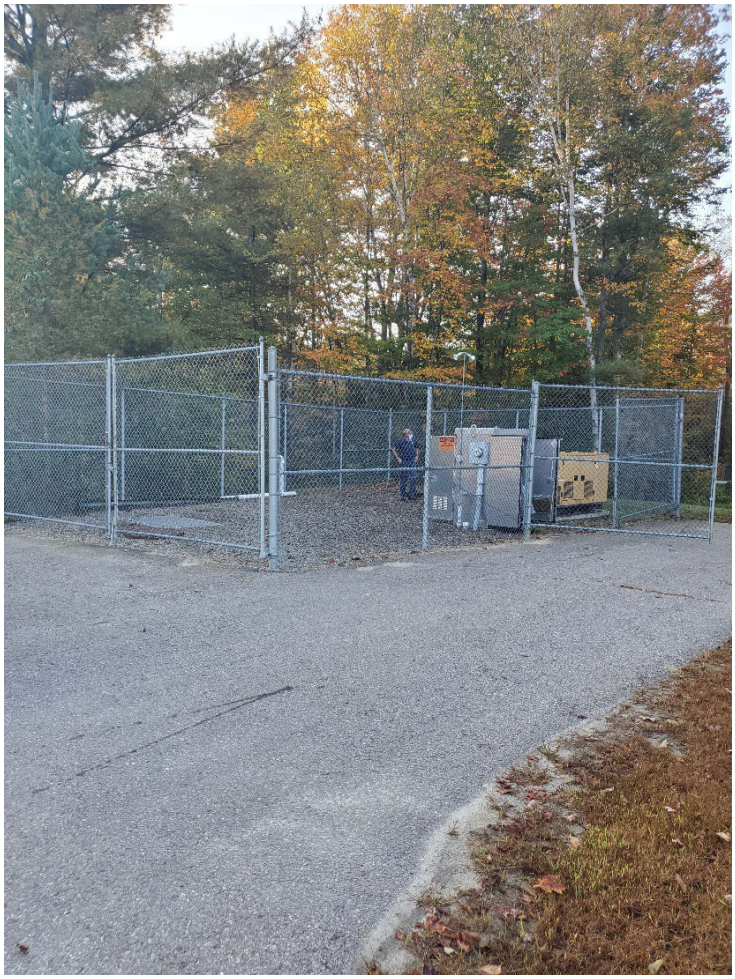
34 School Street • Littleton, NH 03561 • Phone 603-444-4111 • Fax 603-444-1343 • www.horizonsengineering.com



CONTRACT DOCUMENTS

SEWAGE PUMP STATION IMPROVEMENTS
GORDON POND BROOK PUMP STATION
WOODSTOCK, NEW HAMPSHIRE
MARCH 2024

Horizons Engineering, Inc.

MAINE • NEW HAMPSHIRE • VERMONT

34 School Street • Littleton, NH 03561 • Phone 603-444-4111 • Fax 603-444-1343 • www.horizonsengineering.com

CONTRACT DOCUMENTS
FOR
SEWAGE PUMP STATION IMPROVEMENTS
GORDON POND BROOK PUMP STATION

WOODSTOCK, NEW HAMPSHIRE

MARCH 2024

Project No. 230492

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ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of **Sewage Pump Station Improvements – Gordon Pond Brook Pump Station** will be received by the **Town of Woodstock, New Hampshire**, at the office of **HORIZONS ENGINEERING, INC**. 34 School Street, Littleton, New Hampshire 03561 until **1:00 PM** local time on **MAY 7, 2024**, at which time the Bids received will be publicly opened and read. Submittal of bids by email to **STEPHEN LAFRANCE** of Horizons Engineering, Inc. at slafrance@horizonsengineering.com is also acceptable.

The Project consists of the replacement of two submersible sewage pumps and guiderails in an existing precast concrete pump station, replacement level control, pump control panel, and emergency generator, and new metering manhole and SCADA system**.** Bids will be received for a single prime Contract. Bids shall be on a lump sum and unit price basis as indicated in the Bid Form. Bids must be accompanied by a Bid Bond for 5% of the Bid amount. Payment and Performance Bonds shall be required for the work.

