergency repairs in accordance with requirements of owners of utility facilities, including individual or residential facilities.

E. Assume responsibility for repair of utilities and facilities damaged by performance of the Work.

F. Expose sanitary and storm sewers, water, gas, electric, telephone utility lines, and other underground facilities indicated to permit survey location prior to commencement of Work in affected area:
   1. Expose in ample time to permit relocation of interfering utilities with minimum delaying effect on Contract Time.

G. Work required for raising, lowering, or relocating utilities not indicated will be performed by affected utility owners or as part of the Work at option of affected owners of utilities:
   1. When part of the Work, perform work in accordance with standards of affected utility owner, and adjustment to Contract Price and Contract Times will be made as stipulated in conditions of Contract.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01354

HAZARDOUS MATERIAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Procedures required when encountering hazardous materials at the Work site.

1.02 REFERENCES

A. Occupational Safety and Health Administration (OSHA).

B. United States Code of Federal Regulation (CFR):
   1. Title 29 - Labor:
      a. 1926.62 - Lead.
   2. Title 40 - Protection of Environment:
      a. 261 - Identification and Listing of Hazardous Waste.

1.03 SUBMITTALS

A. Submit laboratory reports, hazardous material removal plans, and certifications.

B. Submit the following work plan:
   1. Removal and Legal Disposal of Asbestos Cement Pipe Plan.
      a. Work plan shall include, but not be limited, to the following:
         1) Schedule of work.
         2) Security measures for work and disposal area.
         3) Staff training: Contractor shall provide at least one competent person who is capable of identifying asbestos hazards at the job site for the entire duration of the AC pipe removal and disposal operation.
         4) Trenching and removal of pipe procedure.

1.04 DEFINITIONS

A. Adequately Wet: Penetration of the pipe wall with liquid to prevent release of particulates.

B. Asbestos Cement Pipe: Also commonly referred to as AC Transite Pipe, AC pipe or ACP. Pipe that is generally composed of cement and asbestos fibers.

C. Competent Person: A trained worker who is capable of identifying existing and predictable asbestos hazards, perform exposure assessment and monitoring, is qualified to train other workers, and has the authority to take immediate corrective action to eliminate a hazardous exposure.

D. Non-friable Asbestos - Containing Material (NACM): Material containing more than 1 percent asbestos, that when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

E. Regulated Asbestos - Containing Material (RACM): Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder in the course of work.

1.05 OPERATING DIGESTERS

A. Observe safety precautions in vicinity of operating digesters which contain digester gases, including methane, hydrogen sulfide, and carbon dioxide.

1.06 HAZARDOUS MATERIALS PROCEDURES

A. Hazardous materials are those defined by 40 CFR and State specific codes.

B. When hazardous materials have been found:
   1. Prepare and initiate implementation of plan of action.
   2. Notify immediately Owner, Engineer, and other affected persons.
   3. Notify such agencies as are required to be notified by Laws and Regulations with the times stipulated by such Laws and Regulations.
   4. Designate a Certified Industrial Hygienist to issue pertinent instructions and recommendations for protection of workers and other affected persons' health and safety.
   5. Identify and contact subcontractors and licensed personnel qualified to undertake storage, removal, transportation, disposal, and other remedial work required by, and in accordance with, laws and regulations.

C. Forward to Engineer, copies of reports, permits, receipts, and other documentation related to remedial work.

D. Assume responsibility for worker health and safety, including health and safety of subcontractors and their workers.
   1. Instruct workers on recognition and reporting of materials that may be hazardous.

E. File requests for adjustments to Contract Times and Contract Price due to the finding of Hazardous Materials in the Work site in accordance with Contract Documents.
   1. Minimize delays by continuing performance of the Work in areas not affected by hazardous materials operations.

PART 2 EXECUTION

2.01 ASBESTOS MATERIALS

A. Notifications:
   1. Notify OSHA 24 hours prior to performing asbestos material removal operations.
   2. Contractor shall notify Owner 3 working days in advance of commencing asbestos material removal operations.

B. Work area:
   1. Establish a regulated work area, using at a minimum, construction warning tape to establish limits of work area for the asbestos material removal.

2. On site stockpiling or storage of asbestos material designated for disposal shall not be allowed.

C. Safety:
   1. Conduct an Initial Exposure Assessment (IEA).
   2. Provide a hand/face wash station.

D. Worker qualifications:
   1. Asbestos removal shall be performed by trained employees in conformance with Section (g) Methods of Compliance, of CCR, Title 8, § 1529, “Asbestos,” mandating wet methods, vacuum cleaners with HEPA filters to collect debris and prompt cleanup.

E. Legal disposal:
   1. Legal disposal of asbestos material is the Owner’s responsibility.
   2. Contractor shall transport the asbestos material to the location designated by the Owner and place into the location designated for this project.

2.02 EXCAVATION OF AC PIPE

A. Machine excavates to expose asbestos cement pipe.

B. Hand excavates areas under pipe where breaks are planned.

C. Pipe shall be pre-wetted prior to any breaks being made.

D. Pipe shall be snapped using mechanical snapping methods.

2.03 AC PIPE REMOVAL

A. All required pipe breaking operations shall require adequate pre-wetting with potable water.

B. The Contractor shall make every effort to minimize the number of pipe breaks. Wherever possible, the pipe should be removed by pulling the pipe out of the pipe joint collars.

C. Remove sections of AC pipe intact at joint collars by mechanical snapping methods between collars.

D. Wet and containerize waste materials as removed from the trench. Use lifting straps and methods that do not further damage the pipe.

E. Sections of AC pipe that become cut, have broken edges or have any friable surface shall be wet at exposed fractures and immediately wrapped.
   1. The pipe ends shall be sealed completely using a minimum 6-mil poly film wrap, which is securely fastened, taped to completely enclose the pipe and ACP appurtenances and shall have conspicuous, legible labeling that has the following or equivalent labeling: CAUTION: CONTAINS ASBESTOS FIBERS. BREATHING ASBESTOS DUST MAY CAUSE SERIOUS BODILY HARM.

F. AC Pipe sections shall not be left exposed in public view, either in trench or in disposal area.

G. All connecting parts of pipe, rubber gaskets, and pipe couplings shall be discarded with pipe.

H. AC pipe from this project only, shall be placed in the bin designated.

END OF SECTION

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Regulatory authorities and codes.

1.02 AUTHORITIES HAVING JURISDICTION

A. Building Department: City of West Jordan.

B. Fire Department: City of West Jordan.

1.03 APPLICABLE CODES

A. International Code Council (ICC).
   1. Building code:
      a. International Building Code (IBC), 2015.
         1) Utah state amendments.
      b. International Existing Building Code (IEBC), 2015.
   2. Electrical code:
      a. National Electrical Code (NEC), 2014.
   3. Energy code:
      a. International Energy Conservation Code (IECC), 2015.
   4. Fire code:
      a. International Fire Code (IFC), 2015.
   5. Mechanical code:
      a. International Mechanical Code (IMC), 2015.
   6. Plumbing code:
      a. International Plumbing Code (IPC), 2015.
   7. Fuel gas code:
      a. International Fuel Gas Code (IFGC), 2015.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01424

ABBREVIATIONS AND ACRONYMS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Abbreviations and meanings.

1.02 INTERPRETATIONS

A. Interpret abbreviations by context in which abbreviations are used.

1.03 ABBREVIATIONS

A. Abbreviations used to identify reference standards:

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ABC	Associated Air Balance Council
AATCC	American Association of Textile Chemists and Colorists.
ABMA	American Bearing Manufacturers' Association (formerly AFBMA, Anti-Friction Bearing Manufacturers' Association)
ABPA	Acoustical and Board Products Association
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ADC	Air Diffusion Council
ABMA	American Bearing Manufacturers' Association (formerly AFBMA, Anti-Friction Bearing Manufacturers' Association)
AGA	American Gas Association
AGC	Associated General Contractors
AGMA	American Gear Manufacturers' Association
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
AI	Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association International, Inc.
AMG	Arizona Masonry Guild
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ASAHC	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers

ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	ASTM International
AWI	Architectural Woodwork Institute
AWPA	American Wood Protection Association
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWSC	American Welding Society Code
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America
BSI	Building Stone Institute
CFR	United States Code of Federal Regulations
CLFMI	Chain Link Fence Manufacturers Institute
CPSC	U.S. Consumer Product Safety Commission
CRA	California Redwood Association
CRI	Carpet and Rug Institute
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSA	CSA International
CSI	Construction Specifications Institute
CTI	Ceramic Tile Institute
DHI	Door and Hardware Institute
EIFS	Exterior Insulation and Finish System
EJCDC	Engineers Joint Contract Documents Committee
EPA	United States Environment Protection Agency
FDA	Food and Drug Administration
FGMA	Flat Glass Marketing Association
FHWA	Federal Highway Administration
FIA	Factory Insurance Association
FM	FM (Factory Mutual) Global
FS	Federal Specifications
FTI	Facing Tile Institute
GA	Gypsum Association
HI	Hydraulic Institute
HMMA	Hollow Metal Manufacturers Association
IAPMO	International Association of Plumbing and Mechanical Officials
ICBO	International Conference of Building Officials
ICC	International Code Council
ICEA	Insulated Cable Engineer’s Association
ICRI	International Concrete Repair Institute
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers

ISA	International Society of Automation
ISO	International Organization for Standardization
JIC	Joint Industrial Council
MAG	Maricopa Association of Governments
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MS	Military Specifications
NAAMM	National Association of Architectural Metal Manufacturers
NACE	NACE International
NAPA	National Asphalt Pavement Association
NAVFAC	Department of the Navy Facilities Engineering Command
NBHA	National Builders Hardware Association
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NETA	InterNational Electrical Testing Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology
NMWIA	National Mineral Wool Insulation Association
NPCA	National Paint and Coatings Association
NRCA	National Roofing Contractors Association
NSF	NSF International
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturer's Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PDCA	Paint and Decorating Contractors of America
PDI	Plumbing and Drainage Institute
PEI	Porcelain Enamel Institute
PS	Product Standard
RCSC	Research Council on Structural Connections
RILEM	International Union of Testing and Research Laboratories for Materials and Structures
RTI	Resilient Tile Institute
SAE	SAE International
SCPA	Structural Clay Products Association
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association

SSPC	Society for Protective Coatings
TABB	Testing, Adjusting, and Balancing Bureau
TCA	Tile Council of America
UL	Underwriters Laboratories, Inc.
UNS	Unified Numbering System
USDA	United States Department of Agriculture
USACE	U.S. Army Corps of Engineers
USEPA	U.S, Environmental Protection Agency
VA	Vermiculite Association
WCLA	West Coast Lumberman's Association
WCLIB	West Coast Lumber Inspection Bureau
WPA	Western Pine Association
WPOA	Western Plumbing Officials Association
WRC	Welding Research Council
WSCPA	Western States Clay Products Association
WWPA	Western Wood Products Association

B. Abbreviations used in Specifications and Drawings:

a	year or years (metric unit)
A	ampere or amperes
am	ante meridian (before noon)
ac	alternating current
ac-ft	acre-foot or acre-feet
atm	atmosphere
AWG	American Wire Gauge
bbl	barrel or barrels
bd	board
bhp	brake horsepower
BIL	basic impulse insulation level
bil gal	billion gallons
BOD	biochemical oxygen demand
Btu	British thermal unit or units
Btuh	British thermal units per hour
bu	bushel or bushels
BV	bed volume(s)
C	degrees Celsius
cal	calorie or calories
cap	capita
cd	candela or candelas
cfm	cubic feet per minute
Ci	curie or curies
CIPP	Cured-in-Place Pipe
cm	centimeter or centimeters
cmu	concrete masonry unit

CO	carbon monoxide
Co.	Company
CO_2	carbon dioxide
COD	chemical oxygen demand
Corp.	Corporation
counts/min	counts per minute
cu	cubic
cu cm	cubic centimeter or centimeters
cu ft	cubic foot or feet
cu ft/day	cubic feet per day
cu ft/hr	cubic feet per hour
cu ft/min	cubic feet per minute
cu ft/sec	cubic feet per second
cu in	cubic inch or inches
cu m	cubic meter or meters
cu yd	cubic yard or yards
d	day (metric units)
day	day (English units)
db	decibels
D/d	column diameter to particle diameter ratio
DB	dry bulb (temperature)
dc	direct current
diam	diameter
DO	dissolved oxygen
DS	dissolved solids
EBCT	empty bed contact time
EER	energy efficiency ratio
emf	electromotive force
fpm	feet per minute
F	degrees Fahrenheit
ft	feet or foot
fc	foot-candle or foot candles
ft/day	feet per day
ft/hr	feet per hour
ft/min	feet per minute
ft/sec	feet per second
g	gram or grams
G	gravitational force
gal	gallon or gallons
gal/day	gallons per day
gal/min	gallons per minutes
gal/sec	gallons per second
gfd	gallons per square foot per day
g/L	grams per liter
gpd	gallons per day
gpd/ac	gallons per day per acre
gpd/cap	gallons per day per capita
gpd/sq ft	gallons per day per square foot

gph	gallons per hour
gpm	gallons per minute
gpm/sq ft	gallons per minute per square foot
gps	gallons per second
g/cm^3	grams per cubic centimeter
h	hour or hours (metric units)
ha	hectare or hectares
hp	high point
hp	horsepower
hp-hr	horsepower-hour or horsepower-hours
hr	hour or hours (English units)
Hz	hertz
ID	inside diameter
ihp	indicated horsepower
Inc.	Incorporated
inch	inch
inches	inches
inches/sec	inches per second
I/O	input/output
J	joule or joules
JTU	Jackson turbidity unit or units
k	kips
K	kelvin
K	thermal conductivity
kA	kiloampere
kcal	kilocalorie or kilocalories
kcmil	thousand circular mils
kg	kilogram or kilograms
kip	kilopound or kilopounds
km	kilometer or kilometers
kN	kilonewton or kilonewtons
kPa	kilopascal or kilopascals
ksi	kips per square inch
kV	kilovolt or kilovolts
kVA	kilovolt-ampere or kilovolt-amperes
kW	kilowatt or kilowatts
kWh	kilowatt hour
L	liter or liters
lb/1000 cu ft	pounds per thousand cubic foot
lb/acre-ft	pounds per acre-foot
lb/ac	pounds per acre
lb/cu ft	pounds per cubic foot
lb/day/cu ft	pounds per day per cubic foot
lb/day/acre	pounds per day per acre
lb/sq ft	pounds per square foot
L/D Ratio	Ratio of filter height to filter media particle diameter
lin	linear, lineal

lin ft	linear foot or feet
lm	lumen or lumens
lmh	liters per square meter per hour
log	logarithm (common)
ln	logarithm (natural)
lx	lux
m	meter or meters
M	molar (concentration)
mA	milliampere or milliamperes
max	maximum
mCi	millicurie or millicuries
meq	milliequivalent
meq/mL	milliequivalents per milliliter
MFBM	thousand feet board measure
mfr	manufacturer
mg	milligram or milligrams
mgd/ac	million gallons per day per acre
mgd	million gallons per day
mg/L	milligrams per liter
mrem	millirem
µF	microfarad or microfarads
Mil	0.001 inch (used for coating thickness)
mile	mile
mil. gal	million gallons
miles	miles
min	minimum
min	minute or minutes
MLSS	mixed liquor suspended solids
MLVSS	mixed liquor volatile suspended solids
mm	millimeter or millimeters
mol wt	molecular weight
mol	mole
Mpa	megapascal or megapascals
mph	miles per hour
MPN	most probable number
MPT	National Pipe Thread, male fitting
mR	milliroentgen or milliroentgens
Mrad	megarad or megarads
mV	millivolt or millivolts
MW	megawatt or megawatts
µg/L	micrograms per liter
µm	micrometer or micrometers
µS/cm	microSeimens per centimeter
N	newton or newtons
N	normal (concentration)
ND	not detected
nm	nanometer
No.	number
Nos	numbers
NPT	National Pipe Thread

NRC	noise reduction coefficient
NTU or ntu	nephelometric turbidity unit
oc	on center
OD	outside diameter
ORP	oxidation-reduction potential
OT	ortho-tolidine
OTA	ortha-tolidine-arsenite
oz	ounce or ounces
oz/sq ft	ounces per square foot
Pa	pascal or pascals
pl	plate or property line
pm	post meridiem (afternoon)
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
pr	pair
psf/hr	pounds per square foot per hour
psf	pounds per square foot
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
PVC	polyvinyl chloride
qt	quart or quarts
R	radius
R	roentgen or roentgens
rad	radiation absorbed dose
RH	relative humidity
rpm	revolutions per minute
rps	revolutions per second
s	second (metric units)
S	Siemens (mho)
scfh	standard cubic feet per hour
scfm	standard cubic feet per minute
SDI	sludge density index or silt density index
sec	second (English units)
SI	International System of Units
sp	static pressure
sp gr	specific gravity
sp ht	specific heat
sq	square
cm^2 or sq cm	square centimeter or centimeters
sq ft	square feet or foot
sq inch	square inch
sq inches	square inches
km^2 or sq km	square kilometer or kilometers
m^2 or sq m	square meter or meters
mm^2 or sq mm	square millimeter or millimeters

sq yd	square yard or yards
SS	suspended solids
STC	Sound Transmission Class
SVI	sludge volume index
TDS	total dissolved solids
TEFC	totally enclosed, fan-cooled
TKN	total Kjeldahl nitrogen
TLM	median tolerance limit
TOC	total organic carbon
TOD	total oxygen demand
TOW	top of weir
TS	total solids
TSS	total suspended solids
TVS	total volatile solids
U	U Factor/U Value
U	Coefficient of Heat Transfer
U	heat transfer coefficient
UNS	Uniform Numbering System
US	United States
V	volt or volts
VA	volt-ampere or volt-amperes
W	watt or watts
WB	wet bulb
wg	water gauge
wk	week or weeks
WRT	water remediation technologies
wt	weight
yd	yard or yards
yr	year or years (English unit)

C. Abbreviations used on Drawings: As listed on Drawings or in Specifications.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Quality control and control of installation.
   2. Tolerances.
   3. References.
   4. Mock-up requirements.
   5. Authority and duties of Owner's representative or inspector.
   6. Sampling and testing.
   7. Testing and inspection services.
   8. Contractor's responsibilities.

1.02 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

H. When specified, products will be tested and inspected either at point of origin or at Work site:
   1. Notify Engineer in writing 30 days in advance unless specified otherwise of when products will be ready for testing and inspection at point of origin.
   2. Do not construe that satisfactory tests and inspections at point of origin is final acceptance of products. Satisfactory tests or inspections at point of origin do not preclude retesting or re-inspection at Work site.

I. Do not ship products which require testing and inspection at point of origin prior to testing and inspection.

1.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When Manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

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

1.04 REFERENCES

A. ASTM International (ASTM):
   1. E329 - Standard for Agencies Engaged in Construction Inspection, Testing or Special Inspection.

1.05 PRODUCT REQUIREMENTS

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

1.06 MOCK-UP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in respective product specification sections.

B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be comparison standard for remaining Work.

D. Where mock-up has been accepted by Engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Engineer.

1.07 AUTHORITY AND DUTIES OF OWNER'S REPRESENTATIVE OR INSPECTOR

A. Owner’s Project Representative employed or retained by Owner is authorized to inspect the Work.

B. Inspections may extend to entire or part of the Work and to preparation, fabrication, and manufacture of products for the Work.

C. Deficiencies or defects in the Work which have been observed will be called to Contractor's attention.

D. Inspector will not:
   1. Alter or waive provisions of Contract Documents.
   2. Inspect Contractor's means, methods, techniques, sequences, or procedures for construction.
   3. Accept portions of the Work, issue instructions contrary to intent of Contract Documents, or act as foreman for Contractor. Supervise, control, or direct Contractor's safety precautions or programs; or inspect for safety conditions on Work site, or of persons thereon, whether Contractor's employees or others.

E. Inspector will:
   1. Conduct on-site observations of the Work in progress to assist Engineer in determining when the Work is, in general, proceeding in accordance with Contract Documents.
   2. Report to Engineer whenever Inspector believes that Work is faulty, defective, does not conform to Contract Documents, or has been damaged; or whenever there is defective material or equipment; or whenever Inspector believes the Work should be uncovered for observation or requires special procedures.

1.08 SAMPLING AND TESTING

A. General:
   1. Prior to delivery and incorporation in the Work, submit listing of sources of materials, when specified in sections where materials are specified.
   2. When specified in sections where products are specified:
      a. Submit sufficient quantities of representative samples of character and quality required of materials to be used in the Work for testing or examination.
      b. Test materials in accordance with standards of national technical organizations.

B. Sampling:
   1. Furnish specimens of materials when requested.
   2. Do not use materials which are required to be tested until testing indicates satisfactory compliance with specified requirements.
   3. Specimens of materials will be taken for testing whenever necessary to determine quality of material.
   4. Assist Engineer in preparation of test specimens at site of work, such as soil samples and concrete test cylinders.

1.09 TESTING AND INSPECTION SERVICES

A. Contractor will employ and pay for specified services of an independent firm to perform Contractor quality control testing as required in the technical specifications for various work and materials.

B. Owner will employ and pay for specified services of an "Owner's independent testing firm" certified to perform testing and inspection as required in the technical specifications for various work and materials or stipulated in Section 01455B -

Special Tests and Inspections to confirm Contractor's compliance with Contract Documents.

C. The Owner's independent testing firm will perform tests, inspections and other services specified in individual specification sections and as required by Owner and requested by the Engineer.

D. The qualifications of laboratory that will perform the testing, contracted by the Owner or by the Contractor, shall be as follows:
   1. Has authorization to operate in the state where the project is located.
   2. Meets "Recommended Requirements for Independent Laboratory Qualification," published by American Council of Independent Laboratories.
   3. Meets requirements of ASTM E329.
   4. Laboratory Staff: Maintain full time specialist on staff to review services.
   5. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards (NBS) or accepted values of natural physical constants.
   6. Will submit copy of report of inspection of facilities made by Materials Reference Laboratory of NBS during most recent tour of inspection, with memorandum of remedies of deficiencies reported by inspection.

E. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing inspections and source quality control as required by Engineer or Owner.

F. Contractor shall cooperate with Owner's independent testing firm, furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
   1. Notify Engineer and Owner's independent testing firm 48 hours prior to expected time for operations requiring testing.
   2. Make arrangements with Owner's independent testing firm and pay for additional samples and tests required for Contractor's use.

G. Limitations of authority of testing Laboratory: Owner's independent testing firm or Laboratory is not authorized to:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency or laboratory may not approve or accept any portion of the Work.
   3. Agency or laboratory may not assume duties of Contractor.
   4. Agency or laboratory has no authority to stop the Work.

H. Testing and employment of an Owner's independent testing firm or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

I. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same Owner's independent testing firm on instructions by Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

J. The Owner's independent testing firm responsibilities will include:
   1. Test samples of mixes submitted by Contractor.

2. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings.

K. Owner's independent testing firm individual test reports: After each test, Owner's independent testing firm will promptly submit electronically and 3 hard copies of report to Engineer and to Contractor. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Certified test results stamped and signed by a registered Engineer in the State of Utah.
10. Summary of conformance with Contract Documents.
11. When requested by Engineer, the Owner's independent testing firm will provide interpretation of test results.

L. Owner's independent testing firm will provide monthly report of certification to identify all work performed for special inspections and other contract requirements on this project. The following certified monthly report at a minimum will include but not limited to:
1. Results of testing.
2. Testing logs.
3. Outstanding deficiencies.
4. Various statistical data.
5. Testing curves (up to 4 types) as required by the Engineer.

1.10 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with Owner's independent testing firm or laboratory personnel and provide access to construction and manufacturing operations.

B. Secure and deliver to Owner's independent testing firm or laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to Owner's independent testing firm or laboratory and Engineer preliminary mix design proposed to be used for concrete, and other materials mixes which require control by testing laboratory.

D. Furnish electronically and 5 hard copies of product test reports.

E. Furnish incidental labor and facilities:
   1. To provide access to construction to be tested.
   2. To obtain and handle samples at Work site or at source of product to be tested.
   3. To facilitate inspections and tests.
   4. For storage and curing of test samples.

F. Notify Owner's independent testing firm or laboratory 48 hours in advance of when observations, inspections and testing is needed for laboratory to schedule and perform in accordance with their notice of response time.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01455B

SPECIAL TESTS AND INSPECTIONS PROVIDED BY OWNER

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: This Section describes the requirements for providing special inspections, special tests, and structural observation.

B. Special Tests and Inspections specified by this Section will be provided by the OWNER. Contractor to coordinate with as needed with Owner's Special Inspector to accommodate the requirements of this specification.

1.02 REFERENCES

A. American Concrete Institute (ACI):
   1. 318 - Building Code Requirements for Structural Concrete.
   2. 530 - Building Code Requirements for Masonry Structures.
   3. 530.1 - Specification for Masonry Structures.

B. American Institute of Steel Construction (AISC):
   1. 360 - Specification for Structural Steel Buildings.

C. American Society of Civil Engineers (ASCE):
   1. 7 - Minimum Design Loads for Buildings and Other Structures.

D. American Welding Society (AWS):
   1. D1.3 - Structural Welding Code - Sheet Steel.
   2. D1.4 - Structural Welding Code - Reinforcing Steel.

E. ASTM International (ASTM):
   1. A706 - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.
   2. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   4. C1611 Standard Test Method for Slump Flow of Self-Consolidating Concrete.

F. International Building Code (IBC) 2015 with State of Utah amendments.

1.03 DEFINITIONS

A. Special Inspection: Inspection of the materials, installation, fabrication, erection, or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards.

B. Special Inspection, Continuous: The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

C. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed and at the completion of the work.

D. Structural Observation: The visual observation of the structural system by a registered design professional for general conformance to the approved construction documents at significant construction stages and at completion of the structural system.

1.04 DESCRIPTION

A. This Section describes special inspections, special tests, and structural observation of structural assemblies and components to be performed in compliance with the regulatory building code specified in Section 01410 - Regulatory Requirements.

B. These special tests and inspections are in addition to the requirements specified in Section 01450 - Quality Control, and by the individual Sections.

1.05 SPECIAL INSPECTION

A. Owner will employ 1 or more special inspectors who will provide special inspections during construction.

B. Special inspectors shall be qualified for inspection of the particular type of materials or operations requiring special inspection.

C. Duties of Special Inspector:
   1. General: Required duties of the special inspector(s) shall be as described in Chapter 17 of the building code, specified in Section 01410 - Regulatory Requirements, and this Section.
   2. Reporting: Special inspector(s) shall provide reports of each inspection to the Building Official and the Engineer.
      a. Reports shall, at a minimum, indicate the following items:
         1) Date and time of inspection, and name(s) of individual(s) performing the inspection.
         2) Structures and areas of the structure where work or testing was observed.
         3) Discrepancies between the requirements of the Contract Documents and the work or testing observed.
         4) Other areas of deficiency in the Work.

D. Special inspections shall not be construed as fulfilling the requirements for structural observation.

1.06 TESTING

A. Testing laboratory: Special tests will be performed by Owner's testing laboratory as specified in Section 01450 - Quality Control.

B. Selection of the material to be tested shall be by Engineer or by Owner's testing laboratory, and not by the Contractor.

1.07 STRUCTURAL OBSERVATION

A. Owner will employ 1 or more registered design professionals who will provide structural observation during construction.
   1. Registered design professional shall be a civil or structural engineer currently licensed as such in the State of Utah and regularly engaged in the structural design of structures equivalent or similar to those indicated on the Drawings.

B. Structural observations shall not be construed as fulfilling the requirements for special inspections.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SPECIAL TESTING AND INSPECTIONS

A. The following types of work require special inspection as described in Section 1705 of the building code as specified in Section 01410 - Regulatory Requirements and shall be provided wherever such work occurs unless otherwise specified. Refer to the following schedules:
   1. Appendix A: Concrete Special Inspection Schedule.
   2. Appendix B: Architectural, Mechanical, and Electrical Component Special Inspection Schedule.
   3. Appendix C: Level C Masonry Special Inspection and Minimum Tests Schedule.
   4. Appendix D: Soils Verification and Inspection Schedule.
   5. Appendix E: Structural Steel Welding Special Inspection Schedule.
   6. Appendix F: Structural Steel Bolting Special Inspection Schedule.

B. Testing and qualification for seismic resistance (Section 1705.12 of the regulatory building code):
   1. The following designated systems shall be subject to the testing and qualification requirements of Section 1705.12.3 of the regulatory building code and shall require special certification as set forth in ASCE 7, Section 13.2:
      a. Mechanical equipment with an importance factor of 1.50 as specified in Section 01612 - Seismic Design Criteria.
      b. All electrical equipment.
   2. Seismic certification requirements for designated systems:
      a. Submittals for mechanical and electrical equipment identified in this Section as designated systems shall include certification that the equipment is seismically qualified. Certifications shall be subject to review and acceptance by the Contractor.
         1) Certifications may be at least 1 of the following in accordance with ASCE 7, Section 13.2:
            a) Analysis.
            b) Testing.
            c) Experience data.

b. Special inspector shall examine the designated seismic system and determine whether the designated system components, including anchorage, conform to the evidence of compliance submitted.

3.02 STRUCTURAL OBSERVATION

A. The following work requires structural observation in accordance with Section 1704.5 of the regulatory building code:
   1. All structures in all areas:
      a. Foundations.
      b. Elevated slabs.
      c. Walls and columns.
      d. Roof framing and diaphragms.

3.03 OTHER SPECIFIC TESTS

A. Any unusual materials that are expected to support design live loads.

3.04 SCHEDULE

A. Contractor shall allow time necessary for Special Inspections as listed above.

B. Sufficient notice shall be given so that the Special Inspections can be performed. This includes time for off-site Special Inspectors to plan the inspection and travel to site.

3.05 PROCEDURE

A. The Special Inspector will immediately notify the Engineer of any corrections required and follow notification with appropriate documentation.

B. Contractor shall not proceed until the work is satisfactory to the Engineer.

END OF SECTION

APPENDIX A

CONCRETE SPECIAL INSPECTION SCHEDULE
(Includes: cast-in-place, precast, prestressed, precast-prestressed, and shotcrete.)

Verification and Inspection	Reference Standard ACI 318-14 AWS D1.4-11 IBC 2015	Frequency of Inspection[(1)] (During Task Listed)	
		Continuous	Periodic
1. Construction of forms.	ACI 318: 26.13.3.3(c)		●
a. Removal of slab forms and installation of re-shoring	ACI 318: 26.13.3.2(c)		●
2. Inspection of reinforcing steel, including prestressing and post-tensioning tendons.	ACI 318: Ch 20, 25.2, 25.3, 26.5.1-26.5.3, 26.13.3.3(a) IBC: 1908.4		●
a. Reinforcing bar couplers and terminators:	Evaluation Service Reports	●	
b. Inspection of reinforcing steel welding:	AWS D1.4 ACI 318: 26.6.4.1		
3. Verify weldability of reinforcing bars (other than ASTM A706).	ACI 318: 26.6.4.1		●
a. Single pass fillet welds (to 5/16 inch).	IBC: Table 1705.3		●
b. All other welds.	IB:C Table 1705.3	●	
c. Inspect anchors and embedments cast into concrete (prior to and during placement of concrete).	ACI 318: 17.8.2, 26.13.3.3(a)		●
4. Inspection of anchors post-installed in hardened concrete members.			
5. Adhesive anchors installed in horizontal or upwardly inclined orientations.	ACI 318: 17.8.2.4, 26.13.3.2(c). Evaluation Service Reports.	●	
a. Mechanical anchors, and adhesive anchors not included under 4a.	ACI 318: 17.8.2, 26.13.3.3(f)		●
b. Concrete placement:			
6. Verify use of required mix design.	ACI 318: Ch 19, 26.4.3, 26.4.4 IBC: 1904.1, 1904.2, 1908.2, 1908.3	●	

Verification and Inspection	Reference Standard ACI 318-14 AWS D1.4-11 IBC 2015	Frequency of Inspection[1] (During Task Listed)	
		Continuous	Periodic
a. Sampling and preparation of cylinders and specimens for testing.	ACI 318: 26.12 IBC: 1908.10	●	
b. At the time fresh concrete is sampled to fabricate specimens for testing, perform slump and air content tests, and determine the temperature of the concrete.	ASTM C172 ASTM C31 ACI 318: 26.12 IBC 1908.10	●	
c. Inspection of concrete placement for proper application and consolidation techniques.	ACI 318: 26.13.3.2(a) IBC: 1908.6, 1908.7, 1908.8	●	
7. Inspection for maintenance of specified curing temperatures, techniques, and duration.	ACI 318: 26.13.3.3(b) IBC: 1908.9		●
8. Inspection of prestressed concrete:			
9. Application of prestressing forces.	ACI 318: 26.13.3.2(b)	●	
a. Grouting of bonded prestressing tendons.	ACI 318: 26.13.3.2(b)	●	
b. Precast concrete members: sequence of erection and connections	ACI 318: 26.13.3.3(d),		●
10. Verification of in-place concrete strength before stressing post-tensioned reinforcement, and before removal of shores and forms from beams and structural slabs.	ACI 318: 26.13.3.3(e)		●
11. Inspect formwork for shape, location, and dimensions of the concrete member being formed.	ACI 318: 26.10.2		●

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

APPENDIX B

ARCHITECTURAL, PLUMBING, MECHANICAL, AND ELECTRICAL COMPONENTS SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard IBC 2015	Frequency of Inspection[(1)] (During Task Listed)	
		Continuous	**Periodic**
12. Architectural components:			
a. Cladding - exterior, weighing more than 5 psf: erection and fastening.	IBC: 1705.12.5		●
b. Exterior insulation and finish system (EIFS): NTS: Review IBC and edit for project.	IBC: 1705.16		
c. Non-bearing walls - exterior: erection and fastening.	IBC: 1705.12.5		●
d. Non-bearing walls - interior, weighing more than 15 psf.	IBC: 1705.12.5		●
e. Veneer, exterior and interior, weighing more than 5 psf: erection and fastening.	IBC: 1705.12.5		●
f. Access floors: erection and anchorage.	IBC: 1705.12.5.1		●
g. Suspended ceiling system: anchorage.			●
h. Storage racks - 8 feet or greater in height: erection and anchorage.	IBC: 1705.12.7		●
13. Plumbing, mechanical, and electrical components:			
a. Anchorage of electrical equipment for emergency and standby power systems.	IBC: 1705.12.6.1		●
b. Anchorage of other electrical and mechanical equipment over 400 lb. on floors or roofs.	IBC: 1705.12.6.2		●
c. Installation and anchorage of pipelines carrying hazardous chemicals and their associated mechanical units.	IBC: 1705.12.6.3		●
d. Installation and anchorage of pipelines greater than 8 inches in diameter.			●
e. Installation and anchorage of ductwork designed to carry hazardous materials.	IBC: 1705.12.6.4		●
f. Installation and anchorage of ductwork greater than 6 sf in cross section.			●

g. Installation and anchorage of vibration isolation systems where contract documents require nominal clearance of 1/4 inch or less between the equipment support frame and its support/restraint.	IBC: 1705.12.6.5		●
14. Fire-resistance elements:			
a. Sprayed fire-resistant coatings:	IBC: 1705.14		
b. Mastic and intumescent coatings:	IBC: 1705.15		
c. Penetration firestops:	IBC: 1705.17, 1705.17.1		
d. Fire-resistant joint systems:	IBC: 1705.17, 1705.17.2		
15. Smoke control systems;	IBC: 1705.18		
Notes: (1) The "●" represents a required inspection activity for the project where it occurs.			

APPENDIX C

MASONRY SPECIAL INSPECTION SCHEDULE - "LEVEL C"

MINIMUM TESTS

Verification of Slump flow and Visual Stability Index (VSI) as delivered to the project site as determined by ASTM C1611 for self-consolidating grout.

Verification of proportions of materials in premixed or pre-blended mortar and grout as delivered to the project site.

Verification of f'_m in accordance with Specification Section 04220 - Concrete Unit Masonry prior to construction.

MINIMUM SPECIAL INSPECTION - LEVEL C			
	Reference Standard ACI 530-13 ACI 530.1-13	**Frequency of Inspection(1) (During Task Listed)**	
Verification and Inspection		**Continuous**	**Periodic**
1. Verify compliance with the approved submittals.	ACI 530.1: Art. 1.5		●
2. As masonry construction begins, verify that the following are in compliance:			
a. Proportions of site-prepared mortar.	ACI 530.1: Art. 2.1, 2.6A		●
b. Placement of masonry units and construction of mortar joints.	ACI 530.1: Art. 3.3B		●
c. Placement of reinforcement, connectors, and anchors.	ACI 530.1: Art 3.4 ACI 530: Sec 6.1, 6.2.6, 6.2.7	●	
a. Reinforcing bar couplers and terminators.		●	
3. Prior to grouting, verify that the following are in compliance:			
a. Placement of masonry units and construction of mortar joints.	ACI 530.1: Art. 3.3B		●
b. Grout space.	ACI 530.1: Art. 3.2D, 3.2F	●	
c. Grade, type, and size of reinforcement and anchor bolts.	ACI 530.1: Art. 2.4, 3.4 ACI 530: Sec. 6.1		●
d. Placement of reinforcement, connectors, and anchors.	ACI 530.1: Art. 3.2E, 3.4 ACI 530: Sec. 6.1, 6.2.6, 6.2.7	●	

MINIMUM SPECIAL INSPECTION - LEVEL C			
Verification and Inspection	**Reference Standard** ACI 530-13 ACI 530.1-13	**Frequency of Inspection(1) (During Task Listed)**	
		Continuous	**Periodic**
4. Verify during construction:			
a. Size and location of structural elements:	ACI 530.1: Art. 3.3F		●
b. Type, size, and location of anchors, including details of anchorage of masonry to structural members, frames, or other construction.	ACI 530: Sec. 1.2.1(e), 6.1.4.3, 6.2.1	●	
c. Welding of reinforcement.	ACI 530: Sec 8.1.6.7.2, 9.3.3.4(c), 11.3.3.4(b)	●	
d. Preparation, construction, and protection of masonry during cold weather (temperature below 40 degrees F) or hot weather (temperature above 90 degrees F).	ACI 530.1: Art. 1.8C, 1.8D		●
5. Observe preparation of grout specimens, mortar specimens, and/or prisms.	ACI 530.1: Art. 1.4 B.2.a.3, 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B.4	●	

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

APPENDIX D

SOILS VERIFICATION AND SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Reference Standard IBC 2015	Frequency of Inspection[(1)] (During Task Listed)	
		Continuous	**Periodic**
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	IBC: T-1705.6		●
2. Verify excavations are extended to proper depth and have reached proper material.	IBC: T-1705.6		●
3. Perform classification and testing of fill and backfill materials.	IBC: T-1705.6		●
4. Verify use of proper materials, densities, and lift thicknesses during placement and compaction of fill and backfill.	IBC: T-1705.6	●	
5. Prior to placement of fill, observe subgrade and verify that site has been prepared properly.	IBC: T-1705.6		●

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

APPENDIX E

STRUCTURAL STEEL WELDING SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Referenced Standard AISC 360-10	Frequency of Inspection[(1)] (During Task Listed)	
		Continuous	**Periodic**
Inspection Tasks Prior to Welding	AISC 360, Table N5.4-1		
1. Welding procedure specifications (WPSs) available.		●	
2. Manufacturer certifications for welding consumables available.		●	
3. Material identification (type/grade).			●
4. Welder identification system.			●
5. Fit-up groove welds (including joint geometry): • Joint preparation. • Dimensions (alignment, root opening, root face, bevel). • Cleanliness (condition of steel surfaces). • Tacking (tack weld quality and location). • Backing type and fit (if applicable).			●
5. Configuration and finish of access holes.			●
6. Fit-up of fillet welds: • Dimensions (alignment, gaps at root). • Cleanliness (condition of steel surfaces). • Tacking (tack weld quality and location).			●
7. Check welding equipment.			●
Inspection Tasks During Welding	AISC 360, Table N5.4-2		
8. Use of qualified welders.			●
9. Control and handling of welding consumables: • Packaging. • Exposure control.			●
10. No welding over cracked tack welds.			●
11. Environmental conditions: • Wind speed within limits. • Precipitation and temperature.			●

Verification and Inspection	Referenced Standard AISC 360-10	Frequency of Inspection[1] (During Task Listed) Continuous	 Periodic
12. WPS followed: • Settings on welding equipment. • Travel speed. • Selected welding materials. • Shielding gas type/flow rate. • Preheat applied. • Interpass temperature maintained (min/max). • Proper position (F, V, H, OH).			●
13. Welding techniques: • Interpass and final cleaning. • Each pass within profile limitations. • Each pass meets quality requirements.			●
Inspection Tasks After Welding	AISC 360, Table N5.4-3		
14. Welds cleaned.			●
15. Size, length, and location of welds.		●	
16. Welds meet visual acceptance criteria: • Crack prohibition. • Weld/base-metal fusion. • Crater cross section. • Weld profiles. • Weld size. • Undercut. • Porosity.		●	
17. Arc strikes.		●	
18. k-area.		●	
19. Backing removed and weld tabs removed (if required).		●	
20. Repair activities.		●	
21. Document acceptance or rejection of welded joint or member.		●	

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

APPENDIX F

STRUCTURAL STEEL BOLTING SPECIAL INSPECTION SCHEDULE

Verification and Inspection	Referenced Standard ASIC 360-10	Frequency of Inspection[(1)] (During Task Listed)	
		Continuous	**Periodic**
Inspection Tasks Prior to Bolting	AISC 360, Table N5.6-1		
1. Manufacturer's certifications available for fastener materials.		●	
2. Fasteners marked in accordance with ASTM requirements.			●
3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane).			●
4. Proper bolting procedure selected for joint detail.			●
5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.			●
6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.			●
7. Proper storage provided for bolts, nuts, washers and other fastener components.			●
Inspection Tasks During Bolting	AISC 360, Table N5.6-2		
8. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.			●
9. Joint brought to the snug-tight condition prior to the pretensioning operation.			●
10. Fastener component not turned by the wrench prevented from rotating.			●
11. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges.			●
Inspection Tasks After Bolting	AISC 360, Table N5.6-3		
12. Document acceptance or rejection of bolted connections.		●	

Verification and Inspection	Referenced Standard	Frequency of Inspection[1] (During Task Listed)	
	ASIC 360-10	Continuous	Periodic

Notes:

(1) The "●" represents a required inspection activity for the project where it occurs.

SECTION 01460

CONTRACTOR QUALITY CONTROL PLAN

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Contractor Quality Control Plan.

1.02 SUBMITTALS

A. Qualifications of the Contractor's Quality Control (CQC) Plan Manager must include all qualifying registrations and show that the candidate has had experience (minimum 10 years) on projects of similar type and size.

B. Contractor's Daily Quality Control Report: Submit to Engineer within 1 day of completion of each inspection.

C. Daily Inspection Report: Submit to Engineer at the end of each working day or no later than prior to the beginning of the next working day.

1.03 CONTRACTOR'S INSPECTION OF THE WORK

A. Work performed by Contractor shall be inspected by the Contractor's CQC Plan Manager. Non-conforming Work and any safety hazards in the Work area shall be noted and promptly corrected.

B. No materials or equipment shall be used in Work without inspection and acceptance by Contractor's CQC Plan Manager.

1.04 QUALIFICATIONS

A. Contractor's CQC Plan Manager: Demonstrate having performed similar CQC functions on similar type projects. Submit records of personnel experience, training, and qualifications.

1.05 COVERING WORK

A. Whenever Contractor intends to backfill, bury, cast in concrete, or otherwise cover any Work, notify Engineer not less than 24 hours in advance to request inspection before beginning any such Work of covering. Failure of Contractor to notify Engineer in accordance with this requirement shall be resolved according to Article 14 of the General Conditions.

1.06 REJECTED WORK

A. Failure to promptly remove and replace rejected Work will be considered a breach of this Contract, and Owner may proceed under provisions of the General Conditions.

1.07 CONTRACTOR'S QUALITY CONTROL PROGRAM

A. General: Establish and execute a Quality Control (CQC) Plan for Work. The plan shall establish adequate measures for verification and conformance to defined requirements by Contractor personnel and lower-tier Subcontractors (including Fabricators, Suppliers, and Subcontractors). This program shall be described in a Plan responsive to this Section.

B. CQC personnel:
   1. Contractor's CQC Plan Manager shall report to a Senior Project Manager of the Contractor and shall have no supervisory or managerial responsibility over the workforce.
   2. The Contractor CQC Plan Manager shall be on-site as often as necessary, but not less than the daily working hours specified in the Contract Documents to remedy and demonstrate that Work is being performed properly and to make multiple observations of Work in progress.
   3. The Contractor is to furnish personnel with assigned CQC functions reporting to the CQC Manager. Persons performing CQC functions shall have sufficient qualifications, authority, and organizational freedom to identify quality problems and to initiate and recommend solutions.

C. CQC Plan:
   1. Contractor's CQC Plan shall include a statement by the Senior Project Manager designating the CQC Plan Manager and specifying the authority delegated to the CQC Plan Manager to direct cessation or removal and replacement of defective Work.
   2. Describe the CQC program and include procedures, work instructions, and records. Describe methods relating to areas that require special testing and procedures as required by the specifications.
   3. Include specific instructions defining procedures for observing Work in process and comparing this Work with the Contract requirements (organized by specifications section).
   4. Describe procedures to ensure that equipment or materials that have been accepted at the Site are properly stored, identified, installed and tested.
   5. Include procedures to verify that procured products and services conform to the requirements of the Specifications. Requirements of these procedures shall be applied, as appropriate, to lower-tier Suppliers and/or Subcontractors.
   6. Commissioning quality control: Include procedures to verify that the commissioning requirements of the Contract Documents are integrated into the Contractor's CQC Plan and conform to the requirements of the Specifications. Requirements of these procedures shall be applied, as appropriate, to the Contractor and the lower-tier Suppliers and/or Subcontractors.
   7. Include instructions for recording inspections and requirements for demonstrating through the Daily Inspection Reports that Work inspected was in compliance or a deficiency was noted and action to be taken.
   8. Procedures to preclude the covering of deficient or rejected Work.
   9. Procedures for halting or rejecting Work.
   10. Procedures for resolution of differences between the CQC Plan Manager and the production personnel.
   11. Identify contractual hold/inspection points as well as any Contractor-imposed hold/inspection points.

D. Daily Inspection Report: Include, at a minimum:
   1. Inspection of specific work.
   2. Quality characteristics in compliance.
   3. Quality characteristics not in compliance.
   4. Corrective/remedial actions taken.
   5. Statement of certification.
   6. CQC Manager's signature.
   7. Information provided on the daily report shall not constitute notice of delay or any other notice required by the Contract Documents.

E. Deficient and Nonconforming Work and Corrective Action: Include procedures for handling deficiencies and non-conforming Work. Deficiencies and non-conforming Work are defined as documentation, drawings, material, equipment, or Work not conforming to the indicated requirements or procedures. The procedure shall prevent non-conformances by identification, documentation, evaluation, separation, disposition, and corrective action to prevent reoccurrence. Conditions having adverse effects on quality shall be promptly identified and reported to the senior level management. The cause of conditions adverse to quality shall be determined and documents and measures implemented to prevent recurrence. In addition, at a minimum, this procedure shall address:
   1. Personnel responsible for identifying deficient and non-complying items within Work.
   2. How and by whom deficient and non-compliant items are documented "in the field."
   3. The personnel and process utilized for logging deficient and non-compliant Work at the end of each day onto a deficiency log.
   4. Tracking processes and tracking documentation for deficient and non-conforming Work.
   5. Personnel responsible for achieving resolution of outstanding deficiencies.
   6. Include detailed procedures for the performance and control of special process (e.g., welding, soldering, heat treating, cleaning, plating, nondestructive examination, etc.).

F. Audits: The CQC program shall provide for regularly scheduled documented audits to verify that CQC procedures are being fully implemented by Contractor and its Subcontractors. Audit records shall be made available to Engineer upon request.

G. Documented control/quality records:
   1. Establish methods for control of Contract Documents that describe how Drawings and Specifications are received and distributed to ensure the correct issue of the document being used. Describe how record document/drawing data are documented and furnished to Engineer.
   2. Maintain evidence of activities affecting quality. Including operating logs, records of inspection, audit reports, personnel qualification and certification records, procedures, and document review records.
   3. Maintain quality records in a manner that provides for timely retrieval and traceability. Protect quality records from deterioration, damage and destruction.
   4. Develop a list of specific records as required by the Contract Documents that will be furnished to Engineer at the completion of activities.

H. Acceptance of CQC Plan: Engineer's acceptance of the CQC Plan shall not relieve Contractor from any of its obligations for performance of Work. Contractor's CQC staffing is subject to Engineer's review and continued acceptance. Owner, at its sole discretion, and without cause, may direct Contractor to remove and replace the CQC Plan Manager.
   1. Acceptance of the CQC Plan by the Engineer is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction.
   2. After acceptance of the CQC Plan, notify the Engineer in writing of any proposed change. Proposed changes are subject to acceptance by the Engineer.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, project sign, field offices and sheds, and removal after construction.

1.02 REFERENCE

A. American National Standards Institute (ANSI).

B. Occupational Safety and Health Administration (OSHA).

1.03 SUBMITTALS

A. General: For products specified to be furnished under this Section, submit product data as specified in Section 01330 - Submittal Procedures.

B. For temporary piping systems:
   1. Submit layout drawings showing proposed routing of piping, including proposed pipe support and pipe restraint locations.
   2. Submit product data for piping, fittings, appurtenances, restraints, supports, and all other components of the temporary piping system.
   3. Submit all information at least 28 days prior to when each temporary piping system is scheduled to be installed and allow 14 days for review and comment.

C. For temporary pumping systems:
   1. Submit pump data, performance curves, and other operating information as specified in Section 15050 - Common Work Results for Mechanical Equipment.
   2. Submit sketches showing layout of temporary pumping system, including pump quantity, configuration in wet well, and proposed piping layout specified in this Section.
   3. Submit piping headloss calculations based on proposed temporary piping system layout.

D. Submit all information at least 28 days prior to when the temporary pumping system is scheduled to be installed and allow 14 days for review and comment.