The Issuing Office for the Bidding Documents is: **HORIZONS ENGINEERING INC., 34 SCHOOL STREET, LITTLETON, NEW HAMPSHIRE 03561, 603-444-4111, CONTACT STEPHEN LAFRANCE, SLAFRANCE@HORIZONSENGINEERING.COM**. Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of **8:00 AM AND 4:30 PM**.

Copies of the Bidding Documents may be obtained from the Issuing Office. Digital copies are available on the website www.horizonsengineering.com. Hard copies are also available upon payment of a non-refundable fee of $150 for each set. Checks for Bidding Documents shall be payable to "**HORIZONS ENGINEERING INC.**". Upon request and receipt of the document deposit indicated above plus a non-refundable shipping charge, the Issuing Office will transmit printed copies of the Bidding Documents via delivery service. The shipping charge amount will depend on the shipping method selected by the prospective Bidder. The date that the Bidding Documents are transmitted by the Issuing Office will be considered the Bidder's date of receipt of the Bidding Documents. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

Owner: **TOWN OF WOODSTOCK, NEW HAMPSHIRE**

165 LOST RIVER ROAD

POST OFFICE BOX 156

WOODSTOCK, NEW HAMPSHIRE 03262

Date: **April 2, 2024**

+ + END OF ADVERTISEMENT FOR BIDS + +

INSTRUCTIONS TO BIDDERS

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additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:

a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

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

~~4. Geotechnical Baseline Report: The Bidding Documents contain a Geotechnical Baseline Report (GBR). The GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.~~

~~The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.~~

~~Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.~~

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

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

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

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

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

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

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

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

4.05 *Other Work at the Site*

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

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

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

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

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

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

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

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

ARTICLE 6 – PRE-BID CONFERENCE

~~6.01 A pre-Bid conference will be held at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in~~

~~response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.~~

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

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

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

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

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

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

~~11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or equal" items. In cases in which the Contract allows the Contractor to request that Engineer authorize the use of a substitute or "or equal" item of material or equipment, application for such acceptance may not be made to and will not be considered by Engineer until after the Effective Date of the Contract.~~

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

11.01 **The Contract for the Work, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or- equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids in the case of a proposed substitute and 5 days prior in the case of a proposed "or-equal." Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner. Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions after the Effective Date of the Contract.**

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

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

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

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

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

12.03 **If required by the bid documents, t**~~T~~he apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work: **all work**.

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

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

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

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

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

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

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

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

13.03 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.

13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.

13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.

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

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

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

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

ARTICLE 14 – BASIS OF BID

14.01 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

ARTICLE 15 – SUBMITTAL OF BID

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

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to **HORIZONS ENGINEERING, INC., 34 SCHOOL STREET, LITTLETON. NEW HAMPSHIRE 03561**.

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

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the

date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

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

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

ARTICLE 17 – OPENING OF BIDS

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

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

19.03 Evaluation of Bids

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

B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22 – SALES AND USE TAXES

22.01 ~~Owner is exempt from [_____] state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. [_____]). Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information~~. **Section not used.**

ARTICLE 23 – CONTRACTS TO BE ASSIGNED

23.01 **Section not used.**

BID FORM

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Page

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to: Horizons Engineering, Inc., 34 School Street, Littleton, New Hampshire 03561.

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	**Addendum Date**

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

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

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of

such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

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

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coersive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 **Bidders must bid on each item.**

5.02 **Bids must include sales tax and all other associated fees.**

5.03 **All bids must be written clearly in ink in both words and figures.**

5.04 **Bidder should multiply the unit bid price by the bid quantity to obtain the total item bid price.**

5.05 **In the event that the total item bid price does not equal the unit bid price written in words multiplied by the bid quantity, the extended total item bid price shall be corrected accordingly and accepted as the assumed total item price bid.**