1.04 TEMPORARY UTILITIES

A. Temporary electrical power:
   1. The Owner will provide temporary power for construction.

a. Temporary electrical power (480 VAC, 3-phase) is available at the following locations:
    1) Bioreactors: BR-MCC-1, BR-MCC-2, BR-MCC-3, BR-MCC-2 located in the existing Bioreactor power house.
        a) Coordinate with the Owner the specific MCC to be used.
    2) Blower Building No. 3: Switchboard ES-5.
b. The Contractor is responsible for providing all breakers, conduit, and cables required to obtain temporary power from these location(s).
    1) Coordinate equipment shutdowns to make/remove connections with the Owner.
c. The Contactor is responsible for providing all temporary electrical equipment used for construction including transformers, panelboards, cables etc.
d. The Owner will pay all charges for construction power.

2. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.

B. Temporary electrical lighting:
1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
2. When available, permanent lighting facilities may be used in lieu of temporary facilities:
    a. Prior to Substantial Completion of the Work, replace bulbs, lamps, or tubes used by Contractor for lighting.

C. Temporary heating, cooling, and ventilating:
1. Heat and ventilate work areas to protect the Work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.

D. Temporary water:
1. Pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction.
2. Remove temporary piping and connections and restore affected portions of the facility to original condition before Substantial Completion.
3. Pay for water used for construction prior to final completion. Owner will provide water for 30-day operational testing.
4. Development of non-potable water supply:
    a. Post ample signs throughout the work area warning that plant water is not potable.
    b. Non-potable water is available from hydrants or hose valves within plant without cost. When combined demand of the Work and plant exceeds plant supply capacity, provide additional temporary supply capacity.

E. Temporary sanitary facilities:
1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
2. Existing facility use is not allowed.
3. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.

F. Temporary fire protection: Provide sufficient number of fire extinguishers of type and capacity required to protect the Work and ancillary facilities.

G. First aid: Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.

H. Utilities in existing facilities: As specified in Section 01140 - Work Restrictions.

1.05 CONSTRUCTION AIDS

A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.

C. Design temporary supports with adequate safety factor to ensure adequate load bearing capability:
   1. When requested, submit design calculations by professional registered engineer prior to application of loads.
   2. Submitted design calculations are for information and record purposes only.

D. Accident prevention:
   1. Exercise precautions throughout construction for protection of persons and property.
   2. Observe safety provisions of applicable Laws and Regulations.
   3. Guard machinery and equipment, and eliminate other hazards.
   4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
   5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.

E. Barricades:
   1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
   2. Provide barriers with flashing lights after dark.
   3. Keep barriers in place until excavations are entirely backfilled and compacted.
   4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.

F. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:
   1. Devices shall conform to minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located.

G. Hazards in public right-of-way:
   1. Comply with local jurisdiction standards and requirements for right-of-way barricades and other safety devices.

2. Mark at reasonable intervals, trenches, and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours:
    a. During hours of darkness, provide markers with torches, flashers, or other adequate lights.
3. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades:
    a. During hours of darkness, provide warning lights at close intervals.

H. Hazards in protected areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.

I. Above grade protection: On multi-level structures, provide safety protection that meets requirements of OSHA and State agency which administers OSHA regulations where Project is located.

J. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage, or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.

K. Fences:
1. Enclose temporary offices and storage areas with fence adequate to protect temporary facilities against acts of theft, violence, and vandalism.
2. When entire or part of site is to be permanently fenced, permanent fence may be built to serve for both permanent and temporary protection of the work site, provided that damaged or defaced fencing is replaced prior to final completion.
3. Protect temporary and permanent openings and close openings in existing fences to prevent intrusion by unauthorized persons.
    a. Bear responsibility for protection of plant and material on site of the Work when openings in existing fences are not closed.
4. During night hours, weekends, holidays, and other times when no work is performed at site, provide temporary closures or enlist services of security guards to protect temporary openings.
5. Fence temporary openings when openings are no longer necessary.

1.06 SECURITY

A. Make adequate provision for protection of the work area against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.07 ACCESS ROADS

A. General:
1. Build and maintain access roads to and on site of the Work to provide for delivery of material and for access to existing and operating plant facilities on site.
2. Build and maintain dust free roads which are suitable for travel at 20 miles per hour.

B. Off-site access roads:
1. Build and maintain graded earth roads.

2. Build roads only in public right-of-way or easements obtained by Owner.
3. Obtain rights-of-way or easements when electing to build along other alignment.

C. On-site access roads:
1. Maintain access roads to storage areas and other areas to which frequent access is required.
2. Maintain similar roads to existing facilities on site of the Work to provide access for maintenance and operation.
3. Protect buried vulnerable utilities under temporary roads with steel plates, wood planking, or bridges.
4. Maintain on-site access roads free of mud. Under no circumstances shall vehicles leaving the site track mud off the site onto the public right-of-way.

1.08 TEMPORARY CONTROLS

A. Dust control:
1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.

B. Noise control:
1. Comply with noise and work hours regulations by local jurisdiction.
2. In or near inhabited areas, particularly residential, perform operations in manner to minimize noise.
3. In residential areas, take special measures to suppress noise during night hours.

C. Mud control:
1. Prevent mud nuisance caused by construction operations, unpaved roads, excavation, backfilling, demolition, or other activities.

1.09 FIELD OFFICES AND SHEDS

A. Contractor's field office:
1. Maintain on Project Site weather tight space in which to keep copies of Contract Documents, progress schedule, shop drawings, and other relevant documents.
2. Provide field office with adequate space to examine documents, and provide lighting and telephone service in that space.

B. Engineer field office:
1. Provide separate field office on project site for the exclusive use of the Engineer as follows:
a. Size: Approximately 12 feet by 46 feet with 8-foot minimum ceiling height.
b. Construction: Weather tight building constructed at the site, pre-manufactured building, or trailer.
c. Layout:
1) Private offices: 2.
2) Conference area: 1.
3) Toilet room: 1.

a) Containing a water closet and lavatory, partitioned off from the working area. The water closet may be of the chemical type provided that it is a flush type with an approved holding tank, if no direct hook-up existing sewer line is available.

4) Closet with shelving: 1.

d. Exterior materials: Weather-resistant and finished in one color. Skirting for under pinning of field office.

e. Provide wood stairs with handrails for each entry.

1) Porch landing 5 feet by 5 feet for each entry.

f. Interior materials in offices: Sheet-type materials for walls and ceilings, prefinished or painted; resilient floors and bases. Interior walls shall be insulated for noise attenuation.

g. Openings: At least 4 windows (with operable sash, insect screens, and blinds) and 2 entrance doors, each with cylinder lock and 4 keys.

h. Exterior lighting over entrance doors.

i. Fire extinguishers: Appropriate type fire extinguisher(s) for field office.

j. Twenty 110 volts AC duplex receptacles with at least 2 in each office and conference room.

2. Arrange and pay for:

a. Monthly comprehensive cleaning, including windows.

b. Heating, ventilating, and air conditioning equipment in operating condition.

1) Furnish all maintenance and consumables.

c. Electric wiring, power, and lighting fixtures capable of providing at least 75-foot candles of light on work surfaces.

d. A continuous supply of toilet paper, paper hand towels and hand soap for each restroom.

e. Bottled drinking water service with hot and cold dispenser including water cups.

f. Suitable restroom facilities with sinks with hot and cold water.

g. Provide and maintain First Aid Kit and Cabinet in accordance with ANSI and OSHA requirements.

3. Provide following furnishings and equipment:

a. Office desks: 36 inches by 72 inches with 6 drawers with 2 with locks.

b. Padded, upholstered swivel arm multi-function ergonomic chairs.

c. Plan/conference table: 1, not less than 48 inches by 120 inches.

d. Drafting table: 1, not less than 36 inches by 72 inches.

e. Metal drafting stools with backs: 2.

f. Straight chairs: 4.

g. Metal filing cabinet: 2, 18 inches by 30 inches by 52 inches, 4 drawers.

h. Supply cabinet: 1, with not less than 15 square feet of shelves.

i. Bookcases: 2, with not less than 12 linear feet of shelves for each bookcase.

j. Wastebaskets: 4.

k. Dry erase board 96 by 48 inches, magnetic: 2.

l. Refrigerator: 15.0 cubic feet capacity.

m. Microwave oven: 1.0 cubic feet.

4. Field office data service and network equipment:

a. Provide the following data services for the duration of the project.

b. Contractor is responsible for all maintenance of service and hardware.

c. Data service will be dedicated to the Engineer and not shared with any other party.

d. The Contractor shall provide a durable and weather tight system for connecting the Engineer trailer to the service provider's facilities at the jobsite boundary:
e. Contractor is responsible for all maintenance of service and hardware:
    1) Provide high-speed Internet access (DSL or cable modem):
        a) Requirements: Minimum 10 Gb per second download/ upload. This access must have a minimum of 8 (5 usable) IP address. In addition, it must provide an average round-trip delay of less than 150 ms to the Engineer Internet gateway.
        b) Equipment: Provide appropriate DSL or cable modem device. In addition, provide the following:
            (1) Cisco ASA 5505 firewall with 3DES software, part number ASA5505-SEC-BUN-K9 and Cisco 4 hour response onsite Smart Net Maintenance for duration of project.
            (2) Cisco Aironet 3500 Series Wireless Access Point Model No. AIR-CAP3502I-A-K9.
    2) Provide private line or frame-relay Internet access.
        a) Requirements: T1 speed. This access must have a minimum of 8 (5 usable) IP address. In addition, it must provide an average round-trip delay of less than 150 ms to the Engineer Internet gateway.
        b) Equipment:
            (1) Visual Networks IP Enterprise central office T1 drop-and-insert CSU/DSU.
            (2) Cisco 2911 router bundle, Cisco part number 2911/K9 and Cisco 4 hour response onsite Smart Net Maintenance for duration of project.
            (3) Serial interface card, Cisco part number HWIC-1T.
            (4) Serial cable, Cisco part number CAB-SS-V35MT.
            (5) Security license, Cisco part number SL29-SEC-K9.
            (6) Cisco Aironet 3500 Series Wireless Access Point Model No. AIR-CAP3502I-A-K9.
5. Locate field office where directed.
6. Have field office ready for occupancy within 2 weeks after start of the Work.

1.10 TEMPORARY PROCESS PIPING

A. Contractor shall provide all piping, appurtenances, and other materials as required to provide temporary piping systems as specified in this Section, as indicated on the Drawings, and as needed to perform the Work.

B. Contractor shall field route piping as needed and as field conditions dictate, unless otherwise indicated on the Drawings, and determine appropriate lengths of piping and quantity/type of pipe fittings needed to construct temporary piping system. Do not block access points such as stairs, doors, and walkways to existing facilities unless approved in writing by the Owner.

C. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
    1. When piping is buried, use concrete thrust block or mechanical restraints.
    2. When piping is exposed or under water, use mechanical or structural restraints.

3. Determine thrust forces by multiplying the nominal cross sectional area of the piping by the operating pressure of the piping.

D. Temporary piping systems shall be installed in a manner that will not damage existing or new facilities.

E. Unless indicated otherwise, piping material, including gaskets, shall be suitable for the process fluid requiring temporary piping.

F. After temporary piping system is no longer required:
   1. Remove temporary piping system.
   2. Clean and repair damage caused by installation or use of temporary piping system.
   3. Restore existing facilities to original condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01520

SECURITY AND PROCESS SAFETY MANAGEMENT

PART 1 GENERAL

1.01 SECURITY PROGRAM

A. The Contractor shall:
   1. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
   2. Maintain program throughout construction period.
   3. Require that the workers employed by the Contractor, his Subcontractors and his Vendors shall obey all Rules and Ordinances enacted by the South Valley Water Reclamation Facility (SVWRF) regarding the existence of firearms on SVWRF property. The Contractor shall immediately suspend any such worker who disobeys said Rules and Ordinances and remove such worker from the SVWRF property.

1.02 ENTRY CONTROL

A. The Contractor shall:
   1. Limit entry of persons and vehicles into project site.
   2. Allow entry only to authorized persons.
   3. Require that all personal vehicles of the workers employed by the Contractor, his Subcontractors and his Vendors shall park their cars where designated by the Owner.

B. Owner will control entrance of persons and vehicles related to Owner's operations.

1.03 PERSONNEL IDENTIFICATION

A. The Contractor shall:
   1. Maintain a list of their authorized employees, subcontractors, vendors and other persons and submit a copy to Owner on request.
   2. Require that an identifying badge shall be worn by each of the workers of the Contractor, his subcontractors and vendors on the front of their construction hard hats. Further, the Contractor shall collect the Driver's License of each worker as he first comes on-site and submit them to the Owner's Representative. The Owner will oversee the production of the badges for Contractor key personnel and will return the Driver's Licenses with Badges to the Contractor's Project Superintendent.

1.04 SAFETY PLAN

A. At the Preconstruction Conference the Contractor shall submit a Safety, Health, and Environmental Action Plan (SHEAP). SVWRF will review the SHEAP to ensure its compatibility with the safety policies of SVWRF. The Contractor shall address the topics provided on the SVWRF-SHEAP outline (outline is included in the appendix to specification)

B. Contractor shall be solely responsible for initiating, maintaining and supervising all health safety and environmental issues for his or her employees, including all aspects of on-site construction, operation and activities associated with the contract.

C. The Contractor shall provide the following insurance and safety data for each of the past three years including the current year to date. See form entitled “Job Related Accident Reports” (form is included in appendix to specification)

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01530

PROTECTION OF EXISTING FACILITIES

PART 1 GENERAL

1.01 GENERAL

A. The Contractor shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than prior to such damage or temporary relocation.

1.02 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 electrical 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 therefore from the proper party.

B. After authority has been obtained, the Contractor shall give said party due notice of its intention to begin Work, if required by said party, and shall remove, shore, support, or otherwise protect such pipeline, transmission line, ditch, fence, or structure, re replace the same.

C. Some of the South Valley Water Reclamation Facility (SVWRF) facilities are located on Rocky Mountain Power (RMP) rights-of-way as shown on the Drawings. SVWRF has permanent easements to install remove, repair or replace sewer pipelines and other facilities on these easements. Copies of the easements and conditions for their use may be examined at the office of the SVWRF during regular business hours. The Contractor shall comply with the conditions of each easement. The Contractor shall maintain the minimum clearance mandated by RMP or 6 feet, whichever is greater, between the lowest conductor on the RMP power lines and maximum vertical reach of the equipment booms operated by the Contractor.

D. When 2 or more contracts are being executed at one time of the same or adjacent land in such manner the Work on 1 contract may interfere with that on another, the Owner shall determine the sequence and order of the Work. When the territory of one contract is necessary or convenient means of access for the execution of another contract, such privilege of access or any other reasonable privilege may be granted by the Owner to Contractor so desiring, to the extent, amount, in the manner, and at the times permitted, No such decision as to the method or time of conducting the Work or the use of territory shall be made the basis of any claim for delay or damage, except as provided for temporary suspension of the Work in Article of the General Conditions of the Contract.

1.03 PROTECTION OF STREET OR ROADWAY MARKERS

A. The Contractor shall not destroy, remove, or otherwise disturb any existing survey markers or other existing street or roadway markers without proper authorization. No pavement breaking or excavation shall be started until all survey or other

permanent marker points that will be disturbed by the construction operations have been properly referenced. Survey markers or points disturbed by the Contractor shall be accurately restored after street or roadway resurfacing has been complete.

1.04 RESTORATION OF PAVEMENT

A. General: All paved areas including asphaltic concrete berms cut or damaged during construction shall be replaced with similar materials of equal thickness to match the existing adjacent undisturbed areas, except where specific resurfacing requirements have been called for in the Contract Documents or in the requirements of the agency issuing the permit. The pavement restoration requirement to match existing sections shall apply to all components of existing sections, including sub-base, base, and pavement. Temporary and permanent pavement shall conform to the requirements of the affected pavement owner. Pavements which are subject to partial removal shall be neatly saw cut in straight lines.

B. Permanent resurfacing: In order to obtain a satisfactory junction with adjacent surfaces, the Contractor shall saw cut back and trim the edge so as to provide a clean, sound, vertical joint before permanent replacement of an excavated or damaged portion of pavement. Damaged edges of pavement along excavations and elsewhere shall be trimmed back by saw cutting in straight lines. All pavement restoration and other facilities restoration shall be constructed to finish grades compatible with adjacent undisturbed pavement.

C. Restoration of sidewalks or private driveways: Wherever sidewalks or private roads have been removed for purposes of construction, the Contractor shall place suitable temporary sidewalks or roadways promptly after backfilling and shall maintain them in satisfactory condition until the final restoration thereof has been made.

1.05 EXISTING UTILITIES AND IMPROVEMENTS

A. General: The Contractor shall protect underground utilities and other improvements which may be impaired during construction operations, regardless of whether or not the utilities are indicated on the Drawings. 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 necessary.

B. Except where the Drawings indicate utilities have been field located during design or certain utility locations shall be exposed as part of the Work, the Contractor shall be responsible for exploratory excavations as it deems necessary to determine the exact locations and depths of utilities which may interfere with its work. All such exploratory excavations shall be performed as soon as practicable after Notice to Proceed and, in any event, a sufficient time in advance of construction to avoid possible delays to the Contractor’s progress. When such exploratory excavations show the utility location as shown on the Drawings to be in error, the Contractor shall so notify the Resident Project Representative (RPR).

C. The number of exploratory excavations required shall be that number which is sufficient to determine the alignment and grade of the utility.

D. Utilities to be moved: In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon request of the Contractor, be notified by the Owner to move such property within a

specified reasonable time. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the RPR a sufficient time in advance for the necessary measures to be taken to prevent interruption of service.

E. Utilities to be removed: Where the proper completion of the Work requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which I indicated, the Contractor shall remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the RPR and the owner of the facility. In all cases of such temporary removal or relocation, restoration to the 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. Permanent relocation of any utility shall be noted on the Contractor's record drawings.

F. Owner's right of access: 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.

G. Underground utilities indicated: Existing utility lines that are indicated 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 backfilling and if damaged, shall be immediately repaired or replaced by the Contractor, unless otherwise repaired by the owner of the damaged utility. If the owner of the damaged facility performs its own repairs, the Contractor shall reimburse said owner for the costs of repair.

H. Underground utilities not indicated: In the event that the Contractor damages existing utility lines that are not indicated or the locations of which are not made know to the Contractor prior to excavation, a verbal report of such damage shall be made immediately to the RPR and a written report thereof shall be made promptly thereafter. The RPR will immediately notify the owner of the damaged utility. If the RPR is not immediately available, the Contractor shall notify the utility owner of the damage. If directed by the RPR, repairs shall be made by the Contractor under the provisions for changes and extra work contained in the General Conditions.

I. Costs of locating and repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Contract Documents with reasonable accuracy, and for equipment on the project which was actually working on that portion of the Work which was interrupted or idled by removal or relocation of such utility facilities, and which was necessarily idled during such work will be paid for as extra work in accordance with the provisions of Articles 10, 11, and 12 of the General Conditions.

J. Approval of repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement owner before being concealed by backfill or other work.

K. Maintaining in service: Unless indicated otherwise, oil and gasoline pipelines, power, and telephone or the communication cable ducts, gas and water mains,

irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the Work shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the RPR are made with the owner of said pipelines, duct, main, irrigation line, sewer, storm drain, pole, or wire or cable. The Contractor shall be responsible for and shall repair all damage due to its operations, and the provisions of this Section shall not be abated even in the event such damage occurs after backfilling or it not discovered until after completion of the backfilling.

1.06 TREES OR SHURBS WITHIN STREET RIGHTS-OF-WAY AND PROJECT LIMITS

A. General: Except where trees or shrubs are indicated to be removed, the Contractor shall exercise all necessary precautions so as not to damage or destroy any trees or shrubs, including those lying within street rights-of-way and project limits, and shall not trim or remove any trees unless such trees have been approved for trimming or removal by the jurisdictional agency or Owner. Existing trees and shrubs which are damaged during construction shall be trimmed or replaced by the Contractor or a certified tree company under permit from the jurisdictional agency and/or the Owner. Tree trimming and replacement shall be accomplished in accordance with the following paragraphs.

B. Trimming: Symmetry of the tree shall be preserved; no stubs or splits or torn branches left; clean cuts shall be mace close to the trunk or large branch. Spikes shall not be used for climbing live trees. Cuts over 1-1/2 inches in diameter shall be coated with a tree paint product that is waterproof, adhesive, and elastic, and free from kerosenes, coal tar, creosote, or other materials injurious to the life of the tree.

C. Replacement: The Contractor shall immediately notify the jurisdictional agency and/or the Owner if any tree or shrub is damaged by the Contractor’s operations. If, in the opinion of said agency or the Owner, the damage is such that replacement is necessary, the Contractor shall replace the tree or shrub at its own expense. The tree or shrub shall be of a like size and variety as the one damaged, or, if of a smaller size, the Contractor shall pay to the owner of said tree a compensatory payment acceptable to the tree or shrub owner, subject to the approval of the jurisdictional agency or Owner. The size of the tree or shrub shall be not less than 1-inch diameter nor less than 6 feet in height. Planting of replacement trees and shrubs shall be in accordance with the recommendations of the nursery furnishing the plants. Unless otherwise indicated, the Contractor shall water and maintain the replacements trees and shrubs for 6 months after planting.

1.07 LAWN AREAS

A. Lawn or landscaped areas and irrigation systems damaged during construction shall be repaired for by the Owner. The damaged lawn due to trenching shall be replaced with seeding on top of an adequate layer of topsoil by the Contractor. Damaged sprinkler heads shall be replaced with identical heads. Installation details for sprinkler system and sprinkler heads shall match existing.

1.08 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 than 7 days prior to excavation so that a representative of said owners or agencies can be present during such work if they so desire. The Contractor shall notify RMP three days prior to mobilizing any machinery or equipment within reach of any overhead power lines and shall comply with RMP requirements regarding the operation of such machinery or equipment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01573

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Installation of erosion and sediment control filter fabric fences.
   2. Triangular filter fabric fences.
   3. Straw bale fences and brush berms used during construction and prior to final development of site.

B. Purpose of control fences is to contain pollutants from overland flow.
   1. Control fences are not for use in channelized flow areas.

1.02 UNIT PRICES

A. Measure and pay for filter fabric fence by linear foot of completed and accepted filter fabric fence installed around construction site. Limits of construction site are indicated on the Drawings.

B. Measure and pay for triangular filter fabric fence by linear feet of completed and accepted triangular filter fabric fence between limits of beginning and ending of wooden stakes.

C. Measure and pay for straw bale barrier by linear feet of completed and accepted straw bale barrier.

D. Measure and pay for brush berm by linear feet of completed and accepted brush berm.

1.03 SUBMITTALS

A. Manufacturer’s catalog sheets and other product data on geotextile fabric.

1.04 REFERENCES

A. ASTM International (ASTM):
   1. D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 [600 kN-m/m^3]).
   2. D4355 - Standard Test Method for Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus.
   3. D4491- Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
   4. D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
   5. D4833 - Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products.

6. D5665- Standard Specification for Thermoplastic Fabrics Used in Cold-Applied Roofing and Waterproofing.
7. D6459 - Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.
8. D6475 - Standard Test Method for Measuring Mass per Unit Area of Erosion Control Blankets.
9. D6525 - Standard Test Method for Measuring Nominal Thickness of Rolled Erosion Control Products.
10. D6567 - Standard Test Method for Measuring the Light Penetration of a Rolled Erosion Control Product (RECP).
11. D6818 - Standard Test Method for Ultimate Tensile Properties of Rolled Erosion Control Products.

1.05 QUALITY ASSURANCE FOR EROSION CONTROL BLANKETS

A. Product shall be manufactured in accordance to a documented Quality Control Program. At a minimum, the following procedures and documentation shall be provided:
   1. Manufacturing Quality Control Program Manual.
   2. First piece inspection of products produced to assure component materials and finished product tolerances are within manufacturer specifications.
   3. Additional inspections for product conformance shall be conducted during the run after the first piece inspection.
   4. Every roll shall be visually inspected.
   5. Moisture content of straw and coconut fibers measured upon receipt.
   6. At a minimum, every third roll shall be weighed to insure conformance of manufacturer's specifications.
   7. Each individual erosion control blanket shall be inspected prior to packaging for conformance to manufacturing specifications.

1.06 PERFORMANCE REQUIREMENTS FOR EROSION CONTROL BLANKETS

A. Erosion control blanket shall provide a temporary, biodegradable cover material to reduce slope and enhance vegetation. Erosion control blanket performance capabilities shall be in accordance with ASTM D6459, "Determination of Erosion Control Blanket (ECB) Performance in Protecting Hillslopes from Rainfall-Induced Erosion."

PART 2 PRODUCTS

2.01 FILTER FABRIC

A. Provide woven or nonwoven geotextile filter fabric made of either polypropylene, polyethylene, ethylene, or polyamide material.

B. Geotextile fabric:
   1. Grab strength of 100 pounds per square inch in any principal direction in accordance with ASTM D4632.
   2. Puncture strength exceeding 115 pounds per square inch in accordance with ASTM D4833.

3. Equivalent opening size between 50 and 140 for soils with more than 15 percent by weight passing No. 200 sieve and between 20 and 50 for soil with less than 15 percent by weight passing No. 200 sieve.
4. Maximum water flow rate of 40 gallons per minute per square feet in accordance with ASTM D4491.

C. Filter fabric material shall contain ultraviolet inhibitors and stabilizers to provide expected usable life comparable to anticipated construction period.
1. Ultraviolet stability shall exceed 70 percent after 500 hours of exposure in accordance with ASTM D4355.

D. Manufacturers: The following or equal:
1. Mirafi, Inc.

2.02 EROSION CONTROL BLANKETS

A. Manufacturers: One of the following or equal:
1. American Excelsior Co., AEC Premier Straw/Coconut™ Blankets.
2. Proper Geotextile Systems.

B. Product requirements:
1. Erosion control blanket shall be furnished in rolls and wrapped with suitable material to protect against moisture intrusion and extended ultraviolet exposure prior to placement.
2. Erosion control blanket shall be of consistent thickness with fibers distributed evenly over the entire area of the blanket.
3. Erosion control blanket shall be free of defects and voids that would interfere with proper installation or impair performance.

C. Materials:
1. Blend of 70 percent straw and 30 percent coconut fibers.
   a. The straw fibers shall consist of straw with 75 percent of fibers greater than 4 inches in length, and certified weed seed free.
   b. Product shall be 100 percent biodegradable.
   c. The blended fibers shall be evenly distributed throughout the entire area of the blanket.
   d. The top and bottom of each blanket is covered with biodegradable jute netting.
2. Blanket performance requirements:
   a. C factor: 0.15.
   b. Shear stress: 2.0 lb/ft^2.
   c. Velocity: 8.5 feet per second.
   d. Functional longevity: Less than 24 months.
3. Material characteristics:
   a. Width: 8.0 feet.
   b. Length: 112.5 feet.
   c. Area: 100.0 yard^2.
   d. Weight: 50.0 pounds.
   e. Mass per unit area: 0.50 lv/yd^2.
   f. Net openings: 0.5 inch by 1.0 inch.

g. Minimum Index Values:

Index Property	Test Method	Value
Thickness	ASTM D6525	0.331 in (8.41 mm)
Light Penetration	ASTM D6567	5.8%
Mass per Unit Area	ASTM D6475	0.81 lb/yd^2 (437 g/m^2)
MD-Tensile Strength Max.	ASTM D6818	321.6 lb/ft (4.69 kN/m)
TD-Tensile Strength Max.	ASTM D6818	159.6 lb/ft (2.33 kN.m)
MD-Elongation	ASTM D6818	4.1%
TD-Elongation	ASTM D6818	4.8%
Water Absorption	ASTM D5665	382%

D. Staples:
   1. Staples shall be 100 percent biodegradable with a U-shaped top. Staples shall be a minimum 4 inch biodegradable staple for cohesive soils and 6 inches for non-cohesive soils.

PART 3 EXECUTION

3.01 PREPARATION AND INSTALLATION

A. Provide erosion and sediment control systems at locations as indicated on the Drawings.
   1. Construct in accordance with requirements as indicated on the Drawings and of type indicated as specified in this Section.

B. No clearing, grubbing or rough cutting permitted until erosion and sediment control systems are in place, other than site work specifically directed by Project Manager to allow soil testing and surveying.

C. Maintain existing erosion and sediment control systems located within project site until acceptance of Project or until directed by Project Manager to remove and discard existing system.

D. Regularly inspect and repair or replace damaged components of erosion and sediment control systems as specified in this Section.
   1. Unless otherwise directed, maintain erosion and sediment control systems until project area stabilization is accepted by the Authority.
   2. Remove erosion and sediment control systems promptly when directed by Project Manager.
   3. Discard removed materials off site.

E. Remove and dispose sediment deposits at designated spoil site for Project.
   1. If a project spoil site is not indicated on the Drawings, dispose of sediment off site at location not in or adjacent to stream or floodplain.
   2. Assume responsibility for off-site disposal.
   3. Spread sediment evenly throughout site, compacted and stabilized.

4. Prevent sediment from flushing into a stream or drainage way.
5. If sediment has been contaminated, dispose of in accordance with existing federal, state, and local rules and regulations.

F. Unless otherwise indicated, compact embankments, excavations, and trenches by mechanically blading, tamping, and rolling soil in maximum of 8-inch layers.
1. Compaction density shall be at a minimum of 90 percent Standard Proctor ASTM D698 density.
2. Make at least 1 test per 500 cubic yards of embankment.

G. Prohibit equipment and vehicles from maneuvering on areas outside of dedicated rights-of-way and easements for construction.
1. Immediately repair damage caused by construction traffic to erosion and sediment control.

3.02 GENERAL CONSTRUCTION METHODS

A. Provide erosion and sedimentation control systems as indicated on the Drawings.
1. Install erosion and sedimentation control systems in manner that surface runoff shall percolate through system in sheet flow fashion and allow retention and accumulation of sediment.

B. Inspect erosion and sedimentation control systems after each rainfall, daily during periods of prolonged rainfall, and at minimum once each week.
1. Repair or replace damaged sections immediately.
2. Remove sediment deposits when silt reaches depth 1/3 height of fence or 6 inches, whichever is less.

3.03 SITE PREPARATION FOR EROSION CONTROL BLANKETS

A. Before placing erosion control blanket, Contractor shall certify that the subgrade has been properly compacted, graded smooth, has no depressions, voids, soft or uncompacted areas, is free from obstructions such as tree roots, protruding stones or other foreign matter, and is seeded and fertilized according to project specifications.
1. Contractor shall not proceed until all unsatisfactory conditions have been remedied.
2. By beginning construction, Contractor signifies that the proceeding work is in conformance with this Section.

B. Contractor shall fine grade the subgrade by hand dressing where necessary to remove local deviations.

C. No vehicular traffic shall be permitted directly on the erosion control blanket.

D. Slope installation
1. Erosion control blanket shall be installed as directed by Owner's representative in accordance with manufacturer's Installation Guidelines, Staple Pattern Guides, and CAD details. The extent of erosion control blanket shall be as indicated on the Drawings.
2. Erosion control blanket shall be oriented in vertical strips and anchored with staples, as identified in the Staple Pattern Guide.

a. Adjacent strips shall be overlapped to allow for installation of a common row of staples that anchor through the nettings of both blankets.
b. Horizontal joints between erosion control blankets shall be sufficiently overlapped with the uphill end on top for a common row of staples so that the staples anchor through the nettings of both blankets.

3. Where exposed to overland sheet flow, a trench shall be located at the uphill termination erosion control blanket shall be stapled to the bottom of the trench.
   a. The trench shall be backfilled and compacted.
   b. Where feasible, the uphill end of the blanket shall be extended 3 feet over the crest of the slope.

3.04 FILTER FABRIC FENCE CONSTRUCTION METHODS

A. Attach filter fabric to 1-inch by 2-inch wooden stakes or driven steel rods spaced a maximum of 3 feet apart and embedded minimum of 8 inches or deeper to hold fence in place.
   1. If filter fabric is factory preassembled with support netting, then maximum spacing allowable is 8 feet.
   2. Install anchoring stakes or rods at slight angle toward source of anticipated runoff.
   3. Contractor is responsible for providing adequate fence anchoring appropriate for the varying soil and rock conditions at the well sites.

B. Trench in toe of filter fabric fence with spade or mechanical trencher so that downward face of trench is flat and perpendicular to direction of flow.
   1. V-trench configuration as indicated on the Drawings may also be used.
   2. Lay filter fabric along edges of trench.
   3. Backfill and compact trench.

C. Filter fabric fence shall have a minimum height of 18 inches and a maximum height of 36 inches above natural ground.

D. Provide filter fabric in continuous rolls and cut to length of fence to minimize use of joints.
   1. When joints are necessary, splice fabric together only at support post with minimum 6-inch overlap and seal securely.

END OF SECTION

SECTION 01600

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Product requirements; product selection; product options and substitutions; quality assurance; shipping, delivery, handling, and storage; and instructions for spare parts, maintenance products, and special tools.

1.02 REFERENCES

A. American National Standards Institute (ANSI).

B. NSF International (NSF):
   1. 61 - Drinking Water System Components - Health Effects.
   2. 372 - Drinking Water System Components - Lead Content.

1.03 DEFINITIONS

A. Products: Inclusive of raw materials, finished goods, equipment, systems, and shop fabrications.

B. Special tools: Tools that have been specifically made for use on a product for assembly, disassembly, repair, or maintenance.

1.04 SUBMITTALS

A. As specified in Section 01330 - Submittal Procedures.

B. Calculations/certifications in accordance with NSF 61 and 372 for materials in contact with drinking water.

1.05 GENERAL REQUIREMENTS

A. Comply with Specifications and referenced standards as minimum requirements.

B. Provide products by same manufacturer when products are of similar nature, unless otherwise specified.

C. Provide like parts of duplicate units that are interchangeable.

D. Provide equipment that has not been in service prior to delivery, except as required by tests.

E. When necessary, modify manufacturer's standard product to conform to specified requirements or requirements indicated on the Drawings.

1.06 SUBSTITUTIONS

A. Formal substitution request procedure:
   1. Submit a written formal substitution request to Engineer for each proposed substitution within 30 days of effective date of Contract.
   2. Engineer will return initial opinion and request for additional information within 30 days.
   3. Engineer will notify Contractor in writing of decision to accept or reject the substitution request within 30 days of receiving required information.

B. Formal substitution request contents:
   1. Provide Substitution Request Form as specified in this Section.
   2. Manufacturer's literature including:
      a. Manufacturer's name and address.
      b. Product name.
      c. Product description.
      d. Reference standards.
      e. Certified performance and test data.
      f. Operation and maintenance data.
   3. Samples, if applicable.
   4. Shop drawings, if applicable.
   5. Reference projects where the product has been successfully used:
      a. Name and address of project.
      b. Year of installation.
      c. Year placed in operation.
      d. Name of product installed.
      e. Point of contact: Name and phone number.
   6. Itemized comparison of the proposed substitution with product specified including a list of significant variations:
      a. Design features.
      b. Design dimensions.
      c. Installation requirements.
      d. Operations and maintenance requirements.
   7. Define impacts:
      a. Impacts to construction schedule.
      b. Impacts to other contracts.
      c. Impacts to other work or products.
      d. Impact to Contract Sum:
         1) Do not include costs under separate contracts.
         2) Do not include Engineer's costs for redesign or revision of Contract Documents.
         3) Required license fees or royalties.
      e. Availability of maintenance services and sources of replacement materials.
   8. Contractor represents the following:
      a. Contractor shall pay associated costs for the Engineer to evaluate the substitution.
      b. Contractor bears the burden of proof of the equivalency of the proposed substitution.
      c. Proposed substitution does not change the design intent and will have equal performance to the specified product.
      d. Proposed substitution is equal or superior to the specified product.

e. Contractor will provide the warranties or bonds that would be provided on the specified product on the proposed substitution, unless Owner requires a Special Warranty.
f. Contractor will coordinate installation of accepted substitution into the Work and will be responsible for the costs to make changes as required to the Work.
g. Contractor waives rights to claim additional costs caused by proposed substitution which may subsequently become apparent.

C. Substitutions will not be considered for acceptance under the following conditions:
1. No formal substitution request is made.
2. The substitution is simply implied or indicated on shop drawings or product data submittals.
3. The formal substitution request is submitted by a subcontractor or supplier.

D. Substitution requests submitted after the deadline will not be considered unless the following evidence is submitted to the Engineer:
1. Proof that the specified product is unavailable for reasons beyond the control of the Contractor.
a. Reasons may include manufacturing discontinued, bankruptcy, labor strikes, or acts of God.
b. Contractor placed or attempted to place orders for the specified products within 10 days after the effective date of the Agreement.
c. The formal substitution request is submitted to Engineer within 10 days of the Contractor discovering the specified product cannot be obtained.

E. Engineer's decision on a substitution requests will be final and binding.
1. Approved substitutions will be incorporated into the Contract Documents with a Change Order.
2. Requests for time extensions and additional costs based on submission of, approval of, or rejection of substitutions will not be allowed.

PART 2 PRODUCTS

2.01 GENERAL

A. Material requirements:
1. Materials: Provide corrosion resistance suitable for project conditions as specified in Section 01610 - Project Design Criteria.
2. Dissimilar metals: Separate contacting surfaces with dielectric material.

B. Edge grinding:
1. Sharp projections of cut or sheared edges of ferrous metals which are not to be welded shall be ground to a radius required to ensure satisfactory paint adherence.

2.02 PRODUCTS IN CONTACT WITH DRINKING WATER

A. Materials in contact with drinking waters: In accordance with NSF 61 and NSF 372.
1. Certification by an independent ANSI accredited third party, including, but not limited to, NSF International, as being lead free.

2.03 PRODUCT SELECTION

A. When products are specified by standard or specification designations of technical societies, organizations, or associations only, provide products that meet or exceed reference standard and Specifications.

B. When products are specified with names of manufacturers but no model numbers or catalog designations, provide:
   1. Products by one of named manufacturers that meet or exceed Specifications.
   2. Engineer deemed "or equal" evidenced by an approved shop drawing or other written communication.

C. When products are specified with names of manufacturers and model numbers or catalog designations, provide:
   1. Products with model numbers or catalog designations by one of named manufacturers.
   2. Engineer deemed "or equal" evidenced by an approved shop drawing or other written communication.

D. When products are specified with names of manufacturers, but with brand or trade names, model numbers, or catalog designations by one manufacturer only, provide:
   1. Products specified by brand or trade name, model number, or catalog designation.
   2. Products by one of named manufacturers proven, in accordance with requirements for an "or equal", to meet or exceed quality, appearance and performance of specified brand or trade name, model number, or catalog designation.
   3. Engineer deemed "or equal" evidenced by an approved shop drawing or other written communication.

E. When Products are specified with only one manufacturer followed by "or Equal," provide:
   1. Products meeting or exceeding Specifications by specified manufacturer.
   2. Engineer deemed "or equal" evidenced by an approved shop drawing or other written communication.

2.04 SHIPMENT

A. Mandatory requirements prior to shipment of equipment:
   1. Engineer approved shop drawings.
   2. Engineer approved Manufacturer’s Certificate of Source Testing as specified in Section 01756 - Commissioning, when required by specifications.
   3. Draft operations and maintenance manuals, as specified in Section 01782 - Operation and Maintenance Data, when required by specifications.

B. Prepare products for shipment by:
   1. Tagging or marking products to agree with delivery schedule or shop drawings.
   2. Including complete packing lists and bills of material with each shipment.
   3. Packaging products to facilitate handling and protection against damage during transit, handling, and storage.
   4. Securely attach special instructions for proper field handling, storage, and installation to each piece of equipment before packaging and shipment.

C. Transport products by methods that avoid product damage.

D. Deliver products in undamaged condition in manufacturer's unopened containers or packaging.

2.05 SPARE PARTS, MAINTENANCE PRODUCTS, AND SPECIAL TOOLS

A. Provide spare parts and maintenance products as required by Specifications.

B. Provide one set of special tools required to install or service the equipment.

C. Box, tag, and clearly mark items.

D. Contractor is responsible for spare parts, maintenance products, and special tools until acceptance by Owner.

E. Store spare parts, maintenance products, and special tools in enclosed, weather-proof, and lighted facility during the construction period.
   1. Protect parts subject to deterioration, such as ferrous metal items and electrical components with appropriate lubricants, desiccants, or hermetic sealing.

F. Provide spare parts and special tools inventory list, see Appendix A:
   1. Equipment tag number.
   2. Equipment manufacturer.
   3. Subassembly component, if appropriate.
   4. Quantity.
   5. Storage location.

G. Store large items individually:
   1. Weight: Greater than 50 pounds.
   2. Size: Greater than 24 inches wide by 18 inches high by 36 inches long.
   3. Clearly labeled:
      a. Equipment tag number.
      b. Equipment manufacturer.
      c. Subassembly component, if appropriate.

H. Store in spare parts box smaller items:
   1. Weight: Less than 50 pounds.
   2. Size: Less than 24 inches wide by 18 inches high by 36 inches long.
   3. Clearly labeled:
      a. Equipment tag number.
      b. Equipment manufacturer.
      c. Subassembly component, if appropriate.

I. Spare parts and special tools box:
   1. Wooden box:
      a. Size: 24 inches wide by 18 inches high by 36 inches long.
   2. Hinged wooden cover:
      a. Strap type hinges.
      b. Locking hasp.
      c. Spare parts inventory list taped to underside of cover.
   3. Coating: As specified in Section 09960 - High-Performance Coatings.

4. Clearly labeled:
    a. The words “Spare Parts and/or Special Tools”.
    b. Equipment tag number.
    c. Equipment manufacturer.

PART 3 EXECUTION

3.01 DELIVERY AND HANDLING

A. Handle equipment in accordance with manufacturer's instructions.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Upon delivery, promptly inspect shipments:
    1. Verify compliance with Contract Documents, correct quantities, and undamaged condition of products.
    2. Acceptance of shipment does not constitute final acceptance of equipment.

3.02 STORAGE AND PROTECTION

A. Immediately store and protect products and materials until installed in Work.

B. Store products with seals and legible labels intact.

C. Maintain products within temperature and humidity ranges required or recommended by manufacturer.

D. Protect painted surfaces against impact, abrasion, discoloration, and other damage.
    1. Repaint damaged painted surfaces.

E. Exterior storage of fabricated products:
    1. Place on aboveground supports that allow for drainage.
    2. Cover products subject to deterioration with impervious sheet covering.
    3. Provide ventilation to prevent condensation under covering.

F. Store moisture sensitive products in watertight enclosures.

G. Furnish covered, weather-protected storage structures providing a clean, dry, noncorrosive environment for mechanical equipment, valves, architectural items, electrical and instrumentation equipment and special equipment to be incorporated into this project.
    1. Storage of equipment shall be in strict accordance with the “instructions for storage” of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc.
    2. The Contractor shall furnish a copy of the manufacturer’s instructions for storage to the Engineer prior to storage of all equipment and materials.

H. Store loose granular materials on solid surfaces in well-drained area.
    1. Prevent materials mixing with foreign matter.
    2. Provide access for inspection.

I. Payment will not be made for equipment and materials improperly stored or stored without providing Engineer with the manufacturer's instructions for storage.

J. Provide an Equipment Log including, as a minimum, the equipment identification, date stored, date of inspection/maintenance, date removed from storage, copy of manufacturer's recommended storage guidelines, description of inspection/maintenance activities performed, and signature of party performing inspection/maintenance.

3.03 PROTECTION AFTER INSTALLATION

A. Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations.
   1. Remove covering when no longer needed.
   2. Replace corroded, damaged, or deteriorated equipment and parts before acceptance of the project.

B. Update Equipment Log on a monthly basis with description of maintenance activities performed in accordance with the manufacturer's recommendation and industry standards and signature of party performing maintenance.

3.04 QUALITY ASSURANCE

A. Employ entities that meet or exceed specified qualifications to execute the Work.

B. Verify project conditions are satisfactory before executing subsequent portions of the Work.

3.05 COMMISSIONING

A. As specified in Section 01756 - Commissioning.

3.06 CLOSEOUT ACTIVITIES

A. Owner may request advanced delivery of spare parts, maintenance products, and special tools.
   1. Deduct the delivered items from the inventory list and provide transmittal documentation.

B. Immediately prior to the date of Substantial Completion, arrange to deliver spare parts, maintenance products, and special tools to Owner at a location on site chosen by the Owner.
   1. Provide itemized list of spare parts and special tools that matches the identification tag attached to each item.
   2. Owner and Engineer will review the inventory and the itemized list to confirm it is complete and in good condition prior to signing for acceptance.

3.07 ATTACHMENTS

A. Appendix A - Spare Parts, Maintenance Products, and Special Tools Inventory List.

B. Appendix B - Sample Substitution Request Form.

END OF SECTION

APPENDIX A
SPARE PARTS, MAINTENANCE PRODUCTS, AND SPECIAL TOOLS INVENTORY LIST

Owner: _____ **Date:** _____

Contractor: _____ **Project No.:** _____

Project Name: _____

Inventory List				
Spec Number: _____		Spec Title _____		
Equipment Tag No.: _____		Equipment Manufacturer: _____		
Quantity	**Subassembly Component**	**Description**	**Manufacturer's Part Number**	**Storage Location**

APPENDIX B

SUBSTITUTION REQUEST FORM

DOCUMENT 01600
SUBSTITUTION REQUEST FORM

Owner: _____ **Date:** _____

Contractor: _____ **Project No.:** _____

Project Name: _____

To: _____ **From:** _____

Re: _____

Contract For: _____

Engineering Project Number: _____ **Substitution Request Number:** _____

Specification Information
Title: _____
Number: _____ Page: _____ Article/Paragraph: _____
Description: _____

Proposed Substitution				
Product: _____				
Manufacturer: _____				
Address: _____			Phone: _____	
Trade Name: _____			Model No.: _____	
Installer: _____				
Address: _____			Phone: _____	
History:	New Product	2-5 years old	5-10 years old	More than 10 years old
Differences between proposed substitution and specified product:				
Point-by-point comparative data and impacts attached – REQUIRED BY ENGINEER				

Reason For Not Providing Specified Item

Reason: _____

Similar Installation: _____

Project: _____

Address: _____ Date Installed: _____

Owner: _____ Architect: _____

Proposed substitution affects other parts of Work:

____ No ____ Yes, Explain: _____

Benefit to Owner For Accepting Substitution

Savings: _____ ($) _____

Proposed substitution changes Contract Time:

____ No ____ Yes **(Add)** **(Deduct)** _____ days

Supporting Data Attached

___ Drawings ____ Product Data ____ Samples _____ Tests ____ Reports

___ Reference Projects Other: _____

Certifications

The undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product, unless Owner requires a Special Warranty.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including Engineer design, detailing, and construction costs caused by the substitution.

Certifications
• Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.
Submitted by: _____
Signed by: _____
Firm Name _____
Firm Address: _____
_____
Phone: _____
Attachments: _____

Engineer's Review And Action
___ Substitution accepted - Make submittals in accordance with Specification Section 01330 - Submittal Procedures.
___ Substitution accepted as noted - Make submittals in accordance with Specification Section 01330 - Submittal Procedures.
___ Substitution rejected - Use specified materials.
___ Substitution Request received too late - Use specified materials.
Signed by: _____ Date: _____

Additional Comments
Additional Comments:
___ Contractor ___ Subcontractor ___ Supplier ___ Manufacturer ___ Engineer
Other: _____
Comments: _____

SECTION 01610

PROJECT DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Project design criteria such as temperature and site elevation.

1.02 PROJECT DESIGN CRITERIA

A. All equipment and materials for the project are to be suitable for performance in wastewater treatment plant environment and under following conditions:
   1. Design temperatures are:
      a. Outdoor temperatures: -10 to 110 degrees Fahrenheit.
      b. Indoor temperatures for the following buildings and areas:
         1) Process areas: 50 to 80 degrees Celsius.
         2) Electrical rooms: 50 to 80 degrees Celsius.
         3) Other: 50 to 80 degrees Celsius.
   2. Design groundwater elevation: varies (6 feet below grade adjacent to bioreactors, 17 feet below grade at new Grit Handling Facility).
   3. Freeze-thaw conditions.
   4. Moisture conditions: Defined in individual equipment sections.
   5. Site elevation: Approximately 4,300 feet above mean sea level.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01612

SEISMIC DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Seismic design criteria for the following:
   1. Anchorage of mechanical and electrical equipment.
   2. Seismic design and design of anchorage for small tanks fabricated off site and shipped to the Project site.
   3. Other structures or items as specified or indicated on the Drawings.

1.02 REFERENCES

A. American Society of Civil Engineers (ASCE):
   1. 7-10 - Minimum Design Loads for Buildings and Other Structures.

1.03 SYSTEM DESCRIPTION

A. Design in accordance with the requirements of the building code as specified in Section 01410 - Regulatory Requirements.

B. Design spectral acceleration at short period, S_{DS}: 0.918.

C. Design of non-structural components and their connections to structures:
   1. Component amplification factor, a_p: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
   2. Component response modification factor, R_p: In accordance with ASCE 7, Tables 13.5-1 and 13.6-1.
   3. Component importance factor, I_p:

Table 1: Component Importance Factor, Ip

Component	Description	Ip
Electrical	Equipment and appurtenances provided and installed under Division 26.	1.5
All Other Equipment	Equipment and appurtenances provided and installed under any other Divisions.	Per ASCE 7-10, Section 13.1.3

D. Seismic Design Category (SDC):
   1. Seismic Design Category (SDC) for certification of mechanical and electrical equipment as required by ASCE 7: Seismic Design Category D.

E. Design requirements: Anchorage of equipment to structures.

1. Do not use friction to resist sliding due to seismic forces. Do not design or provide connections that use friction to resist seismic loads. Resist seismic forces through direct tension and/or shear on anchors and fasteners.
2. Anchoring and fastening to concrete and masonry:
    a. Provide anchors specified in Section 03055 - Adhesive-Bonded Reinforcing Bars and All Thread Rods.

1.04 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and seismic calculations.

B. Calculations shall be signed and stamped by a civil or structural engineer licensed in the state of Utah.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01614

WIND DESIGN CRITERIA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Wind design criteria.

1.02 SYSTEM DESCRIPTION

A. Design requirements:
   1. Building code criteria: Design for wind in accordance with building code as specified in Section 01410 - Regulatory Requirements:
      a. Risk category: III.
      b. Wind speed, V_{ult}: 120 miles per hour.
      c. Wind speed, V_{asd}: 93 miles per hour.
      d. Exposure category: C.
      e. Topographic factor, K_{zt}: 1.0.
   2. Resist wind forces through direct bearing on anchors and fasteners. Do not design or provide connections that use friction to resist wind loads.
   3. Anchoring and fastening to concrete and masonry:
      a. Provide anchors specified in Section 03055 - Adhesive-Bonded Reinforcing Bars and All-Thread Rods and 05190 - Mechanical Anchoring and Fastening to Concrete and Masonry.