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

~~[SUGGESTED FORMAT FOR UNIT PRICE BID]~~

~~Item No.~~	~~Description~~	~~Unit~~	~~Estimated Quantity~~	~~Bid Unit Price~~	~~Bid Price~~
~~Total of All Unit Price Bid Items~~					$

****

Item No.	Brief Description - Unit or Lump Sum Price (both words and numbers)	Quantity and Units	Item Price
1.	Mobilization, per lump sum: _____Dollars and _____Cents ($_____)	1 LS	$_____
2.	Submersible sewage pumps, per lump sum: _____Dollars and _____Cents ($_____)	1 LS	$_____
3.	Site Work, per lump sum: _____Dollars and _____Cents ($_____)	1 LS	$_____
4.	Electrical, per lump sum: _____Dollars and _____Cents ($_____)	1 LS	$_____
5.	SCADA system, per lump sum: _____Dollars and _____Cents ($_____)	1 LS	$_____

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

Total of Lump Sums = Total Bid Price

_____Dollars

and _____Cents TOTAL BID PRICE $_____

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

~~A.~~ Required Bid security;

~~B. List of Proposed Subcontractors;~~

C. ~~List of Proposed Suppliers~~;

~~D. List of Project References~~;

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

F. ~~Contractor's License No.: _____ **[or]** Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids~~;

G. ~~Required Bidder Qualification Statement with supporting data~~;

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

_____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

BID BOND

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

BIDDER *(Name and Address)*:

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

OWNER *(Name and Address)*:
Town of Woodstock, New Hampshire
Post Office Box 156
Woodstock, New Hampshire 03262

BID
Bid Due Date:

Sewage Pump Station Improvements
Gordon Pond Brook Pump Station

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

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

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature

Title Title

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

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall

govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term “Bid” as used herein includes a Bid, offer, or proposal as applicable.

NOTICE OF AWARD

Date of Issuance:

Owner:	Town of Woodstock, New Hampshire	Owner's Contract No.: n/a
Engineer:	HORIZONS ENGINEERING INC.	Engineer's Project No.: 230492
Project:	Sewage Pump Station Improvements	Contract Name: Gordon Pond Brook Pump Station

Bidder:

Bidder's Address:

TO BIDDER:

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

_____ .

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

The Contract Price of the awarded Contract is: $_____

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

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

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

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

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:**

Authorized Signature

By:

Title:

Copy: Engineer

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

THIS AGREEMENT is by and between the Town of Woodstock, New Hampshire ("Owner") and

("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **SEWAGE PUMP STATION IMPROVEMENTS-GORDON POND BROOK PUMP STATION**

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by **HORIZONS ENGINEERING, INC.**

3.02 The Owner has retained **HORIZONS ENGINEERING, INC.** ("Engineer") to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

4.02 *Contract Times: Days*

A. The Work will be substantially completed within 90 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 120 days after the date when the Contract Times commence to run.

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any

extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner $1,000 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

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

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

4.04 *Special Damages*

~~A. In addition to the amount provided for liquidated damages, Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.~~

~~B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.~~

[Deleted]

ARTICLE 5 – CONTRACT PRICE

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

A. For all Work other than Unit Price Work, a lump sum of: $_____.

All specific cash allowances are included in the above price in accordance with Paragraph 13.02 of the General Conditions.

B. For all Unit Price Work, an amount equal to the sum of the extended prices (established for each separately identified item of Unit Price Work by multiplying the unit price times the actual quantity of that item):

Unit Price Work					
Item No.	**Description**	**Unit**	**Estimated Quantity**	**Unit Price**	**Extended Price**
Total of all Extended Prices for Unit Price Work (subject to final adjustment based on actual quantities)					$

The extended prices for Unit Price Work set forth as of the Effective Date of the Contract are based on estimated quantities. As provided in Paragraph 13.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer.