1.03 SUBMITTALS

A. Shop drawings and calculations: Complete shop drawings and wind design calculations.

B. Calculations shall be signed and stamped by a civil or structural engineer licensed in the state of Utah.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01722

FIELD ENGINEERING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Field engineering to establish lines and grades for the Work.

1.02 SUBMITTALS

A. Submit as specified in Section 01330 - Submittal Procedures.

B. Qualifications of the professional land surveyor or registered civil engineer in Utah that will be performing the field engineering.

C. Pre-Excavation Report.

1.03 PRE-EXCAVATION REPORT

A. Prior to the start of the Work, create a report confirming the verification of the following data:
   1. Site elevation.
   2. Existing structures including but not limited to buildings, manholes (sanitary, storm, electrical, and other), drainage inlets:
      a. Location coordinates.
      b. Top of wall elevation and coordinates.
      c. Floor elevations.
      d. Invert elevations.
   3. Existing utilities as specified in Section 01353 - Special Procedures for Locating and Verifying. Concealed Existing Utilities.
   4. Proposed building corners, tank, and equipment locations.
   5. Verify existing electrical, instrumentation, and phone utilities.

B. Incorporate information from Pre-Excavation Report into the record drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 SURVEY REFERENCE POINTS

A. Basic reference line, a beginning point on basic reference line, and a benchmark will be provided by Owner.

B. From these reference points, establish other control and reference points as required to properly lay out the Work.

C. Locate and protect control points prior to starting site work, and preserve permanent reference points during construction:
   1. Make no changes or relocations without prior written notice.
   2. Replace Project control point, when lost or destroyed, in accordance with original survey control.

D. Set monuments for principal control points and protect them from being disturbed and displaced:
   1. Re-establish disturbed monuments.
   2. When disturbed, postpone parts of the Work that are governed by disturbed monuments until such monuments are re-established.

3.02 PROJECT SITE SURVEY REQUIREMENTS

A. Establish minimum of 2 permanent benchmarks on site referenced to data established by survey control points.

B. Record permanent benchmark locations with horizontal and vertical data on Project Record Documents.

C. Perform verifications and checking in accordance with standard surveying practice.

D. Maintain complete, accurate log of control points and survey.

E. Affix civil engineer's or professional land surveyor's signature and registration number to Record Drawings to certify accuracy of information shown.

3.03 CONSTRUCTION STAKES, LINES, AND GRADES

A. Execute the Work in accordance with the lines and grades indicated.

B. Make distances and measurements on horizontal planes, except elevations and structural dimensions.

3.04 QUALITY CONTROL

A. Accuracy of stakes, alignments, and grades may be checked randomly by Engineer:
   1. Notice of when checking will be conducted will be given.
   2. When notice of checking is given, postpone parts of the Work affected by stakes, alignments, or grades to be checked until checked.
   3. Engineer's check does not substitute or complement required field quality control procedures.

3.05 RECORD DOCUMENTS

A. Prepare and submit Record Documents as specified in Section 01770 - Closeout Procedures.

B. Provide certified site survey including buildings, benchmarks, and appurtenances sealed and signed by professional land surveyor or registered civil engineer.
   1. File with permitting agency, as required.

END OF SECTION

SECTION 01738

SELECTIVE ALTERATIONS AND DEMOLITION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Cutting or modifying of existing and new work.
   2. Partial demolition of structures.
   3. In-place abandonment of pipe.

1.02 REFERENCES

A. American National Standards Institute (ANSI):
   1. A10.6 - Safety and Health Program Requirements for Demolition Operations.

B. International Concrete Repair Institute (ICRI):
   1. Guideline No. 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.
   2. Guideline No. 310.3R - Guide for the Preparation of Concrete Surfaces for Repair Using Hydrodemolition Methods.

1.03 DEFINITIONS

A. Chipping hammer: A hand-operated electrical or pneumatic demolition device for removal of hardened concrete or masonry materials having a weight of less than 15 pounds and an impact frequency of greater than 2,000 blows/minute.

B. Concrete breaker: A hand-operated electrical or pneumatic demolition device for removal of hardened concrete or masonry materials having a weight greater or impact frequency less than the limits defined for a chipping hammer.

C. Coring equipment: Non-impact rotary drill with diamond cutting edges.

D. Heavy abrasive blast: Cleaning procedure by which various abrasives materials, or steel shot, are forcibly propelled by high pressure against a surface to remove loose material and produce a concrete surface roughened to ICRI Surface Profile CSP-7, or higher, as specified in ICRI 301.3R.

1.04 DESCRIPTION OF WORK

A. The work includes partial demolition, cutting, and modifying of existing facilities, utilities, and/or structures.

B. These facilities may be occupied and/or operational. Satisfactory completion of the work will require that the Contractor plan activities carefully to work around unavoidable obstacles and to maintain overall stability of structures and structural elements. It will further require restoration of existing facilities, utilities, and

structures that are to remain in place and that are damaged by demolition or removal operations.

1.05 SUBMITTALS

A. General:
   1. Submit specified in Section 01330 - Submittal Procedures.

B. Shop drawings: Include:
   1. The location of all embedded items shall be documented using diagrams and/or other media that clearly show dimensions and locations of existing structural elements, existing embedded items and any new embedded items and their relationship to each other.

C. Submittals for information only:
   1. Permits and notices authorizing demolition.
   2. Certificates of severance of utility services.
   3. Permit for transport and disposal of debris.
   4. Selective Demolition Plan.
   5. Pipe Abandonment Plan.

D. Quality assurance submittals:
   1. Qualifications of non-destructive testing agency/agencies.

E. Project record documents.

F. Drawings and/or other media documenting locations of service lines and capped utilities.

1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Assign relocation, removal, cutting, coring and patching to trades and workers qualified to perform the Work in manner that causes the least damage and that provides means of returning surfaces to an appearance at least equal to that of the surrounding areas unaffected by the Work.
   2. Non-destructive testing agencies: Minimum of 5 years' experience performing non-destructive testing for location of steel reinforcement in existing concrete under conditions similar to that required for this Work.

1.07 SEQUENCING

A. Perform Work in sequences and within times specified in Section 01140 - Work Restrictions.

B. If the facility or utility to be modified cannot be removed from service, perform the Work while the facility is in operation using procedures and equipment that do not jeopardize operation or materially reduce the efficiency of that facility.

C. Coordinate the Work with operation of the facility:
   1. Do not begin alterations of designated portions of the Work until specific permission for activities in each area has been granted by Owner in writing.
   2. Engineer will coordinate the planned procedure with facility manager.

3. Complete Work as quickly and with as little delay as possible.

D. Operational functions of the facility that are required to be performed to facilitate the Work will be performed by facility personnel only.

E. Owner will cooperate in every way practicable to assist in expediting the Work.

F. When necessary for the proper operation or maintenance of portions of the facility, reschedule operations so the Work will not conflict with required operations or maintenance.

1.08 REGULATORY REQUIREMENTS

A. Dispose of debris in accordance with governing regulatory agencies.

B. Comply with applicable air pollution control regulations.

C. Obtain permits for building demolition, transportation of debris to disposal site and dust control.

1.09 PREPARATION

A. Non-destructive evaluation of existing concrete and masonry:
   1. Prior to cutting, drilling, coring, and/or any other procedure that penetrates existing concrete or masonry, retain and pay for the services of a qualified non-destructive testing agency to perform investigations to determine the location of existing steel reinforcement, plumbing, conduit, and/or other embedments in the concrete.
   2. Submit documentation of the investigations to the Engineer for review and approval as specified in Section 01330 - Submittal Procedures before any work involving penetration of existing concrete is initiated.

B. Obtain permission from adjacent property owners when outriggers, swinging cranes, and other equipment may have to traverse or extend into adjacent property.

1.10 PROJECT CONDITIONS

A. Do not interfere with use of adjacent structures and elements of the facility not subject to the Work described in this Section. Maintain free and safe passage to and from such facilities.

B. Provide erect and maintain barricades, lighting, guardrails, and protective devices as required to protect building occupants, general public, workers, and adjoining property:
   1. Do not close or obstruct roadways without permits.
   2. Conduct operations with minimum interference to public or private roadways.

C. Prevent movement, settlement, or collapse of structures adjacent services, sidewalks, driveways and trees:
   1. Provide and place bracing or shoring.
   2. Cease operations and notify Engineer immediately when safety of structures appears to be endangered. Take precautions to properly support structure. Do not resume operations until safety is restored.

3. Assume liability for movement, settlement, or collapse. Promptly repair damage.

D. Arrange and pay for capping and plugging utility services. Disconnect and stub off.
   1. Notify affected utility company in advance and obtain approval before starting demolition.
   2. Place markers to indicate location of disconnected services.

E. Unknown conditions:
   1. The drawings may not represent all conditions at the site and adjoining areas. Compare actual conditions with drawings before commencement of Work.
   2. Existing utilities and drainage systems below grade are located from existing documents and from surface facilities such as manholes, valve boxes, area drains, and other surface fixtures.
   3. If existing active services encountered are not indicated or otherwise made known to the Contractor and interfere with the permanent facilities under construction, notify the Engineer in writing, requesting instructions on their disposition. Take immediate steps to ensure that the service provided is not interrupted, and do not proceed with the Work until written instructions are received from the Engineer.

PART 2 PRODUCTS

2.01 SALVAGE MATERIALS

A. Salvage materials: Materials removed from existing facility.

B. Materials designated for salvage:
   1. As indicated on the drawings.

C. Handling and storage:
   1. Prevent damage to salvaged materials during removal, handling, and transportation of salvaged materials.
   2. Prepare salvaged materials for storage:
   3. Store salvaged materials in the following locations:
      a. On-site area will be identified by Owner.

D. Pay costs associated with salvaging materials, including handling, transporting, and storage.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to beginning selective demolition operations, perform a thorough inspection of the facility and site, and report to the Engineer defects and structural damage to or deterioration of existing construction to remain.

B. Examine areas affected by the Work and verify the following conditions prior to commencing demolition:
   1. Disconnection of utilities as required.

2. That utilities serving occupied or active portions of surrounding facilities will not be disturbed, except as otherwise indicated.

C. If unsatisfactory conditions exist, notify the Engineer, and do not begin demolition operations until such conditions have been corrected.

3.02 PREPARATION

A. Selective Demolition Plan:
   1. Prepare and submit a comprehensive selective demolition plan for the Work including the following elements, at a minimum:
      a. Proposed sequence, methods, temporary support, and equipment for demolition, removal, and disposal of portions of structure(s).
      b. Provisions and procedures for salvage and delivery to Owner of salvaged items, if required.
   2. Plan shall be signed and sealed by a Professional Structural Engineer registered in the state where Project is located.
   3. Submit plan a minimum 4 weeks before demolition is scheduled to begin.

B. Pipe Abandonment Plan:
   1. Prepare and submit a comprehensive Pipe Abandonment Plan for the Work to demonstrate and verify with camera inspection that all solids have been removed and pipe is free of residual.
   2. At a minimum, define the following elements:
      a. Proposed sequence, methods, cleaning procedures, or demolition, removal, and disposal of contents of the piping.
      b. Method of verification of final pipe condition.
      c. Detailed drawings showing treatment of pipe ends**.**
   3. Submit plan a minimum 4 weeks before abandonment is scheduled to begin.

C. Protection:
   1. Erect weatherproof closures to protect the interior of facilities and elements or equipment that are not designed for exposure to the weather. Provide temporary heat, cooling, and humidity control as necessary to prevent damage to existing and new construction. Maintain existing exiting paths and/or provide new paths in compliance with Building Code requirements.
   2. Erect and maintain dustproof partitions as required to prevent spread of dust, to other parts of building. Maintain negative pressure in the area where the Work is being performed to prevent the accidental spread of dust and to minimize the spread of fumes related to the Work.
   3. Upon completion of Work, remove weatherproof closures and dustproof partitions, and repair damaged surfaces to match adjacent surfaces.
   4. Provide and maintain protective devices to prevent injury from falling objects.
   5. Locate guardrails in stairwells and around open shafts to protect workers. Post clearly visible warning signs.
   6. Cause as little inconvenience to adjacent building areas as possible.
   7. Protect landscaping, benchmarks, and existing construction to remain from damage or displacement.
   8. Carefully remove designated materials and equipment to be salvaged by Owner or reinstalled.
   9. Store and protect materials and equipment to be reinstalled.

D. Layout:
   1. The limits of selective demolition are indicated on the Drawings. Confine demolition operations within the limits indicated on the Drawings.
   2. Lay out demolition and removal work at the site and coordinate with related Work for which demolition and removal is required. Clearly mark the extent of structural elements to be removed on the actual surfaces that will be removed.
   3. Arrange for Engineer's inspection of the lay out extents.
   4. Do not begin demolition/removal operations until the lay out markings have been reviewed by the Engineer.

3.03 DEMOLITION

A. General:
   1. Perform demolition work in accordance with ANSI A10.6.
   2. Demolish designated portions of structures and appurtenances in orderly and careful manner in accordance with the Selective Demolition Plan.
   3. Conduct demolition and removal work in a manner that will minimize dust and flying particles.
      a. Use water or dust palliative when necessary to prevent airborne dust.
      b. Provide and maintain hoses and connections to water main or hydrant.
   4. Demolish concrete and masonry in small sections. Perform demolition with small tools as much as possible. Blasting with explosive charges is not permitted.
   5. Sawcut concrete to establish the edges of demolition, wherever possible.
      a. Do not use a concrete breaker within 6 inches of reinforcing or structural metals that are designated to remain.
      b. At edges that are not sawcut, remove the final 6 inches of material with a chipping hammer as defined herein. At surfaces where material is removed with a chipping hammer, follow with a heavy abrasive blast to remove all loose material and microcracking.
      c. Alternate techniques to remove concrete may be used if acceptable to the Engineer; however, techniques other than those deemed by ICRI Guideline No. 310.2R to provide a low risk of introducing microcracking will require a subsequent procedure to remove loose material.
      d. Provide final surface preparation for repairs as specified.
   6. At locations indicated on the Drawings that the existing reinforcing is to be preserved, remove concrete using methods that do not damage the reinforcing. Use one of the following techniques:
      a. Hydrodemolition techniques as outlined in ICRI Guideline No. 310.3R.
      b. Chipping hammer, as defined herein, followed by heavy abrasive blast to remove all loose material and microcracking at remaining surfaces impacted by the chipping hammer.
      c. Alternate methods may be used, only if acceptable to the Engineer.
      d. For all methods, provide a small completed area for Engineer's review and acceptance. If the proposed method, in the opinion of the Engineer, damages the reinforcing, revise the removal method to remove the concrete with a less aggressive technique to protect the reinforcing.
   7. Remove materials carefully, to the extent indicated and as required.
      a. Provide neat and orderly junctions between existing and new materials.
      b. Use methods that terminate surfaces in straight lines at natural points of division.

8. Do not remove anything beyond the limits of Work indicated without prior written authorization of the Engineer. If in doubt about whether to remove an item, obtain written authorization of the Engineer prior to proceeding.
9. Perform work so as to provide the least interference and most protection to existing facilities to remain.
10. Assume possession of demolished materials, unless otherwise indicated on the Drawings or specified.
    a. Remove demolished materials from site at least weekly and dispose of in accordance with Laws and Regulations.
    b. Do not burn materials on site.

B. In-place Abandonment of Pipe:
1. Abandoned pipe in-place as indicated on the Drawings.
2. Clean buried or exposed solids service piping to a condition free of residual.
    a. Solids service piping includes: raw wastewater (RAW WW), primary sludge or scum (PS), mixed liquor (ML), return activated sludge (RAS), waste active sludge (WAS), surface waste activated sludge (SWAS), thickened waste activated sludge (TWAS), digested sludge (DS), centrate, or other similar solids service subject to biological degradation, etc.
3. Provide closure of abandoned pipe cut ends as indicated on the Drawings using one of the following methods:
    a. Install cap.
    b. Install plug.
    c. Install drain valves, pressure relief valves, vents, etc.
    d. Fill abandoned pipe as specified in Section 02312 - Controlled Low Strength Material (CLSM). And Section 02050 - Soils and Aggregate for Concrete.

C. Sizing of openings in existing concrete or masonry:
1. Make openings large enough to permit final alignment of pipe and fittings without deflections, but without oversizing.
2. Allow adequate space for packing around pipes and conduit to ensure watertightness.
3. If the Engineer deems the opening to be insufficient in size to accomplish this criteria, remove additional material using the procedures outlined in this Section.

D. Cutting openings in existing concrete or masonry:
1. Do not allow saw cuts to extend beyond limits of openings.
2. Create openings by the following method or other means acceptable to the Engineer that prevents over-cutting of member at corners:
    a. Core-drill through slab or wall at corners, being careful not to damage materials beyond the area to be removed.
    b. Saw cut completely through the member, between the core holes at the corners.
    c. As an alternate to sawcutting through the member, score the edges of the opening with a saw to a 1-inch depth on both surfaces (when accessible).
        1) Remove concrete or masonry to within 6 inches of material to remain with a concrete breaker.
        2) Remove the remaining material with a chipping hammer.

d. Remove the remaining material at the corners left by the core-drilling with a chipping hammer.

3. Prevent debris from falling into adjacent tanks or channels in service or from damaging existing equipment and other facilities.

E. Fill tanks with sand or fine gravel and cover with fill.

F. Immediately upon discovery, remove and dispose of contaminated, vermin-infested, or dangerous materials using safe means that will not endanger health of workers and public.

G. Remove trees and shrubs within marked areas; clear undergrowth and dead plant material as specified in Section 02300 - Earthwork.

H. Backfill open pits and holes caused by demolition as specified in Section 02300 - Earthwork.

I. Rough grade areas affected by demolition.

J. Remove demolished materials, tools, and equipment upon completion of demolition.

3.04 RESTORATION

A. General:
1. Repair damage caused by demolition to a conditions equal to those that existing prior to beginning of demolition.
   a. Patch and replace portions of existing finished surfaces that are damaged, lifted, and discolored with matching material. Refinish patched portion surfaces in a manner which produces uniform color and texture to entire surface.
   b. When existing finish cannot be matched, refinish entire surface to nearest change of plane where angle of change exceeds 45 degrees.
2. The cost of repairs shall be at the Contractor's expense at no increase in the Contract Price.
3. When new construction abuts or finishes flush with existing construction, make smooth transitions. Match finish of existing construction.
4. Where partitions are removed, patch floors, walls, and ceilings with finish materials that match existing materials.
5. Where removal of partitions results in adjacent spaces becoming one, rework floors, walls, and ceilings to provide smooth planes without breaks, steps, or bulkheads.
6. Where changes of plane exceed 2 inches, request instructions for making transition.
7. Trim and refinish existing doors as necessary to clear new floors.
8. Match patched construction with adjacent construction in texture and appearance so that patch or transition is invisible at 5-foot distance.
9. When finished surfaces are cut so that smooth transition is impossible, terminate existing surface in neat manner along straight line at natural line of division and provide appropriate trim.

B. Restore existing concrete reinforcement as follows:
1. Where existing reinforcement is to be incorporated into the new Work, protect, clean, and extend into new concrete.

2. Where existing reinforcement is not to be retained, cut off as follows:
    a. Where new concrete joins existing concrete at the removal line, cut reinforcement flush with concrete surface at the removal line.
    b. Where concrete surface at the removal line will become the finished surface, cut reinforcement 2 inches below the surface, paint ends with epoxy, and patch holes with dry pack mortar.

C. Restore areas affected by removal of existing equipment, equipment pads and bases, piping, supports, electrical panels, electric devices, and conduits such that little or no evidence of the previous installation remains:
1. Fill areas in existing floors, walls, and ceilings from removed piping, conduit, and fasteners with non-shrink grout and finish smooth.
2. Remove concrete bases for equipment and supports by:
    a. Saw cutting clean, straight lines with a depth equal to the concrete cover over reinforcement minus 1/2 inch below finished surface.
        1) Do not cut existing reinforcement on floors.
    b. Chip concrete within scored lines and cut exposed reinforcing steel and anchor bolts.
    c. Patch with non-shrink grout to match adjacent grade and finish.
3. Terminate abandoned piping and conduits with blind flanges, caps, or plugs.

3.05 FIELD QUALITY CONTROL

A. Do not proceed with demolition without Engineer's inspection of lay out.

B. Do not deviate from the submitted demolition plan without notifying the Engineer prior to Work.

END OF SECTION

SECTION 01756

COMMISSIONING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Requirements for each Commissioning phase of the Project, equipment/system, and/or facility.

1.02 DEFINITIONS

A. Commissioning - The process of planning, testing, and process start-up of the installation for compliance with contract requirements and demonstrating, through documented verification, that the project has successfully met the Contractual requirements. It includes training the Owner's staff to operate the facility.

B. Commissioning Phases - The work activities of facility commissioning are grouped into the phases defined in the table below.

Commissioning		
Planning Phase	**Testing and Training Phase**	**Process Start-Up Phase**
Owner Training Plan and Schedule	Source Testing	Process Start-up
Commissioning Schedule	Owner Training	Process Operational Period
Subsystem Testing Plan	Installation Testing	Instrumentation and Controls Fine-Tuning
	Closeout Documentation	

C. Component - A basic building block of equipment, subsystems, and systems that requires installation or functional testing but does not have an electrical connection or internal electronics. (Examples: filter effluent piping and manual isolation valves).

D. Device - A basic building block of equipment, subsystems, and systems that requires installation or functional testing and does have an electrical connection or internal electronics. (Examples: filter level transmitter or water pump pressure transmitter).

E. Equipment - An assembly of component(s) and devices(s) that requires installation or functional testing. (Examples: Pump, motor, VFD, Ozone Generator, UV Disinfection System, etc.).

F. Facility - A grouping of process areas, systems, subsystems, equipment, components, and devices (Examples: treatment plant, pump station, etc.).

G. Functional Testing - Testing performed on a completed subsystem to demonstrate that equipment/system meets manufacturers' calibration and adjustment requirements and other requirements as specified. Functional testing includes operating equipment/system manually in local, manually in remote (or remote manual), and automatically in remote (in remote auto).

H. Installation Testing - Testing to demonstrate that subsystem component (piping, power, networks, devices, etc.) is ready and meets the project requirements in advance of functional testing. Installation testing also includes manufacturers' certification of installation and other requirements as specified to prepare equipment/system for Functional Testing. Also referred to as Field Acceptance Testing.

I. Manufacturer's Certificate of Source Testing - When applicable, the form is used during Source Testing for the manufacturer to confirm that the applicable source tests have been performed and results conform to the Contract Documents. The form is provided at the end of this Section.

J. Manufacturer's Certificate of Installation and Functionality Compliance - The form is used during Installation Testing and Functional Testing. It is submitted at the end of Functional Testing to confirm that the equipment/system is installed in conformance with the Contract Documents and that it meets the Functional Testing requirements defined in the Contract Documents. The form is provided at the end of this Section.

K. Process Area - A grouping of systems, subsystems, equipment, components, and devices that divide a facility into functional areas. (Examples: Filter Process Area or Chemical Area).

L. Process Operational Period - A period of time after completion of the process start-up set aside for final Operational Testing to verify facility performance meets the Contract Document requirements. This period may specifically limit other construction activities.

M. Process Start-up Phase - Operating the facility to verify performance meets the Contract Document requirements.

N. Process Start-Up - Activities conducted after the testing and training phase that are necessary to place systems or process areas into operational service.

O. Product - A system, subsystem or component.

P. Subsystem - A building block of systems made up from a grouping of components, devices, and equipment that perform a definable function. (Examples: Filter No. 1 Backwash Subsystem, Sedimentation Basin No. 1 Hoseless Sludge Removal Subsystem).

Q. System - A grouping of subsystems, equipment, components, and devices that perform a definable function. (Examples: Filter No. 1, Sedimentation Basin).

1.03 COMMISSIONING COORDINATOR (CC)

A. Designate and provide a CC for this project.

B. Submit summary of the CC's qualifications within 30 days of NTP:
   1. Include description of previous experience as a CC on similar projects for the designated CC with a list of references including phone numbers for review and Owner approval.

C. CC responsibilities include the following:
   1. Lead efforts relating to Commissioning.
   2. Be thoroughly familiar with commissioning requirements in the Contract Documents.
   3. Be regularly engaged and experienced in all aspects of commissioning.
   4. Provide technical instruction for commissioning.
   5. Provide primary interface with Engineer and Owner for efforts relating to Commissioning of Project facilities.
   6. Coordinate training efforts.

D. CC on-site:
   1. NTP to 30 percent milestone: 2 hours per week.
   2. 30-percent milestone to 70-percent milestone: 1 day per week.
   3. Testing and Training Phase: Full-time.
   4. Process Start-up Phase: Full-time.

E. Designate and provide CC assistants, as needed.

1.04 SERVICES OF MANUFACTURER'S REPRESENTATIVES

A. Qualification of manufacturer's representative as specified in the Contract Documents technical sections include the following:
   1. Authorized representative of the manufacturer, factory trained and experienced in the technical applications, installation, operation, and maintenance of respective equipment/system with full authority by the equipment/system manufacturer to issue the certifications required of the manufacturer.
   2. Competent, experienced technical representative of equipment/system manufacturer for assembly, installation, testing guidance, and training.
   3. Additional qualifications may be specified in the individual sections.
   4. Submit qualifications of the manufacturer's representative no later than 30 days in advance of required observations.
   5. Representative subject to approval by Owner and Engineer.
   6. No substitute representatives will be allowed until written approval by Owner and Engineer has been obtained.

B. Completion of manufacturer on-site services: Engineer approval required.

C. Manufacturer is responsible for determining the time required to perform the specified services.
   1. Minimum times specified in the Contract Documents are estimates.
   2. No additional costs associated with performing the required services will be approved.
   3. Manufacturer required to schedule services in accordance with the Contractor's project schedule up to and including making multiple trips to project site when there are separate milestones associated with installation of each occurrence of manufacturer's equipment.

D. Manufacturer’s on-site services as specified in the Contract Documents include the following:
   1. Assistance during Commissioning Phase and Process Start-Up Phase.
   2. Provide daily copies of manufacturer's representative’s field notes and data to Engineer.
   3. Other requirements as specified in the Contract Documents.

1.05 PLANNING PHASE

A. Overview of Planning Phase:
   1. Define approach and timing for Commissioning.

B. Owner training plan and schedule:
   1. Training outcomes:
      a. Owner’s operations, maintenance, and engineering staff have the information needed to safely operate, maintain, and repair the equipment/systems provided in the Contract Documents.
   2. Training objectives:
      a. To instruct personnel in the operation and maintenance of the equipment/system. Instruction shall include step-by-step troubleshooting procedures with all necessary test equipment/system.
      b. To instruct personnel in the removal, inspection, and cleaning of equipment/system as needed.
      c. Training tailored to the skills and job classifications of the staff attending the classes (e.g., plant superintendent, treatment plant operator, maintenance technician, electrician, etc.).
      d. Provide supporting documentation, such as vendor operation and maintenance manuals.
   3. Training schedule:
      a. Schedule Owner’s staff training within the constraints of their workloads. Those who will participate in this training have existing full-time work assignments, and training is an additional assigned work task, therefore, scheduling is imperative. Owner staff work schedules regularly shift, as treatment facilities are typically operated on an around-the-clock basis.
   4. Training plan:
      a. Coordinate and arrange for manufacturer’s representatives to provide both classroom-based learning and field (hands-on) training, based on training module content and stated learning objectives.
      b. Conduct classroom training at location designated by Owner.
      c. Scope and sequence:
         1) Plan and schedule training in the correct sequence to provide prerequisite knowledge and skills to trainees.
            a) Describe recommended procedures to check/test equipment/system following a corrective maintenance repair.
   5. Training scheduling coordination:
      a. CC is responsible for the following:
         1) Coordinate schedule for training periods with the Owner’s personnel and manufacturer's representatives (instructors).
      b. Complete Owner training no sooner than 15 calendar days prior to start of process start-up of each system.

6. Meetings:
    a. CC is responsible for setting commissioning coordination meeting dates and times, as well as preparing the agendas and meeting minutes.
    b. CC shall meet with Engineer and Owner's designated training coordinator to develop list of personnel to be trained and to establish expected training outcomes and objectives at least 90 calendar days prior to commissioning of equipment/system.
    c. CC shall conduct commissioning progress meetings throughout construction, to plan, scope, coordinate, and schedule future activities, resolve problems, etc.
        1) Frequency: Monthly minimum. Increase frequency as needed based on complexity and quantity of commissioning activities.
7. Submittals:
    a. Submit Training Plan Schedule 90 calendar days before the first scheduled training session, including but not limited to lesson plans, participant materials, instructor's resumes, and training delivery schedules.
    b. Submit training documentation including the following:
        1) Training plan:
            a) Training modules.
            b) Scope and sequence statement.
            c) Contact information for manufacturer's instructors including name, phone, and e-mail address.
            d) Instructor qualifications.
        2) Training program schedule:
            a) Format: Bar chart:
                (1) Additionally include in the Project Progress Schedule.
            b) Contents:
                (1) Training modules and classes.
8. Training sessions:
    a. Provide training sessions for equipment/system as specified in the individual equipment/system section.

C. Commissioning Schedule:
1. Commissioning overview:
    a. Comply with Commissioning Roles and Responsibilities Matrix specified at the end of this Section.
2. Submittal due date:
    a. Submit Commissioning Schedule not less than 90 calendar days prior to planned initial commissioning of each subsystem or system.
3. Schedule requirements:
    a. Schedule durations and float for commissioning activities to ensure Work does not fall behind schedule due to complications or delays during commissioning.
    b. Time-scaled network diagram detailing the work to take place in the period between 210 calendar days prior to planned initial commissioning of equipment and systems, and prior to the date of Substantial Completion, together with supporting narrative.
    c. Provide detailed schedule of commissioning activities including durations and sequencing requirements.

1) Identify the following activities:
    a) Testing and Training Phase:
        (1) Source Testing.
        (2) Owner Training.
        (3) Installation Testing.
        (4) Functional Testing.
        (5) Clean Water Facility Testing.
        (6) Closeout Documentation.
    b) Process Start-Up Phase:
        (1) Process Start-Up.
        (2) Process Operational Period.
        (3) Instrumentation and Controls Fine-Tuning.

d. Schedule manufacturer's services to avoid conflict with other on-site testing or other manufacturers' on-site services.

e. Verify that conditions necessary to allow successful testing have been met before scheduling services.

D. Subsystem testing plans:

1. Provide separate testing plans for each individual subsystem and system that include the following:
    a. Approach to testing including procedures, schedule, and recirculation requirements.
    b. Test objective: Demonstrate subsystem meets the design requirements as specified in the technical sections.
    c. Test descriptions, forms, temporary systems (pumps, piping, etc.), shutdown requirements for existing systems, test forms, test logs, witness forms, and checklists to be used to control and document the required tests.
    d. Test forms: Include, but not limited to, the following information:
        1) Tag and name of equipment/system to be tested.
        2) Test date.
        3) Names of persons conducting the test.
        4) Names of persons witnessing the test, where applicable.
        5) Test data.
        6) Applicable project requirements.
        7) Check offs for each completed test or test step.
        8) Place for signature of person conducting tests and for the witnessing person, as applicable.
    e. Define start-up sequencing of unit processes:
        1) Include testing of alarms, interlocks, permissives, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters.
        2) Provide detailed test procedures setting forth step-by-step descriptions of the procedures for systematic testing of equipment/system.
        3) Demonstrate proper rotation, alignment, speed, flow, pressure, vibration, sound level, adjustments, and calibration.
            a) Perform initial checks in the presence of and with the assistance of the manufacturer's representative.
        4) Demonstrate proper operation of each control loop function including mechanical, electrical, alarms, local and remote controls, instrumentation, and other equipment/system functions.

a) Generate signals with test equipment/system to simulate operating conditions in each control mode.

2. Engineer approval of test plan is required prior to performing test.
   a. Revise and update test plans based on review comments, actual progress, or to accommodate changes in the sequence of activities.
   b. Submit test reports for each phase of testing for each equipment/system.
   c. Engineer approval of preceding test reports is required prior to start of next test.
   d. Tests will be rescheduled if test plan is not approved by the required deadline.
      1) Contractor is responsible for any resulting delay.
3. Contractor is responsible to reproduce and distribute final test procedures.
   a. Provide 3 copies for Engineer.
4. Tests may commence only after Engineer has received approved test plan copies.
5. Submittals:
   a. Submit test plans not less than 60 calendar days prior to planned installation testing of subsystem or system.
   b. Completed Manufacturer's Certificate of Installation and Functionality Compliance.
   c. Test procedures and forms: Provide signed-off copy of test forms and test reports upon completion of the test.
   d. Test reports:
      1) Submit preliminary copies within 1 day after testing completion.
      2) Submit final copies and report within 14 days after testing completion.

1.06 TESTING AND TRAINING PHASE

A. Overview of Testing and Training Phase:
   1. General:
      a. Include specified Source Testing, Owner Training, Installation Testing, Functional Testing, Clean Water Facility Testing, and Closeout Documentation required by this Section and the technical sections.
   2. Contractor responsibilities:
      a. Furnish labor, power, chemicals, tools, equipment, instruments, and services required for and incidental to completing commissioning activities in accordance with the approved Commissioning Plans.
      b. Prior to testing, verify equipment protective devices and safety devices have been installed, calibrated, and tested.
      c. Acceptable tests: Demonstrate the equipment/system performance meets the requirements stated in the Contract Documents.
         1) When the equipment/system fails to meet the specified requirements, perform additional, more detailed, testing to determine the cause, correct, repair, or replace the causative components and repeat the testing that revealed the deficiency.

B. Source testing:
   1. Also referred to as factory testing or factory acceptance testing (FAT).
   2. Test components, devices, and equipment/system for proper performance at point of manufacture or assembly as specified in the technical sections.

3. Notify the Engineer in writing when the equipment/system is ready for source inspection and testing.
4. Source Test Plan:
    a. As specified in this Section and other technical sections.
    b. Source testing requirements as specified in technical sections.
        1) Non-witnessed: Provide Manufacturer's Certificate of Source Testing.
        2) Witnessed: 1 Owner's representative and 1 Engineer's representative present during testing, unless otherwise specified, and provide Manufacturer's Certificate of Source Testing.
    c. Prepared by Contractor as a result of discussions and planning emerging from regularly conducted commissioning meetings for source tests as specified in the Contract Documents.
    d. Provide the following items for each Source Test:
        1) Purpose and goals of the test.
        2) Identification of each item of equipment/system, including system designation, location, tag number, control loop identifier, etc.
        3) Description of the pass/fail criteria that will be used.
        4) Listing of pertinent reference documents (Contract Documents and industry standards or sections applicable to the testing).
        5) Complete description, including drawings or photographs, of test stands and/or test apparatus.
        6) Credentials of test personnel.
        7) Descriptions of test equipment to be used, product information, and all appropriate calibration records for the test equipment.
        8) Test set-up procedures.
        9) Detailed step-by-step test procedures.
            a) The level of detail shall be sufficient for any witness with a rudimentary technical aptitude to be able to follow the steps and develop confidence that the tests were being performed as planned.
            b) All steps are significant, and all steps shall be included in the procedures.
        10) Sample data logs and data recording forms.
        11) Sample computations or analyses with the results in the same format as the final report to demonstrate how data collected will be used to generate final results.
            a) Complete disclosure of the calculation methodologies.
            b) Include a sample for each type of computation required for the test and analysis of the results.
        12) Detailed outline of the Source Test report.
        13) Sample test reports.
    e. Submit Source Test Plan and forms as specified in the technical sections.
        1) Submit a copy of the Source Test Plan at least 30 days before any scheduled test date.
        2) Engineer approval of Source Test Plan required prior to beginning source testing.
        3) Schedule the testing after approval of the test procedures submittal.
    f. Indicate the desired dates for source inspection and testing.
        1) Notify the Engineer of the scheduled tests a minimum of 30 days before the date of the test.
5. Test results:
    a. Prepare and submit test results with collected data attached.

6. Contractor is responsible for costs associated with Owner's representatives and Engineer's representative witnessing Source Tests.
    a. Include costs for at least the following:
        1) Transportation:
            a) Travel 1 day on commercial airline to site including air flight costs and $1,600 allowance per person per day.
            b) Travel 1 day on commercial airline from site including air flight costs and $1,600 allowance per person per day.
            c) Rental car from hotel to and from the test site.
        2) Hotel costs at a facility with an American Automobile Association 4 star rating or equivalent for single occupancy room per person per day.
        3) Meal allowance of $60 per person per day.
        4) On-site time: 1 day at the site, unless specified otherwise, including $1,600 allowance per person per day.
    b. If Source Test is not ready when the witnesses arrive or if the Source Test fails, the witnesses will return home with Contractor responsible for costs associated with the trip including costs described above. Contractor is responsible for rescheduling the Source Test and witnesses' costs associated with the second trip including costs described above.
    c. Contractor is responsible for witnesses' costs associated with retests including costs described above.
7. Contractor is responsible for providing fuel, chemicals, and other consumables needed for Source Testing.

C. Owner training:
1. Training instruction format:
    a. The training for operations and maintenance personnel shall be provided as one entity.
    b. Instructors shall apply adult education best practices, emphasizing learner participation and activity.
    c. Training delivery may include problem solving, question/answer, hands-on instruction, practice, evaluation/feedback tools, and lecture.
    d. Visual aids and hands-on practice sessions must support training objectives.
    e. Lecturing should be less than 30 percent of class time.
    f. Conduct hands-on instruction according to the following descriptions:
        1) Present hands-on demonstrations of at least the following tasks:
            a) Proper start-up, shutdown, and normal and alternative operating strategies.
            b) Common corrective maintenance repairs for each group.
            c) Describe recommended procedures to check/test equipment/system following a corrective maintenance repair.
        2) Use tools and equipment provided by manufacturer to conduct the demonstrations.
            a) Submit requests for supplemental assistance and facilities with the Contractor's proposed lesson plans.
        3) Contractor remains responsible for equipment disassembly or assembly during hands-on training situations involving equipment disassembly or assembly by Owner's personnel.
            a) Provide written certification of proper equipment/system operation to Engineer after completion of hands-on training.

2. Class agenda:
    a. Include the following information in the agenda:
        1) Instructor name.
        2) Listing of subjects to be discussed.
        3) Time estimated for each subject.
        4) Allocation of time for Owner staff to ask questions and discuss the subject matter.
        5) List of documentation to be used or provided to support training.
    b. Owner may request that particular subjects be emphasized and the agenda be adjusted to accommodate these requests.
    c. Distribute copies of the agenda to each student at the beginning of each training class.
3. Number of students:
    a. Estimated maximum class size: 5 persons.
        1) Owner will determine the actual number of students.
        2) Engineer will provide an estimated headcount 1 week prior to the class, so that the instructor can provide the correct number of training aids for students.
4. Instructor qualifications:
    a. Provide instructors completely knowledgeable in the equipment/system for which they are training.
    b. Provide instructors experienced in conducting classes.
    c. Provide instructor's technical preparation and instructional technology skills and experience.
    d. Sales representatives are not qualified instructors unless they possess the detailed operating and maintenance knowledge required for proper class instruction.
    e. If, in the opinion of the Owner, an appropriately knowledgeable person did not provide the scheduled training, such training shall be rescheduled and repeated with a suitable instructor.
5. Training aids:
    a. Instructors are encouraged to use audio-visual devices, P&IDs, models, charts, etc. to increase the transfer of knowledge.
    b. Instructors shall provide such equipment (televisions, video recorder/player, computer, projectors, screens, easels, etc.), models, charts, etc. for each class.
    c. Instructor is responsible for confirming with Engineer and Owner in advance of each class that the classroom will be appropriate for the types of audiovisual equipment to be employed.
6. Classroom documentation:
    a. Trainees will keep training materials and documentation after the session.
    b. Operations and maintenance manuals, as specified in technical sections:
        1) Provide a minimum of 2 copies of final Engineer-approved operations and maintenance manuals as specified in Section 01782 - Operation and Maintenance Data for use during the classroom instruction.
        2) Owner reserves the right to delay training for a particular equipment item if the operations and maintenance manuals for that equipment are incomplete, inaccurate, or otherwise unsuitable for use by the Owner's staff.
        3) No contract extensions or extra costs will be allowed for training delays due to operations and maintenance manual submittal delays.
    c. Provide supplemental documentation handouts to support instruction.

d. Digitally record audio and video of each training session.
    1) Include classroom and field instruction with question and answering periods.
    2) Engineer approval required for producer of video materials from one of the following options:
        a) Qualified, professional video production company.
        b) Contractor demonstrates satisfactory skill.
    3) Record in digital format and recording shall become property of the Owner.
        a) Provide audio quality that is not degraded during the recording of the field sessions due to background noise, space, distance or other factors.
    4) Video files shall be file format and delivery medium as directed and approved by Owner.
    5) Provide 2 complete sets of video materials fully indexed and cataloged with printed labels stating session content and dates recorded.
    6) The Contractor shall provide a written release from all claims to the recorded training material produced, if required.
e. Training modules:
    1) Provide a training module for each equipment category.
    2) Divide each training module's instructional content into discrete lesson plans.
f. Lesson plans:
    1) Provide performance-based learning objectives.
    2) State learning objectives in terms of what the trainees will be able to do at the end of the lesson.
    3) Define student conditions of performance and criteria for evaluating instructional success.
    4) Instruction lesson plan outlines for each trade.
        a) Provide specific components and procedures.
    5) Minimum requirements:
        a) Hands-on demonstrations planned for the instructions.
        b) Cross-reference training aids.
        c) Planned training strategies such as whiteboard work, instructor questions, and discussion points or other planned classroom or field strategies.
        d) Attach handouts cross-referenced by section or topic in the lesson plan.
        e) Indicate duration of outlined training segments.
    6) Provide maintenance instruction lesson plans including mechanical, HVAC, instrumentation, and electrical aspects:
        a) Equipment operation:
            (1) Describe equipment's operating (process) function and system theory.
            (2) Describe equipment's fundamental operating principles and dynamics.
            (3) Identify equipment's mechanical, electrical, and electronic components and features.
            (4) Identify support equipment associated with the operation of subject equipment.

(5) Detail the relationship of each piece of equipment or component to the subsystems, systems, and process.
(6) Cite hazards associated with the operations, exposure to chemicals associated with the component, or the waste stream handled by the component.
(7) Specify appropriate safety precautions, equipment, and procedures to eliminate, reduce, or overcome hazards.

b) Detailed component description:
(1) Define Preventative Maintenance (PM) inspection procedures required on equipment in operation, spot potential trouble symptoms (anticipate breakdowns), and forecast maintenance requirements (predictive maintenance).
(a) Review preventive maintenance frequency and task analysis table.
(2) Identify each component function and describe in detail.
(3) Where applicable, group relative components into subsystems.
(4) Identify and describe in detail equipment safety features, permissive and controls interlocks.

7) Provide the following information in equipment troubleshooting lesson plans:
a) Define recommended systematic troubleshooting procedures as they relate to specific craft problems.
b) Provide component specific troubleshooting checklists as they relate to specific craft problems.

8) Provide the following information in equipment Corrective Maintenance (CM) troubleshooting lesson:
a) Describe recommended equipment preparation requirements as they relate to specific craft problems.
b) Identify and describe the use of any special tools required for maintenance of the equipment as they relate to specific craft problems.
c) Describe component removal/installation and disassembly/assembly procedures for specific craft repairs.
d) Perform at least 2 hands-on demonstrations of common corrective maintenance repairs.
(1) Additional demonstrations may be required by the Owner.
e) Describe recommended measuring instruments and procedures, and provide instruction on interpreting alignment measurements, as appropriate.

7. Class logistics:
a. Delivery time minimum: 2 hours.
b. Delivery time maximum: 4 hours.
1) Longer time requires Engineer approval.
c. Class agenda:
1) Refreshment break: One 10-minute break.
2) Meal break: One 45-minute break, unless otherwise specified.
3) Schedule refreshment breaks and meal breaks to meet the class needs and Owner work rules.

d. Schedule specific sessions:
    1) Minimum of 30 days in advance to allow Owner staffing arrangements to take place.
    2) At the times requested by the Owner, within the period 7 a.m. to 7 p.m. Monday through Friday.
        a) Times scheduled will be at Owner's discretion.
    3) Owner approval and confirmation required for session schedules.
    4) Provide minimum of 2 sessions for each class unless otherwise noted.
        a) The purpose of having multiple sessions on each class is to accommodate the attendance of as many Owner personnel working different shifts as possible.

8. Distribute Training Evaluation Form following each training session.
    a. Training Evaluation Form is included in this Section.
    b. Return completed Training Evaluation Forms to Owner's designated training coordinator immediately after session is completed.
    c. Revise training sessions judged "Unsatisfactory" by a majority of attendees.
        1) Conduct training sessions again until a satisfactory rating is achieved at no additional cost to Owner.
9. Submittals:
    a. Prior to the training session:
        1) Instructor qualifications: Due 30 calendar days prior to initial training session.
        2) Training course materials: Due 14 calendar days prior to initial training session.
            a) Training agenda, lesson plan, presentation, and handouts.
            b) Other audio-visual aids utilized during each training course.
            c) Format: 2 electronic copies and 3 hard copies organized in notebooks.
    b. Post training session:
        1) Training course materials: Due 14 calendar days after class completion.
            a) Video recordings.
            b) Class attendance sheet.
            c) Training agenda, final lesson plan, presentation, and handouts.
            d) Other audio-visual aids utilized during each training course.
            e) Provide materials for all sessions of the class in a single transmittal.
            f) Format: 2 electronic copies and 3 hard copies organized in notebooks.

D. Installation Testing:
    1. Perform subsystem testing according to approved Subsystem Testing Plans.
    2. Initiate the Manufacturer's Certificate of Installation and Functionality Compliance for all equipment.
        a. Manufacturer's Certificate of Installation and Functionality Compliance form is included in this Section.
        b. Manufacturer's Certificate of Installation and Functionality Compliance certifies the equipment meets the following requirements:
            1) Has been properly installed, adjusted, aligned, and lubricated.

2) Is free of any stresses imposed by connecting piping or anchor bolts.
3) Is able to be operated as necessary for Functional Testing.

c. Form shall be submitted after completion of Functional Testing, as specified in this Section.

3. Coordinate Installation Testing with restrictions and requirements as specified in Section 01140 - Work Restrictions.
4. Perform coating holiday testing as specified in Section 09960 - High-Performance Coatings.
5. Perform pressure and leakage testing as specified in individual component Sections and Section 15956 - Piping Systems Testing.
6. Perform mechanical equipment Installation Testing: As specified below and in individual equipment sections, such as Section 15050 - Common Work Results for Mechanical Equipment, 15954 - Testing, Adjusting, and Balancing for HVAC, and 15958 - Mechanical Equipment Testing :
   a. Remove rust preventatives and oils applied to protect equipment during construction.
   b. Flush lubrication systems and dispose of flushing oils.
      1) Recharge lubrication system with lubricant recommended by manufacturer.
   c. Flush fuel system and provide fuel for testing and start-up.
   d. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
   e. Remove temporary supports, bracing, or other foreign objects installed to prevent damage during shipment, storage, and erection.
   f. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
   g. Perform cold alignment and hot alignment to manufacturer's tolerances.
   h. Adjust V-belt tension and variable pitch sheaves.
   i. Inspect hand and motorized valves for proper adjustment.
      1) Tighten packing glands to ensure no leakage, but permit valve stems to rotate without galling.
      2) Verify valve seats are positioned for proper flow direction.
   j. Tighten leaking flanges or replace flange gasket.
      1) Inspect screwed joints for leakage.
   k. Install gratings, safety chains, handrails, shaft guards, and sidewalks prior to operational testing.
7. Electrical devices and subsystems Installation Testing: As specified below, in Section 16950 - Field Electrical Acceptance Tests, and the technical sections.
   a. Perform insulation resistance tests on all wiring except wiring and control wiring inside electrical panels.
   b. Perform grounding resistance tests on grounding systems.
   c. Test and set relays and circuit breaker trip units for proper operation.
      1) Settings as documented in approved electrical studies performed as specified in Section 16305 - Electrical System Studies.
   d. Perform direct-current high-potential tests on all cables that will operate at more than 2,000 volts.
   e. Motors:
      1) Windings energized to 1,000 volts DC for 1 minute.
         a) Motor resistance measured at the end of the test and recorded.
      2) Check motors for actual full-load amperage draw and proper rotation.

8. Instrumentation devices and subsystems Installation Testing: As specified below, in Section 17950 - Testing, Calibration, and Commissioning, and technical sections.
9. Heating, ventilating, and air conditioning systems Installation Testing: As specified below, in Section 15954 - Testing, Adjusting, and Balancing for HVAC, and technical sections.
    a. Perform testing of heating, ventilating, and air conditioning equipment, balancing of distribution systems, and adjusting of ductwork accessories.
    b. Test hydronic systems, if required by technical sections.

E. Functional Testing:
1. Perform subsystem testing according to approved Subsystem Testing Plan.
2. Notify the Engineer 5 days prior to when the Work is ready for Functional Testing.
    a. Perform testing in the presence of the Engineer.
3. Determine Functional Testing durations with Owner's input.
    a. Durations will vary depending on the availability of water for testing.
    b. Target minimum Functional Test duration: 8 hours.
        1) Identify equipment/system that cannot be tested for a minimum of 8 hours as specified in technical sections.
4. Perform Functional Testing as specified in technical sections.
    a. Perform Functional Testing in addition to the other tests specified in the technical sections.
    b. Perform Functional Testing to demonstrate that the component equipment functions as an entire system in accordance with the design requirements.
    c. Perform Functional Testing to demonstrate that the unit process has operated in a manner necessary to demonstrate equipment/system functions manually in local, manually in remote (or remote manual), and automatically in remote (in remote auto).
    d. Perform testing with Contractor-provided water.
    e. Repair or replace parts that operate improperly and retest.
    f. Submit testing results as specified in the technical sections to the Owner and Engineer for approval of Functional Testing results.
5. Provide completed Manufacturer's Certificate of Installation and Functionality Compliance forms for all equipment.
    a. Manufacturer's Certificate of Installation and Functionality Compliance form is included in this Section.
    b. Manufacturer's Certificate of Installation and Functionality Compliance certifies the equipment/system meets the following requirements:
        1) Is suitable for satisfactory full-time operation under full-load conditions.
        2) Operates within the allowable limits for vibration and noise.
        3) Electrical and instrumentation requirements:
            a) Electrical equipment, instrumentation, and control panels are properly installed, calibrated, and functioning.
            b) Electrical Installation Testing is complete, and test results have been approved by the Engineer.
                (1) Noted deficiencies have been corrected.
                (2) Relays, circuit breakers, and other protective devices are set.

c) Control logic for start-up, shutdown, sequencing, interlocks, control, and emergency shutdown has been tested and is properly functioning.
d) Motor control is calibrated and tested.