C. Total of Lump Sum Amount and Unit Price Work (subject to final Unit Price adjustment) $_____.

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

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 15th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. **90** percent of Work completed (with the balance being retainage)~~.~~**;** if the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

b. **90** percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion **of the entire construction to be provided under the Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to **95** percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less **100** percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

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

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due shall bear interest at the rate of *0* percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

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

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

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

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

E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

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

or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

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

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 8, inclusive).
2. Performance bond (pages ___ to ___, inclusive).
3. Payment bond (pages ___ to ___, inclusive).
4. Other bonds.
    a. ___ (pages ___ to ___, inclusive).
5. General Conditions (pages ___ to ___, inclusive).
6. Supplementary Conditions (pages ___ to ___, inclusive).
7. Specifications as listed in the table of contents of the Project Manual.
8. Drawings (not attached but incorporated by reference) consisting of ___ sheets with each sheet bearing the following general title: ___ **[or]** the Drawings listed on the attached sheet index.
9. Addenda (numbers ___ to ___, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages ___ to ___, inclusive).
11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.
    b. Work Change Directives.
    c. Change Orders.
    d. Field Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

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

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Other Provisions*

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

Sewage Pump Station Improvements
Gordon Pond Brook Pump Station
IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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

OWNER:	CONTRACTOR:
Town of Woodstock, New Hampshire	
By:	By:
Title:	Title:
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Title:	Title:
Address for giving notices:	Address for giving notices:
Post Office Box 156	
Woodstock, New Hampshire 03262	
	License No.: *(where applicable)*
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	*NOTE TO USER: Use in those states or other jurisdictions where applicable or required.*

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

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

CONTRACTOR AS PRINCIPAL

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

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

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

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

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

the Owner or its heirs, executors, administrators, successors, and assigns.

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

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

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

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

14. Definitions

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

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

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

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

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

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

16. Modifications to this Bond are as follows:

PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

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

BOND

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

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

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

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

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

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

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

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

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

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

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

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

16. **Definitions**

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

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

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

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

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

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

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

18. Modifications to this Bond are as follows:

NOTICE TO PROCEED

Owner:	Town of Woodstock, New Hampshrie	Owner's Contract No.:	n/a
Contractor:		Contractor's Project No.:	
Engineer:	Horizons Engineering, Inc.	Engineer's Project No.:	230492
Project:	Sewage Pump Station Improvements	Contract Name: Gordon Pond Brook Pump Station Effective Date of Contract:	

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 2024.

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

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

Town of Woodstock, New Hampshire

Owner**:**

By:

Title:

Date Issued:

Copy: Engineer

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Contractor's Application for Payment No.

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

Application For Payment

Change Order Summary

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

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

Contractor's Certification

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

Contractor Signature

By:	Date:

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

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

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

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

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

Progress Estimate - Unit Price Work

Contractor's Application

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

Stored Material Summary

Contractor's Application

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

Change Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

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

Description:
Attachments: *[List documents supporting change]*

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

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

Approved by Funding Agency (if applicable)

By: _____ Date:
Title: _____

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Town of Woodstock, New Hampshire	Owner's Contract No.: N/A	
Contractor:		Contractor's Project No.:	
Engineer:	Horizons Engineering, Inc.	Engineer's Project No.:	230492
Project:		Contract Name: Gordon Pond Brook Pump Station	

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

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

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

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

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows:

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

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

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

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

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

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Work Change Directive No.

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

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

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

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

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

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

Contract Price $ [increase] [decrease].

Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price

☐ Cost of the Work ☐ Other

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

Approved by Funding Agency (if applicable)

By: Date:

Title:

CONTRACTOR'S AFFIDAVIT

STATE OF: _____

COUNTY OF: _____

Before me, the undersigned, a _____
(Notary Public, Justice of Peace, Alderman)
in and for said County and State personally appeared, _____
(Individual, Partner or duly
_____ who being duly sworn according to law
authorized representative of corporate contractor)
deposes and says that the cost of all the Work, and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract between _____
(Owner)
and _____ of _____
(Contractor)
dated _____ for the construction of the _____
and necessary appurtenant installations have been paid in full.

_____
(Individual, Partner, or duly authorized representative of corporate contractor)

_____
(Title)

Sworn to and subscribed before me
this _____ day of _____ , 20 ___

_____

_____
Notary Public

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

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

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

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

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

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

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

regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

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

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

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

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

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

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

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

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

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

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and

equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

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

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

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

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items

resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer

any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give

written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

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

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in

question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

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

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the

Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to

industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such

property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and

incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

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

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional

data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

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

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

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

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a

negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

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

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

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

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents,

Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other

work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

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

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

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

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or

quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

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

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3)

other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of

Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined

on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

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

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable,

including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

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

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

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

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by

recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

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

Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

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

appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

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

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

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

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

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

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

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner

against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

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

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be

defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

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

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

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

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

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

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

SC 1.01.A.48 Add the following language at the end of the last sentence of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC 1.01.A.49 Add the following new Paragraph after Paragraph 1.01.A.48:

Abnormal Weather Conditions – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.06 Electronic Submittals

SC- 2.06.B Delete Paragraph 2.06.B and replace it with the term [Deleted].

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.01.A **Amend the last sentence of Paragraph 4.01.A by striking out the following words: In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.**

SC-4.05.C.2 **Amend Paragraph 4.05.C.2 by striking out the following text: "abnormal weather conditions;" and inserting the following text: Abnormal Weather Conditions;**

ARTICLE 1 – 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.05 Underground Facilities

SC 5.05 E.1. Add e. Changes in contract price will only be considered when design changes are required as determined by the Engineer.

SC-5.06 Hazardous Environmental Conditions

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.02 Insurance—General Provisions

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.03 Contractor's Insurance

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:		**Statutory**
Federal, if applicable (e.g., Longshoreman's):		**Statutory**
Jones Act coverage, if applicable:		
Bodily injury by accident, each accident	**$**	**NA**
Bodily injury by disease, aggregate	**$**	**NA**
Employer's Liability:		
Bodily injury, each accident	**$**	**500,000**
Bodily injury by disease, each employee	**$**	**NA**

Bodily injury/disease aggregate **$ 500,000**

For work performed in monopolistic states, stop-gap liability coverage shall be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of: **$ NA**

Foreign voluntary worker compensation **Statutory**

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate **$ 2,000,000**

Products - Completed Operations Aggregate **$ 1,000,000**

Personal and Advertising Injury **$ 1,000,000**

Each Occurrence (Bodily Injury and Property Damage) **$ 1,000,000**

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person **$ 1,000,000**

Each accident **$ 1,000,000**

Property Damage:

Each accident **$ 1,000,000**

[or]

Combined Single Limit of **$ 1,000,000**

4. Excess or Umbrella Liability:

Per Occurrence **$ 5,000,000**

General Aggregate **$ 5,000,000**

5. ~~Contractor's Pollution Liability:~~

~~Each Occurrence~~ **~~$~~**

~~General Aggregate~~ **~~$~~**

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: None

7. ~~Contractor's Professional Liability:~~

~~Each Claim~~	**~~$~~** _____
~~Annual Aggregate~~	**~~$~~** _____

5. 6.05 Property Insurance

SC 6.05.A. Delete the first sentence of Paragraph 6.05.A and insert the following sentence in its place:

Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations).

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

SC-7.02.B. Add the following new subparagraphs immediately after Paragraph 7.02.B:

1. Regular working hours will be 7:00AM to 6:00PM.

SC-7.02.B. Delete Paragraph 7.02 B. in its entirety, and insert the following:

B. In the absence of any Laws or Regulations to the contrary, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.

SC 7.04.A Amend the third sentence of Paragraph 7.04.A by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or 'or-equal' item is permitted.

SC 7.04.A.1 Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC 7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.

4. Liaison:

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

6. Shop Drawings and Samples:

a. **Record date of receipt of Samples and Contractor-approved Shop Drawings.**

b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.

c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions,

together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

8. **Review of Work and Rejection of Defective Work:**

   a. **Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.**

   b. **Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.**

9. **Inspections, Tests, and System Start-ups:**

   a. **Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.**

   b. **Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.**

10. **Records:**

    a. **Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.**

    b. **Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.**

    c. **Maintain records for use in preparing Project documentation.**

11. **Reports:**

    a. **Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.**

    b. **Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.**

c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

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

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

14. Completion:

a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.

5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. **Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.**

7. **Accept Shop Drawing or Sample submittals from anyone other than Contractor.**

8. **Authorize Owner to occupy the Project in whole or in part.**

SPECIAL CONDITIONS

1. WORK PERFORMED AT NIGHT AND ON SATURDAYS, SUNDAYS, AND HOLIDAYS

A. No work will be permitted at night or on Saturdays, Sundays, or holidays except as approved in writing by the ENGINEER, and provided such work is not in violation of local ordinance. When working at night, the CONTRACTOR shall provide flood lighting sufficient to insure the same degree of accuracy of workmanship and the same conditions regarding safety as would be achieved in daylight. No work or equipment may be started between the hours of 7:00 p.m. and 7:00 a.m. unless otherwise directed by the ENGINEER in writing.

B. Whenever Memorial Day or Fourth of July is observed on a Friday or a Monday and during the weekend of Labor Day, the CONTRACTOR may be required to suspend work for the three calendar days. Prior to the close of work, the project shall be placed in the best possible condition for the comfort and safety of the traveling public, and arrangement shall be made for responsible personnel to maintain the project in the above conditions. Holiday time is considered part of the Contract Time with no additional days given.

2. REGULATIONS & PERMITS

A. The CONTRACTOR is responsible to abide by all State & Local Regulations, and adhere to conditions set forth in permits issued for the work.

B. Water from the construction operations shall be allowed to enter the waters of the State only after the CONTRACTOR has complied with all provisions of all issued permits.

3. CLAIMS FOR EXTRA COSTS

If the CONTRACTOR shall claim compensation for any alleged damage sustained by reason of acts of the OWNER or its agents, the CONTRACTOR immediately shall notify the ENGINEER of the alleged damages so that proper appraisal can be made and within five (5) days after the sustaining of such alleged damage, make a written statement to the ENGINEER of the nature of the damages sustained.

The CONTRACTOR shall file with the ENGINEER an itemized statement of the details and amount of such damage, and unless such statement shall be made as thus required, his claim for compensation shall be forfeited and invalidated, and he shall not be entitled to payment on account of any such alleged damage.

4. PROJECT SCHEDULING AND SEQUENCING OF THE WORK

The CONTRACTOR is advised that the intent of this project is to complete sludge removal, liner replacement, and aeration system replacement for both lagoons sequentially under this contract. During construction the facility must remain in service

and provide adequate wastewater attenuation and treatment to avoid permit violations. It is assumed that each lagoon can be taken off line for a period of no more than three weeks. The CONTRACTOR shall coordinate the work with the facility operator to ensure that adequate facility operations are maintained.

5. **CONTRACTOR'S EMERGENCY SERVICE**

The CONTRACTOR must make satisfactory arrangements with the OWNER to service emergencies or complaints which may occur at night, over the weekend, or when the job is shut down.

6. **INSURANCE**

The limits of liability for insurance shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

A. Workers' Compensation, and related coverages of the General Conditions:

a. State:	Statutory
b. Applicable Federal (e.g., Longshoremen's)	Statutory
c. Employer's Liability	$ 500,000

B. Contractor's General Liability shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:

a. General Aggregate	$ 2,000,000
b. Products - Completed Operations Aggregate	$ 1,000,000
c. Personal and Advertising Injury	$ 1,000,000
d. Each Occurrence (Bodily Injury and Property Damage)	$ 1,000,000

e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.

f. Excess or Umbrella Liability

1) General Aggregate	$ 5,000,000
2) Each Occurrence	$ 5,000,000

C. Automobile Liability:

a. Bodily Injury:	
Each Person	$ 1,000,000
Each Accident	$ 1,000,000
b. Property Damage:	
Each Accident	$ 1,000,000
c. Combined Single Limit of	$ 1,000,000

D. The Contractual Liability coverage shall provide coverage for not less than the following amounts:

a. Bodily Injury:	
Each Person	$ 2,000,000
Each Accident	$ 2,000,000
b. Property Damage:	
Each Accident	$ 2,000,000
Annual Aggregate	$ 2,000,000

E. The Owner and Horizons Engineering, Inc. are to be included on policy as additional insured.

F. Blasting coverage shall be obtained and documented by the CONTRACTOR for blasting under this Contract. No blasting shall be done until proof of such insurance is provided to the ENGINEER.

7. **PERMITS**

The CONTRACTOR shall be responsible for conformance with all permit conditions.

The following permit has been approved.

- New Hampshire Department of Environmental Services – Wastewater Engineering Bureau Design Review

8. **NORTHERN BORDERS REGIONAL COMMISSION CONTRACT REQUIREMENTS**

This project is being funded in part through a grant from the Northern Borders Regional Commission (NBRC). NBRC as the following requirements for the construction contract:

Minority/Women Businesses

The non-Federal entity must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible.

Affirmative steps must include:
1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists.
2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources.
3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises.
4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises.
5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and
6. Requiring the prime contractor, if subcontracts are to be allowed, to take the affirmative steps listed in numbers (1) through (5) of this section.

Build America, Buy America Act (BABAA)

The Build America, Buy America Act (hereafter "BABAA") – enacted on November 15, 2021 – sets forth a domestic content procurement preference ("Buy American Preference" hereafter referred to as "BAP") for infrastructure programs funded with Federal dollars. As the NBRC routinely funds infrastructure projects as part of its Catalyst grant program and anticipates funding infrastructure projects as part of its Bipartisan Infrastructure Legislation (BIL) programs beginning in FY'23, BABAA governs future Northern Border Regional Commission (NBRC) infrastructure investments.

Per guidance in M-22-11, "A Buy America preference…only applies to the iron and steel, manufactured products, and construction materials used for the infrastructure project under an award." As such, the NBRC will continue to move forward with the obligation of funds for projects awarded funds under the Catalyst, FEP, BIL, or other programs, which are not impacted by the preference.

Specifically, IIJA §70914(a) of Pub. L. 117-58, instructs Federal agencies to ensure that "none of the funds made available for a Federal financial assistance program for infrastructure, including each deficient program, may be obligated for a project unless all of the iron, steel, manufactured product, and construction materials used in the project are produced in the United States."

Materials Included in the BAP:

Relevant materials are included in IIJA §70914 and are listed below for convenience:

(1) All iron and steel used in the project are produced in the United States. This means all manufacturing processes, from the initial melting stage through the application of coatings,

occurred in the United States.

(2) All manufactured products used in the project are produced in the United States. This means the manufactured product was manufactured in the United States, and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation.

(3) All construction materials are manufactured in the United States. This means that all manufacturing processes for the construction material occurred in the United States.

It is reasonable to seek more precision applied to terms like "manufacturing processes" and "construction materials." At this time, those terms are not completely defined, but OMB is working on them through a rulemaking process, and those will be updated shortly.

For now, vis a vis "construction materials," OMB requests that Agencies follow the below guidance, sourced from **Document 88 FR 8374, Proposed Rule, § 184.6**:

The Buy America Preference applies to the following construction materials used in infrastructure projects. Each construction material is followed by a standard for the material to be considered "produced in the United States."

(a) *Non-ferrous metals.* All manufacturing processes, from initial smelting or melting through final shaping, coating, and assembly, occurred in the United States.
(b) *Plastic and polymer-based products.* All manufacturing processes, from initial combination of constituent, plastic or polymer-based inputs until the item is in a form in which it is delivered to the work site and incorporated into the project, occurred in the United States.
(c) *Composite building materials.* All manufacturing processes, from initial combination of constituent materials until the composite material is in a form in which it is delivered to the work site and incorporated into the project, occurred in the United States.
(d) *Glass.* All manufacturing processes, from initial batching and melting of raw materials through annealing, cooling, and cutting, occurred in the United States.
(e) *Fiber optic cable.* All manufacturing processes, from the initial preform fabrication stage through fiber stranding and jacketing, occurred in the United States.
(f) *Optical fiber.* All manufacturing processes, from the initial