F. Closeout documentation:
1. Submittals:
a. Provide records generated during Commissioning Phase of Project.
1) Required documents include but are not limited to:
a) Training documentation.
b) Manufacturer's Certificate of Source Testing.
c) Manufacturer's Certificate of Installation and Functionality Compliance.
d) Daily logs of equipment/system testing identifying tests conducted and outcome.
e) Test forms and documentation.
f) Functional Testing results.
g) Logs of time spent by manufacturer's representatives performing services on the job site.
h) Equipment lubrication records.
i) Electrical phase, voltage, and amperage measurements.
j) Insulation resistance measurements.
k) Bearing temperature measurements.
2) Data sheets of control loop testing including testing and calibration of instrumentation devices and setpoints. Format: 2 electronic copies and 3 hard copies organized in notebooks.
3) Due date: Within 14 calendar days of Substantial Completion.

1.07 PROCESS START-UP PHASE

A. Overview of Process Start-Up Phase:
1. Operating the facility to verify performance meets the Contract Document requirements.

B. Process Start-Up:
1. Perform process start-up in the presence of the Engineer.
2. Pre-start-up activities:
a. Commissioning Documentation and Data Review.
b. Start-Up Go/No-Go Decision Criteria.
c. Building and Fire Inspection Compliance Check.
d. Process Start-Up Sequence Review.
1) Submit a Process Start-Up plan for review by Engineer not less than 90 calendar days prior to planned commencement of process start-up activities.
2) Include the following:
a) Pre-start-up activities.
b) Process Start-Up.
c) Process Operational Period.
e. Description of Temporary Testing Arrangement, if applicable.
f. Final Process Start-Up Forms and Documentations.
g. Final Operational Testing Plan.

3. Control loop tuning.
    a. Perform control loop tuning during system testing with water to the extent possible.
4. Process area start-ups.
    a. Process start-up individual process areas comprised of multiple interdependent systems where possible and beneficial to reduce complexity and risk of complete facility testing.
    b. Process area test flows may be limited by upstream and downstream process constraints (i.e., tank and basin volumes) and/or localized recirculation capabilities.
5. Facility-wide process start-up.
    a. Upon approved completion of pre-start-up activities, perform entire facility process start-up.
        1) Complete control loop tuning during this phase of process start-up.
        2) Continue process start-up operations until facility meets or exceeds the Contract requirements.
    b. Process control systems testing:
        1) Test complete system instrumentation, controls and PLC, HMI, and LOI programming for the facility.
    c. HVAC systems start-up and testing:
        1) Test complete HVAC system for the facility.
    d. Ancillary systems start-up and testing:
        1) Test complete security system, phone system, fire alarm system, etc. for the facility.
    e. Remaining equipment/system tests:
        1) Conduct remaining specified equipment/system performance tests that could not be performed during the Testing and Training Phase due to inter-system and/or treatment process dependencies.

C. Process Operational Period:
1. Prior to beginning the Process Operational Period:
    a. Conformance with treatment standards is required prior to Operational Testing, if applicable.
        1) Biological processes require time to build up the necessary population of organisms to meet treatment standards, as specified in Section 01140 - Work Restrictions.
    b. Correct any outstanding punch list items prior to the Operational Testing.
2. Duration: 30 calendar days.
3. Engineer will be present for process operational period unless such presence is expressly waived in writing.
4. Prove facility conformance with Contract Document requirements.
5. Contractor to provide:
    a. Specified start-up materials and operating supplies.
    b. Necessary craft of labor assistance, in the event of an emergency equipment failure requiring immediate attention (emergency is defined as a failure of function which precludes the further operation of a critical segment of or the whole of the Work) with a response time of not more than 4 hours from the time of notification.
    c. Manufacturer’s authorized representative to supervise placing equipment/systems in operation and provide guidance during Operational Testing per applicable section.

d. Necessary manufacturer's representatives and operating supplies for retesting systems that fail to pass the initial Operational Testing due to deficiencies in products of workmanship at no additional cost to the Owner.
e. List of 24-hour "on-call" representative supervisory persons who will monitor the Operational Testing and serve as liaison for the Engineer and Owner.

6. Owner will provide:
   a. Operations personnel for duration of test.
7. Prior to date of Substantial Completion of Installation, the Contractor's CC shall oversee Process Operational Period.
   a. Owner staff will operate the completed Project construction.
   b. Entire system shall continuously meet performance requirements and shall operate without fault, failure, or defect for a continuous period.
   c. Individual equipment/system failures that are corrected within 24 hours and do not prevent the entire project from continuously satisfying the established operational requirements shall not require the consecutive 30 day test to be restarted unless the failure recurs.
   d. Restart the consecutive test period for any of the following conditions:
      1) Any failure of the complete Project construction to meet operational requirements.
      2) When malfunctions or deficiencies cause shutdown or partial operation of the facility, or results in failure of the complete Project construction to meet operational requirements.
      3) Any individual equipment/system failure that meets any of the following conditions:
         a) Requires more than 24 hours to correct, unless otherwise specified in Section 17950 - Testing, Calibration, and Commissioning.
         b) Recurs within the 24-hour correction period requiring further correction.
      4) Immediately correct defects in material, workmanship, or equipment/system which became evident during Operational Testing.

1.08 INSTRUMENTATION AND CONTROLS FINE-TUNING:

A. After the Process Operational Period, test PCIS system for additional 60 days as specified in Section 17950 - Testing, Calibration, and Commissioning to identify issues and make corrections, as needed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF SOURCE TESTING

OWNER _____ EQPT/SYSTEM _____
PROJECT NAME _____ EQPT TAG NO. _____
PROJECT NO. _____ EQPT SERIAL NO. _____
SPECIFICATION NO. _____
SPECIFICATION TITLE _____

Comments: _____

_____

_____

_____

_____

I hereby certify Source Testing has been performed on the above-referenced equipment/system as defined in the Contract Documents, and results conform to the Contract Document requirements. Testing data is attached.

Date of Execution: _____, 20____

Manufacturer: _____

Manufacturer's Authorized Representative Name *(print)*: _____

_____
(Authorized Signature)

If applicable, Witness Name *(print)*: _____

_____
(Witness Signature)

MANUFACTURER'S CERTIFICATE OF
INSTALLATION AND FUNCTIONALITY COMPLIANCE

OWNER _____ EQPT/SYSTEM _____
PROJECT NAME _____ EQPT TAG NO. _____
PROJECT NO. _____ EQPT SERIAL NO. _____
SPECIFICATION NO. _____
SPECIFICATION TITLE _____

I hereby certify that the above-referenced equipment/system has been: (Check Applicable)

- ☐ Installed in accordance with manufacturer's recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical/instrumentation and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functionally tested.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements.

NOTES:
Attach test results with collected data and test report.

Attach written certification report prepared by and signed by the electrical and/or instrumentation subcontractor.

Comments: _____

_____

I, the undersigned manufacturer's representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate this equipment/system, and (iii) authorized to make recommendations required to ensure that the equipment/system furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20 ____

Manufacturer: _____

Manufacturer's Authorized Representative Name *(print)*: _____

By Manufacturer's Authorized Representative: _____
(Authorized Signature)

TRAINING EVALUATION FORM

EQUIPMENT/SYSTEM ITEM: _____

VENDOR/MANUFACTURER: _____

DATE: _____ NAME OF REPRESENTATIVE: _____

1.	Was representative prepared?	Acceptable	Unacceptable	or	N/A
2.	Was an overview description presented?	Acceptable	Unacceptable	or	N/A
3.	Were specific details presented for system components?	Acceptable	Unacceptable	or	N/A
4.	Were alarm and shutdown conditions clearly presented?	Acceptable	Unacceptable	or	N/A
5.	Were step-by-step procedures for starting, stopping, and troubleshooting presented?	Acceptable	Unacceptable	or	N/A
6.	Were routine/preventative maintenance items clearly identified?	Acceptable	Unacceptable	or	N/A
7.	Was the lubrication schedule (if any) discussed?	Acceptable	Unacceptable	or	N/A
8.	Was the representative able to answer all questions?	Acceptable	Unacceptable	or	N/A
9.	Did the representative agree to research and answer unanswered questions?	Acceptable	Unacceptable	or	N/A

10. Comments: _____

_____

_____

_____

11. Overall Rating: Satisfactory Unsatisfactory

Note:

Sessions judged “Unsatisfactory” by a majority of attendees shall be revised and conducted again until a satisfactory rating is achieved.

COMMISSIONING ROLES AND RESPONSIBILITIES MATRIX

NO.	TASK	OWNER	CONTRACTOR	ENGINEER
Testing and Training Phase				
Source Testing				
1	Source Testing	Witness	Lead	Witness, Review
Installation Testing				
2	Electrical Conductor Testing	No Action	Lead	Witness
3	Electrical Field Acceptance Tests	No Action	Lead	Witness
4	Instrument Field Calibration	No Action	Lead	Witness
5	Network Installation Testing	Witness	Lead	Witness
6	Loop Testing	Witness	Lead	Witness
7	Pressure Testing	No Action	Lead	Witness
8	Leak Testing	No Action	Lead	Witness
9	Holiday Testing	No Action	Lead	Witness
10	HVAC Testing	No Action	Lead	Witness
11	Motor Electrical Testing	No Action	Lead	Witness
Functional Testing				
12	Network Operational Testing	Witness	Lead	Review
13	Preliminary Run Testing Local/Manual Control	Witness	Lead	Review
14	PCIS Functional Demonstration Testing - Local/Auto Control Testing - Remote/Manual Contact Testing - Alarm Testing - Control Loop Testing	No Action	Lead	Review
15	Subsystem Start-Up and Testing	Witness	Lead	Review
16	Equipment/System Start-Up and Testing	Witness	Lead	Review
17	HVAC Start-Up and Testing	Witness	Lead	Review
18	Corrosion Control Start-Up and Testing	Witness	Lead	Review
19	Wide Area Network Communications Testing	Support	Lead	Witness
20	Manufacturer's Certificate of Installation and Functionality Compliance	No Action	Lead	Witness, Review
Clean Water Facility Testing				
21	Test Water Management Plan Finalization	Support	Lead	Review
22	Clean Water Facility Testing	Witness	Lead	Witness, Review
Process Start-Up Phase				
Process Start-Up				
23	Commissioning Documentation and Data Review	Review	Support	Lead
24	Start-Up Go/No-Go Decision Criteria	Lead	Support	Review
25	Building and Fire Inspection Compliance Check	No Action	Lead	Witness

NO.	TASK	OWNER	CONTRACTOR	ENGINEER
Testing and Training Phase				
26	HVAC Functionality Check	No Action	Lead	Witness
27	Start-Up Sequence Review	Support	Lead	Review
28	Temporary Testing Arrangement Finalization	Support	Lead	Support
29	Start-Up Forms Finalization	Support	Lead	Support
30	Operation Testing Plan Finalization	Review	Support	Lead
31	Test Water Management Plan Finalization	Support	Lead	Review
32	System Testing	Support	Lead	Witness
33	Control Loop Tuning	Support	Lead	Witness
34	Process Area Start-Ups	Support	Lead	Witness
35	Facility-Wide Start-Up	Support	Lead	Witness
36	Process Control Systems Testing	Support	Lead	Witness
38	HVAC Final Testing, Adjust, and Balancing	Witness	Lead	Witness, Review
Process Operational Period				
39	Operational Testing	Support	Lead	Witness, Review
40	Final Testing Reports	Support	Lead	Review
41	Water Quality Testing and Documentation	Support	Lead	Review
Instrumentation and Controls Reliability Phase				
Instrumentation and Controls Reliability Period				
42	As specified in Section 17950 - Testing, Calibration, and Commissioning			

Legend:
Lead: Primarily responsible for organization, coordination, and execution of task work product or result.
Support: Assist the lead with organization, coordination, and execution of task work product or result.
Witness: Observe and document completion of task work product or result.
Review: As necessary to accept task work product result.
No Action: Limited or no involvement.

SECTION 01759

WATER LEAKAGE TEST FOR CONCRETE STRUCTURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Hydrostatic leakage test for concrete water-holding structures.

1.02 REFERENCES

A. Abbreviations and acronyms.

B. Definitions.
   1. Damp spots: Surfaces where visible moisture can be picked up by a dry hand.
   2. Containment structure, lined: Liquid-containing structure with barrier coating or membrane applied to the inside surfaces to prevent leaking of contents to the outside.
   3. Containment structure, unlined: Liquid containing structure where only the concrete structure itself is used to prevent leaking of contents to the outside.

C. Reference standards.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination.

B. Pre-installation meetings.

C. Sequencing.

D. Scheduling.

1.04 SUBMITTALS

A. Product data.

B. Shop drawings:
   1. Description and details of each evaporation/precipitation-measuring device anticipated for use during the test.

C. Samples.

D. Certificates.

E. Delegated design submittals.

F. Tests and evaluation reports:
   1. Results of water leakage test for each structure and for each portion of a structure designated for testing.

G. Manufacturer instructions.

H. Source quality control submittals.

I. Field/site quality control submittals.

J. Manufacturer reports.

K. Sustainable design submittals.

L. Special procedure submittals:
   1. Testing plan for each structure, or portion thereof, required to be tested.
      a. Describe methods of obtaining water for testing and of releasing water for disposal, including provisions for dechlorination if required.
      b. Include plans showing locations where measurements will be made and locations of evaporation/precipitation-measuring device.
      c. Indicate plans for filling and draining structure(s).
      d. Include schedule showing duration of test for each structure or cell to be tested, date and time for start of each test, dates and times of observations and measurements during the test, dates and times for closeout of testing procedures, and date for submittal of final results.
   2. Proposed procedures and products for repair of leaks.

M. Qualifications statements.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL

A. Test structures and portions of structures listed in the following paragraphs for water leakage.
   1. Unless otherwise specified, the Contractor shall:
      a. Obtain all required permits for discharging testing water.
      b. Provide dechlorination of such water if required by the permits.
      c. Prepare and fill the structures.
      d. Provide access and equipment required for testing and for recording test results.
      e. Take measurements and make observations required for testing.
   2. At all times during testing, the Engineer shall have access to observe measurements by others or to make independent measurements.

B. Test the following concrete structures for water leakage:
   1. Grit removal basins.
   2. Grit removal channels.
   3. Bioreactors.
   4. Grit boxes.

C. Required preparation for testing is designated in this Section. Waiver of, or failure to complete preparations shall not change the testing criteria or approval criteria for the areas tested.

D. Retest structures and portions of structures until the evaluation criteria are satisfied.

3.02 TEST WATER SOURCE AND DISPOSAL

A. Water used for the first filling of the tank will be furnished by Owner.

B. After leakage testing is complete, Contractor shall dispose of water as required by the local jurisdiction having authority.

3.03 PREPARATION

A. For each structure to be tested, prepare and submit a plan showing schedule and sequence of activities, method of filling, and methods of disposing of test water.

B. Sequencing requirements:
   1. Complete construction of concrete structure and cure concrete to obtain minimum specified 28-day compressive strength as specified in Section 03300 - Cast-in-Place Concrete.
      a. Do not begin tests until all portions of structure are complete and have reached their minimum specified 28-day compressive strength.
      b. Do not begin tests until at least 14 days have passed since completion of the last concrete placement.
   2. Complete tests before:
      a. Covering any surface of the structure with materials that might mask the location of leaks or obscure damp concrete surfaces. Such coverings include, but are not limited to basin bottom grout, masonry veneer, stucco, plaster, and other coatings.
      b. Installation of equipment, unless otherwise approved by the Engineer.
      c. Backfilling structures to elevations above the limits indicated in the following paragraphs.
   3. Liners and coatings:
      a. Install liners that are mechanically locked to the concrete surface during placement of plastic concrete and before leakage testing.
         1) Examine liners for pinholes, tears, and partially fused splices, complete all required liner integrity testing, and make required repairs before commencing leakage testing.
      b. Unless otherwise specified, do not install surface-applied protective or decorative coatings and linings until leakage tests have been completed.

C. Weather requirements:
   1. Tests on structures with tops open to the atmosphere shall not be scheduled for periods when the 10-day weather forecast indicates a substantial change in weather patterns.
   2. Measurements of water surface levels in the structure shall not be scheduled for periods when the weather forecast indicates a difference of more than 35 degrees Fahrenheit between the ambient temperature readings at the times of initial and final measurements.
   3. Tests shall not be scheduled for periods when the 10-day weather forecast indicates that the water surface may freeze before the test is complete.

D. Groundwater requirements:
   1. Bring groundwater to a level below the low point of the underdrain system and maintain at that level for the duration of the test.

E. Clean interior of structure:
   1. Remove dirt, contaminants, and construction debris.
   2. Flush floors and sumps to provide clean surfaces.
   3. Remove standing water that would interfere with examination of surfaces, cracks, or joints.

F. Observe the structure, or portions of the structure being tested, for potential leak locations:
   1. Give particular attention to cracks, open joints, voids, and honeycombed and repaired surfaces.
   2. Visually observe openings, fitting, and pipe penetrations in the structure at both faces, if possible.
   3. Repair potential leak locations in accordance with these Specifications and as approved by the Engineer.
   4. Backfill excavations to the top of the structure foundation. Do not place backfill against water-bearing walls or over footings unless approved in advance by the Engineer.
      a. If requesting backfilling of walls before testing, include a description of methods that will be used to detect leakage in the backfilled areas.
      b. Engineer's approval of backfilling before testing shall not relieve Contractor of the responsibility to conduct leakage tests, to satisfy the leakage acceptance criteria for the structure, or to repair leaking portions of the structure, including those portions below or behind the backfill.
   5. See Drawings and Section 02300 - Earthwork for requirements to provide wall stability before backfilling.

G. Inlets to/outlets from the structure:
   1. Make inlets to and outlets from the structure watertight.
      a. Include valves; stop, sluice, and slide gates; and temporary bulkheads as required.
      b. Inlets and outlets not required to be operable may be temporarily sealed before testing of the compartments to which they open.
      c. Secure inlets used to fill the structure for testing to ensure that no water is entering or leaving the structure once it has been filled to the test level.
   2. Adjustments to measured leakage at inlets and outlets based on manufacturer's or Contractor's estimates will not be allowed.
      a. Adjustments to measured leakage may be permitted by the Engineer, and, at his/her discretion, only when the Contractor makes specific measurements of leakage at each individual inlet and outlet using methods approved by the Engineer.

3.04 HYDROSTATIC LEAKAGE TEST FOR OPEN OR COVERED CONTAINMENT STRUCTURES ("HST-100")

A. Isolate sections of water-holding structures that can be isolated in actual operation. Fill and test sections for leakage separately.
   1. Fill structures and sections of structures scheduled for testing to 1 inch below any fixed overflow level in covered structures.

B. Initial rate for filling of structures shall not exceed 4 feet per hour.

C. HST-100 testing includes 2 parts, “Qualitative Testing,” and “Quantitative Testing,” as described in the following paragraphs:
   1. HST-100, Part 1: Qualitative Testing:
      a. During the first 24 hours after structures are filled, examine exposed concrete surfaces for damp spots or flowing water.
         1) Make observations in early morning, at midday, and in late afternoon.
         2) Continue observations through the duration of the Quantitative Testing period.
         3) Pay particular attention to conditions at joints, honeycombed areas, cracks, and repaired portions of the structure.
      b. Evaluation criteria:
         1) The structure shall be considered to have failed these Qualitative Testing requirements if any of the following conditions are observed.
            a) Water droplets or moist areas on an outside surface that could only have originated inside the structure.
            b) Water is flowing or seeping from joints, cracks, or surfaces.
               (1) Exception: Dampness or wetness on top of a footing, in the absence of flowing water, shall not be considered as failure to meet this criterion.
            c) Moisture can be transferred to a dry hand from the outside surfaces of the filled area.
      c. Repairs and retesting:
         1) Where damp spots or flowing water as described in the preceding paragraphs are observed, mark locations, provide repairs, and retest the structure as specified in subsequent paragraphs.
   2. HST-100 - Part 2: Quantitative Testing:
      a. If approved by the Engineer, Quantitative Testing may begin before repairs are made to areas failing Part 1 of this test; however:
         1) Adjustments to volume loss calculations of Quantitative Testing based on observed leakage will not be permitted.
         2) All defects identified for repair during Qualitative Testing shall be repaired to the satisfaction of the Engineer before approval of the structure.
      b. Report the results of Quantitative Testing on “Leakage Test Report” included as Figure A at the end of this Section, or similar form prepared by the Contractor and containing at least the information included in Figure A.
      c. Unlined concrete structures:
         1) Fill to the designated water surface elevation. Maintain that level for at least 72 hours before recording initial water levels for leakage test.
         2) Duration of test:
            a) Theoretical time required to lower the water surface in the structure by 3/8 inch when leakage is occurring at the maximum allowable rate specified in subsequent paragraphs of this Section.
            b) The duration (“D”) of the test in days is determined by the following equation:

$$D = \frac{0.375 \text{ inches}}{(0.005 \text{ in/in/day} \times H \text{ ft} \times 12 \text{ in/ft})}$$

Where: H = maximum liquid depth

(1) Round results upward to the next full 24-hour period (day).
(2) Minimum duration of test: 24 hours (1 day).
(3) Maximum duration of test: 120 hours (5 days).

d. Lined concrete structures and secondary containment areas:
   1) Fill to the designated water surface elevation. Recording of water levels for leakage tests may begin as soon as the designated water surface level is reached and the water surface is calm.
   2) Duration of test: 72 hours (3 days).
e. Measurements: Water level:
   1) Record water levels at 24-hour intervals for the full duration of the test period.
   2) Measure water levels at not less than 2 locations on opposite ends of the structure, and preferably at 4 locations spaced equally around the structure. Mark locations on the structure and take measurements at the same locations throughout the duration of the test.
   3) Measure, to an accuracy of 1/16 inch, the vertical distance to the water surface from a fixed point on the structure above.
f. Measurements: Temperatures:
   1) As part of the first and last sets of level measurements, record water temperature at a depth of 18 inches below the water surface. Measure temperature at the same locations where level measurements are taken.
   2) Record ambient temperature at the time of each water level measurement.
g. Measurements: Evaporation and precipitation:
   1) Measure evaporation and precipitation by floating pans inside the structures during testing.
      a) For uncovered structures, measure both evaporation and precipitation.
      b) For covered structures that are well ventilated, measure evaporation.
   2) Measure using specially constructed clear containers:
      a) Provide clear plastic, calibrated, open-top containers not less than 18 inches in diameter and 18-inches deep.
      b) Partially fill containers with water and float inside the structure. Make provisions to hold containers in place at each measurement location, but away from structure walls and items passing overhead, such as beams or pipes.
      c) Measure initial depth of water in each device. Measure changes in water level in each device at the same time measurements of the water level inside the structure are taken.
h. Restart of test:
   1) The Engineer may order a restart of the test when, in the Engineer's opinion, measurements have become unreliable due to unusual precipitation or other factors.
   2) If measurements or observed leakage during the testing period indicate that the allowable leakage requirements will be exceeded, the test may be terminated before completion of the full test period.

Take appropriate actions to correct problems before restarting the test.

i. Calculations of leakage test results:
   1) For each section of the structure tested, use water surface level records to calculate average loss of volume per 24-hour interval.
      a) For each 24-hour interval during the test, calculate the average of all measured drops in water level around the structure.
      b) Use the average drop thus determined to calculate an average loss of volume for each 24-hour interval.
   2) Adjustments to leakage calculations:
      a) For uncovered basins, calculations shall be corrected for precipitation added to the structure.
      b) Calculations may be corrected for evaporation and water temperature.

j. Evaluation criteria:
   1) Unless otherwise specified, the average loss of volume during any 24-hour interval shall not exceed the limits shown in Table A.

Table - Loss of Volume Criteria for Leakage Tests

Structure Type	Maximum Loss of Water Volume
• Structure fully lined prior to leakage test. • Secondary containment areas.	No measurable loss over 72-hour test period.
• Structure with monolithically placed membrane floor slab.	0.0125 percent of volume per 24-hour period.
• Concrete paved canals, drying beds, lagoons, and similar structures.	0.100 percent of volume per 24-hour period.
• Other containment structures.	0.050 percent of volume per 24-hour period.

k. Repairs and retesting:
   1) Structures and portions of structures that have satisfied the qualitative requirements of HST-100, but have failed to satisfy the quantitative requirements of HST-100 may be immediately retested for volume loss.
      a) If the structure fails the second test for volume loss, the structure shall be drained, and the Contractor shall observe the interior for probable areas of leakage.
      b) The structure shall not be retested until repairs to the probable areas of leakage are complete.

3.05 REPAIRS FOR RETESTING

A. Locations showing damp spots or flowing water:
   1. Mark locations of visible leaks and damp spots.
   2. Drain structures for repair.
   3. Repair defects causing damp spots and flowing water using methods specified in Section 03300 - Cast-in-Place Concrete and approved by the Engineer.
      a. Repair both interior and exterior surfaces and make structures watertight.
      b. Submit proposed repair products and procedures for Engineer's review.
      c. Refill structures for retesting.
   4. Repeat filling, observations, and repairs until no leaks or damp spots appear.

B. Structures for which loss of water volume loss exceeds the limits specified after adjustments for evaporation, and precipitation:
    1. Determine cause of volume loss.
    2. Drain structures of water.
    3. Repair defects causing loss of water volume using methods specified in Section 03300 - Cast-in-Place Concrete and approved by the Engineer.
        a. Submit proposed repair products and procedures for Engineer's review.
    4. Refill water-holding structures.
    5. Repeat testing and repairs until volume loss does not exceed specified limits.

END OF SECTION

FIGURE A

WATERTIGHTNESS TEST REPORT

PROJECT:		SUBMITTED BY:	
STRUCTURE:		WITNESSED BY:	
AREA:		TEST DATES:	
TEST DURATION:		TEST DURATION:	

Surface area of structure tested:		(square feet)
Volume of structure tested:		(cubic feet)
Volume of structure tested:		(gallons)
Measured loss through gates, etc.:		(gallons / day)
Allowable loss of water volume:		(per day)
Allowable loss of water volume:		(% in 24 hours)
Allowable measured loss over test duration (inches):		
Measured loss of water:		(gallons / day - From E below)
Measured loss of water volume (%):		(in 24 hours - From E below)

Water Temperature: Start of test: °F End of test: °F

			Water Surface Elevation (top of structure to top of water)				
			Location #1	Location #2	Location #3	Location #4	Initials**
Day	Date	Time	(inches)	(inches)	(inches)	(inches)	
1							
2							
3							
4							
5							
Changes in Level:							

A. Average change in level (feet): _____ (Average of total charges for all locations)

B. Correction for precipitation: _____ (Measured from pan)

C. Correction for evaporation: _____ (Measured from pan)

D. Corrected change in level (CL): _____

E. Total days tested: _____

F. Average measured % water loss in 24 hours: _____ = $\frac{\text{(CL) x (surface area) x 100}}{\text{(initial water volume) x (number of test days)}}$

Notes and field observations**

** Place date and initials at the beginning of each entry

SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Contract closeout requirements including:
   1. Final cleaning.
   2. Waste disposal.
   3. Touch-up and repair.
   4. Disinfection of systems.
   5. Preparation and submittal of closeout documents.
   6. Certificate of Substantial Completion.

1.02 REFERENCES

A. American Water Works Association (AWWA).

1.03 FINAL CLEANING

A. Perform final cleaning prior to inspections for Final Completion.

B. Employ skilled workers who are experienced in cleaning operations.

C. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.

D. Prevent scratching, discoloring, and otherwise damaging surfaces being cleaned.

E. Clean roofs, gutters, downspouts, and drainage systems.

F. Broom clean exterior paved surfaces and rake clean other surfaces of site work:
   1. Police yards and grounds to keep clean.

G. Remove dust, cobwebs, and traces of insects and dirt.

H. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, and fixtures and equipment.

I. Remove non-permanent protection and labels.

J. Polish waxed woodwork and finish hardware.

K. Wash tile.

L. Wax and buff hard floors, as applicable.

M. Wash and polish glass, inside and outside.

N. Wash and shine mirrors.

O. Polish glossy surfaces to clear shine.

P. Vacuum carpeted and soft surfaces.

Q. Clean permanent filters and replace disposable filters when heating, ventilation, and air conditioning units were operated during construction.

R. Clean ducts, blowers, and coils when units were operated without filters during construction.

S. Clean light fixtures and replace burned-out or dim lamps.

T. Probes, elements, sample lines, transmitters, tubing, and enclosures have been cleaned and are in like-new condition.

1.04 WASTE DISPOSAL

A. Arrange for and dispose of surplus materials, waste products, and debris off-site:
   1. Prior to making disposal on private property, obtain written permission from Owner of such property.

B. Do not fill ditches, washes, or drainage ways which may create drainage problems.

C. Do not create unsightly or unsanitary nuisances during disposal operations.

D. Maintain disposal site in safe condition and good appearance.

E. Complete leveling and cleanup prior to Final Completion of the Work.

1.05 TOUCH-UP AND REPAIR

A. Touch-up or repair finished surfaces on structures, equipment, fixtures, and installations that have been damaged prior to inspection for Final Completion.

B. Refinish or replace entire surfaces which cannot be touched-up or repaired satisfactorily.

1.06 FINAL CLEANING AND DISINFECTION OF SYSTEMS OF PLANT FACILITIES

A. Clean channels, pipe, basins, reservoirs, and tanks

B. Wash, wherever practicable, or broom sweep channels, pipe, basins, reservoirs, and tanks.

C. Disinfect piping intended to carry potable water as follows or in accordance with AWWA Standards.

D. Provide ample sampling outlets in pipe for testing.

E. Fill pipe and other plant facilities with chlorine solution of sufficient strength to retain residual of not less than 10 parts per million at end of 24 hours.

F. When reservoirs and basins are too large to be economically disinfected by filling with chlorine solution, spray reservoirs and basins with solution containing 100 parts per million of chlorine.

G. After disinfection, rinse entire potable water system with potable water sufficient to reduce chlorine residual to not more than 0.6 parts per million throughout system before system is put into service.

1.07 FINAL CLEANING AND DISINFECTION OF SYSTEMS OF POTABLE WATER MAINS

A. Clean interior of pipe and fittings.

B. When pipe contains dirt that cannot be removed by flushing, swab pipe interiors with solution containing not less than 500 parts per million of chlorine until clean.

C. Flush 12-inch in diameter and smaller pipe as thoroughly as available water sources will permit.

D. Fill pipe with chlorine solution of sufficient strength to provide 10 parts per million chlorine residual at end of 24 hours.

E. Flush pipes with potable water until chlorine residual is less than 0.6 parts per million before pipe are put into service.

1.08 CLOSEOUT DOCUMENTS

A. Submit following Closeout Submittals before Substantial Completion:
   1. Punch list of items to be completed or corrected with the request for issuance of Substantial Completion.
   2. Evidence of Compliance with Requirements of Governing Authorities.
   3. Project Record Documents.
   4. Approved Operation and Maintenance Manuals.
   5. Approved Warranties and Bonds.
   6. Keys and Keying Schedule.
   7. Completed contract requirements for commissioning and process start-up.

B. Submit following Closeout Submittals before final completion of the Work and at least 7 days prior to submitting Application for Final Payment:
   1. Punch list of items have been completed and Engineer and Owner are satisfied that all deficiencies are corrected.
   2. Evidence of Payment and Release of Liens or Stop Payment Notices as outlined in Conditions of the Contract.
   3. Release of claims as outlined in Conditions of the Contract.
   4. Submit certification of insurance for products and completed operations, as specified in the General Conditions.
   5. Final statement of accounting.

1.09 EVIDENCE OF COMPLIANCE WITH REQUIREMENTS OF GOVERNING AUTHORITIES

A. Submit the following:
   1. Certificate of Occupancy.

2. Certificates of Inspection:
    a. Elevators.
    b. Mechanical:
        1) Form U-1 "Manufacturer's Data Report for Unfired Pressure Vessels" for each pressure vessel furnished and installed.
    c. Electrical.

1.10 PROJECT RECORD DOCUMENTS

A. Maintain at Project site, available to Owner and Engineer, 1 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 in hard copy format with erasable colored pencil conforming to the following color code:

Additions:	Red
Deletions:	Green
Comments	Blue
Dimensions:	Graphite

B. Maintain documents separate from those used for construction:
    1. Label documents "RECORD DOCUMENTS."

C. Keep documents current:
    1. Record required information at the time the material and equipment is installed and before permanently concealing.
    2. Engineer will review Record Documents weekly to ascertain that changes have been recorded.

D. Affix civil engineer's or professional land surveyor's signature and registration number to Record Drawings to certify accuracy of information shown.

E. Deliver Record Documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

F. Record Documents will be reviewed monthly to determine the percent complete for the monthly pay application.

G. Updated Record Documents are a condition for Engineer’s recommendation for progress payment.

H. Final Schedule Submittal as specified in Section 01324A - Progress Schedules and Reports - Large Projects.

1.11 MAINTENANCE SERVICE

A. Maintenance service as specified in technical specifications.

1.12 SUBSTANTIAL COMPLETION

A. Obtain Certificate of Substantial Completion.

1.13 FINAL COMPLETION

A. When Contractor considers the Work is complete, submit written certification that:
   1. Work has been completed in accordance with the Contract Document:
   2. Punch list items have been completed or corrected.
   3. Work is ready for final inspection.

B. Engineer will make an inspection to verify the status of completion with reasonable promptness.

C. Should the Engineer consider that the Work is incomplete or defective:
   1. Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
   2. Contractor shall take immediate steps to remedy the stated deficiencies, and send a second written certification to the Engineer that the Work is complete.
   3. Engineer shall re-inspect the Work.

1.14 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer at least 7 days prior to final Application for Payment.

B. Statement shall reflect all adjustments to the Contract amount.
   1. The original Contract amount.
   2. Additions and deductions resulting from:
      a. Change Orders.
      b. Units installed and unit prices.
      c. Set-offs for uncorrected or incomplete Work.
      d. Set-offs for liquidated damages.
      e. Set-offs for reinspection payments.
      f. Extended engineering and/or inspection services and inspection overtime.
      g. Excessive shop drawings review cost by the Engineer.
      h. Other adjustments.
   3. Total Contract amount, as adjusted.
   4. Previous payments.
   5. Remaining payment due.

C. Engineer will prepare a final Change Order reflecting approved adjustments to the Contract amount which were not previously made by Change Orders.

1.15 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment reflecting the agreed upon information provided in the final statement of accounting.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01782

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Preparation and submittal of Operation and Maintenance Manuals.

1.02 GENERAL

A. Submit Operation and Maintenance Manuals as specified in technical sections.

B. Make approved manuals available at project site for use by construction personnel and Owner.

1.03 SUBMITTALS

A. Draft Operation and Maintenance Manuals:
   1. Submit prior to shipment of equipment or system to site.
   2. Shipment will be considered incomplete without the draft Operation and Maintenance Manuals.
   3. Quantity:
      a. Hard copy: 2 sets.
      b. Electronic: 2 CD-ROM or DVD.

B. Final Operation and Maintenance Manuals:
   1. Make additions and revisions in accordance with Owner's and Engineer's review comments on draft manuals.
   2. Submit approved Operation and Maintenance Manuals at least 30 days prior to Functional Testing and at least 60 days prior to Owner Training.
   3. Quantity:
      a. Hard copy: 3 sets.
      b. Electronic: 2 CD-ROM or DVD.

1.04 PREPARATION

A. General requirements:
   1. Provide dimensions in English units.
   2. Assemble material, where possible, in the same order within each volume.
   3. Reduce drawings and diagrams to 8 1/2 by 11-inch size, if possible unless otherwise specified.
   4. Complete forms on computer, handwriting not acceptable.
   5. Delete items or options not provided in the supplied equipment or system.
   6. Provide package control system annotated ladder logic for PLC, if applicable.

B. Hard copy requirements:
   1. Binders: 3-ring with rigid covers.
      a. Break into separate binders as needed to accommodate large size.

2. Utilize numbered tab sheets to organize information.
3. Provide original and clear text on reproducible non-colored paper, 8 1/2 by 11-inch size, 24 pound paper.
4. Drawings larger than 8 1/2 by 11 inch:
    a. Fold drawings separately and place in envelope bound into the manual.
    b. Label each drawing envelope on the outside regarding contents.

C. Electronic requirements:
1. File format:
    a. Entire manual in PDF format.
        1) Include text and drawing information.
        2) Provide a single PDF file even if the hard copy version is broken into separate binders due to being large.
        3) Create PDF from the native format of the document (Microsoft Word, graphics programs, drawing programs, etc.).
            a) If material is not available in native format and only available in paper format, remove smudges, fingerprints, and other extraneous marks before scanning to PDF format.
            b) Hard copy record drawing requirements:
                (1) Provide a single multipage PDF file of each set of the scanned drawings.
                (2) Page 1 shall be the cover of the drawing set.
            c) At file opening, display the entire cover.
                (1) Scan drawings at 200 to 300 dots per inch (DPI), black and white, Group IV Compression, unless otherwise specified.
                (2) Scan drawings with photos in the background at 400 dots per inch (DPI), black and white, Group IV Compression.
        4) Pagination and appearance to match hard copy.
        5) Searchable.
        6) Scanned images are not acceptable.
        7) Bookmarks:
            a) Bookmarks shall match the table of contents.
            b) Bookmark each section (tab) and heading.
            c) Drawings: Bookmark at a minimum, each discipline, area designation, or appropriate division.
            d) At file opening, display all levels of bookmarks as expanded.
        8) Thumbnails optimized for fast web viewing.
    b. Drawing requirements:
        1) Provide additional copy of drawings in most current version of Microstation format.
        2) Drawings shall have a white background.
        3) Drawing shapes shall not degrade when closely zoomed.
        4) Screening effects intended to de-emphasize detail in a drawing must be preserved.
        5) Delete items or options not provided in the supplied equipment or system.
2. Media:
    a. CD-ROM or DVD-ROM compatible with Microsoft Windows.
    b. Flash drive.
    c. Secure Electronic File Transfer (SEFT).
3. Label media with the following information:
    a. Operation and Maintenance Manual.

b. Equipment name.
c. Specification Section Number
d. Equipment tag number.
e. Owner's name.
f. Project number and name.
g. Date.

4. If multiple submittals are made together, each submittal must have its own subdirectory that is named and numbered based on the submittal number.

1.05 CONTENTS

A. Label the spines:
1. Equipment name.
2. Tag number.
3. Project name.
4. Owner name.

B. Cover page:
1. Operation and Maintenance Manual.
2. Equipment name.
3. Specification Section Number
4. Equipment tag number.
5. Owner's name.
6. Project number and name.
7. Date.

C. Table of Contents: General description of information provided within each tab section.

D. Equipment Summary Form: Completed form as specified in Appendix A of this Section.

E. Equipment Maintenance Summary Form: Completed form as specified in Appendix B of this Section.

F. Electric Motor Technical Data Form: Completed form as specified in Appendix C of this Section.

G. Description of equipment function, normal operating characteristics, and limiting conditions.

H. Manufacturer's product data sheets:
1. Where printed material covers more than 1 specific model, indicate the model number, calibrated range, and other special features.

I. Assembly, installation, alignment, adjustment, and checking instructions.

J. Storage instructions: Control diagrams:
1. Internal and connection wiring, including logic diagrams, wiring diagrams for control panels, ladder logic for computer based systems, and connections between existing systems and new additions, and adjustments such as calibrations and set points for relays, and control or alarm contact settings.
2. Complete set of 11-inch by 17-inch drawings of the control system.

3. Complete set of control schematics.

K. Programming: Copies of Contractor furnished programming.

L. Start-up procedures: Recommendations for installation, adjustment, calibration, and troubleshooting.

M. Operating procedures:
   1. Step-by-step instructions including but not limited to the following:
      a. Safety precautions.
      b. Guidelines.
      c. Manual keyboard entries.
      d. Entry codes.
      e. System responses.
      f. Other information as needed for safe system operation and maintenance.
   2. Modes:
      a. Startup.
      b. Routine and normal operation.
      c. Regulation and control.
      d. Shutdown under specified modes of operation.
      e. Emergency operating shutdown.

N. Preventative maintenance procedures:
   1. Recommended steps and schedules for maintaining equipment.
   2. Troubleshooting.

O. Lubrication information: Required lubricants and lubrication schedules.

P. Overhaul instructions: Directions for disassembly, inspection, repair and reassembly of the equipment; safety precautions; and recommended tolerances, critical bolt torques, and special tools that are required.

Q. Parts list:
   1. Complete parts list for equipment including but not limited to the following information:
   2. Catalog data: Generic title and identification number of each component part of equipment.
   3. Include bearing manufacturer, model and ball or roller pass frequencies for every bearing.
   4. Availability.
   5. Service locations.

R. Spare parts list: Recommended number of parts to be stored at the site and special storage precautions.

S. Engineering data:
   1. Drawings: Complete set of 11-inch by 17-inch equipment drawings.
   2. Exploded view or plan and section views with detailed callouts.
   3. Outline, cross-section, and assembly drawings.
   4. System drawings: Provide interconnection and wiring diagrams, plan views, panel layouts, bill of materials, etc.

5. Packaged equipment system drawings: Provide instrumentation loop drawing, control schematic diagrams, interconnection and wiring diagrams, plan views, panel layouts, bill of materials, etc.
6. System drawings and data sheets: Include drawings and data furnished by the Engineer and the Supplier; provide "as installed" version.
7. Provide electrical and instrumentation schematic record drawings.

T. Test data and performance curves, when applicable.

U. Manufacturer's technical reference manuals.

V. Source (factory) Test results: Provide copies of Source Tests reports as specified in technical sections.

W. Functional Test results: After Functional Tests are completed, insert Functional Test reports as specified in technical sections.

1.06 ARCHIVAL DOCUMENTATION

A. Typically does not require updating to remain valid and should be stored in a format that preserves the document and limits one's ability to make changes.

B. Types of archival documents include the following:
1. Record drawings.
2. Reports.
3. Specifications.
4. Shop drawings.
5. Vendor Equipment O&M Manuals.
6. Photos.
7. Demonstration and training videos.
8. Other.

1.07 LIVING DOCUMENTATION

A. Requires periodic updates to remain valid and should be stored in formats that are easy to update.

B. Types of living documents include the following:
1. Facility O&M Manuals.
2. Standard Operating Procedures.
3. Other.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

APPENDIX A
EQUIPMENT SUMMARY FORM

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT IDENTIFICATION NUMBER(S) _____
(maps equipment number)

4. LOCATION OF EQUIPMENT _____

5. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

_____

_____

_____

NAMEPLATE DATA -
- Horsepower _____
- Amperage _____
- Voltage _____
- Service Factor (S.F.) _____
- Speed _____
- ENC Type _____
- Capacity _____
- Other _____

7. MANUFACTURER'S LOCAL REPRESENTATIVE

Name _____

Address _____

Telephone Number _____

8. MAINTENANCE REQUIREMENTS _____

_____

_____

9. LUBRICANT LIST _____

_____

10. SPARE PARTS (recommendations) _____

_____

11. COMMENTS _____

APPENDIX B

EQUIPMENT MAINTENANCE SUMMARY

1. Equipment Item: _____
2. Manufacturer: _____
3. Serial No. (if applicable): _____
4. Manufacturer's Order No. (if applicable): _____
5. Nameplate Data (horsepower, voltage, speed, etc.): _____

   _____
6. Manufacturer's Local Representative:

   Name: _____

   Address: _____

   Telephone: _____
7. Maintenance Requirements:

Maintenance Operation	Frequency	Lubricant (if applicable)	Comments
(List each operation required. Refer to specific information in Manufacturer's Manual, if applicable)	(List required frequency of each maintenance operation)	(Refer by symbol to lubricant list as required)	

8. Lubricant List:

Reference Symbol	Conoco Phillips	Exxon/Mobil	BP/Amoco	Other (List)
(Symbols used in Item 7 above)	(List equivalent lubricants, as distributed by each manufacturer for the specific use recommended)			

9. Spare Parts: (Include recommendation on what spare parts should be kept on the job):

_____

_____

APPENDIX C

ELECTRIC MOTOR TECHNICAL DATA

Technical Data for Each Motor:

Application: _____

Manufacturer: _____

Frame No.: _____ Type: _____

Code Letter: _____ Design Letter: _____

Rating:

Horsepower: _____Voltage: _____ Phase: _____

Cycles: _____Full Load rpm: _____

(wound rotor secondary)

Volts: _____ Amperes: _____

Full Load Current: _____ amperes

Locked Rotor Current: _____ amperes

Locked Rotor or Starting Torque (percent of full load): _____ percent

Full Load Torque: _____ ft-lb

Breakdown Torque: _____ percent

Efficiency:		Power Factor:	
Full Load:	_____ percent	Full Load	_____ percent
3/4 Load:	_____ percent	3/4 Load:	_____ percent
1/2 Load:	_____ percent	1/2 Load:	_____ percent

Insulation:

Type: _____

Class: _____

Temperature Rise: _____ Above Ambient: _____

Enclosure: _____

Net Weight: _____ lbs

Wk^2: _____ lbs/sq ft

Type of Bearings: _____

Service Factor: _____

Noise Level in Decibels: _____

Heaters: _____ kW, _____ Phase, _____ volts

Altitude: _____

SECTION 01783

WARRANTIES AND BONDS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Warranty and bonds requirements.

1.02 SUBMITTALS

A. For each item of material or equipment furnished under the Contract:
   1. Submit form of manufacturer's warranty prior to fabrication and shipment of the item from the manufacturer's facility.
   2. Submit form of manufacturer's special warranty when specified.

B. Provide consolidated warranties and bonds within 15 calendar days of Substantial Completion.
   1. Contents:
      a. Organize warranty and bond documents:
         1) Include Table of Contents organized by specification section number and the name of the product or work item.
      b. Include each required warranty and bond in proper form, with full information, are certified manufacturer as required, and are properly executed by Contractor, or subcontractor, supplier, or manufacturer.
      c. Provide name, address, phone number, and point of contact of manufacturer, supplier, and installer, as applicable.
   2. Hardcopy format:
      a. Submit 2 copies.
      b. Assemble in 3 D-side ring binders with durable cover.
      c. Identify each binder on the front and spine with typed or printed title "Warranties and Bonds"; Project Name or Title, and the Name Address and Telephone Number of the Contractor.
   3. Electronic copy in PDF format:
      a. Submit 1 copy.

1.03 OWNER'S RIGHTS

A. Owner reserves the right to reject warranties.

B. Owner reserves the right to refuse to accept Work for the project if the required warranties have not been provided.

1.04 RELATIONSHIP TO GENERAL WARRANTY AND CORRECTION PERIOD

A. Warranties specified for materials and equipment shall be in addition to, and run concurrent with, both Contractor's general warranty and the correction period requirements.

B. Disclaimers and limitations in specific materials and equipment warranties do not limit Contractor's general warranty, nor does such affect or limit Contractor's performance obligations under the correction period.

1.05 MANUFACTURER'S WARRANTY MINIMUM REQUIREMENTS

A. Written warranty issued by item's manufacturer.

B. Project-specific information, properly executed by product manufacturer, and expressly states that its provisions are for the benefit of the Owner.

C. Covers all costs associated with the correction of the defect, including but not limited to removal of defective parts, new parts, labor, and shipping.
   1. When correcting warranted Work that has failed, remove and replace other Work that had been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

D. Provides a timely response to correct the defect.
   1. Manufacturer shall provide, in a timely fashion, temporary equipment as necessary to replace warranted items requiring repair or replacement, when warranted items are in use and are critical to the treatment process, as defined by Owner.
   2. In the case that Owner has to provide temporary equipment to replace function of warranted item requiring repair or replacement, manufacturer shall reimburse Owner for such costs associated with the temporary equipment.

E. Warranty commence running on the date of substantial completion.
   1. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit warranty within 10 calendar days after acceptance, listing date of acceptance as beginning of warranty period.

F. Duration of Warranty: 1 year.

1.06 MANUFACTURER'S SPECIAL WARRANTY

A. Manufacturer's special warranty is a written warranty published by the manufacturer which includes the requirements specified in the section where the item is specified.
   1. Includes Project-specific information and requirements, properly executed by product manufacturer, and expressly states that its provisions are for the benefit of the Owner. Technical sections indicate Project-specific requirements that differ from the minimum warranty requirements for that item.
      a. Examples include extending the duration of manufacturer's warranty or to provide increased rights to Owner.

1.07 WARRANTY WORK

A. Contractor's responsibilities:
   1. Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the work that incorporates the product, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.

B. Replacement cost:
   1. Upon determination that work covered by warranty has failed, replace or rebuild the work to an acceptable condition complying with requirement of the Contract Documents.
      a. Contractor is responsible for the cost of replacing or rebuilding defective work regardless of whether Owner has benefited from the use of the work through a portion of its anticipated useful service life.

C. Related damages and losses:
   1. When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.

D. Owner's recourse:
   1. Written warranties are in addition to implied warranties, and shall not limit the duties, obligations, rights, and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitation on time in which Owner can enforce such other duties, obligations, rights, or remedies.

E. Reinstatement of warranty:
   1. When work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement.
      a. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

1.08 IMPLIED WARRANTIES

A. Warranty of title and intellectual rights:
   1. Except as may be otherwise indicated in the Contract Documents, implied warranty of title required by Laws and Regulations is applicable to the Work and to materials and equipment incorporated therein.
   2. Provisions on intellectual rights, including patent fees and royalties, are in the General Conditions, as may be modified by the Supplementary Conditions.

B. Implied warranties: Duration in accordance with Laws and Regulations.

1.09 BONDS

A. Bond requirements as specified in the technical sections.

B. Bonds commence running on the date of substantial completion.
   1. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit warranty within 10 calendar days after acceptance, listing date of acceptance as beginning of bond period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION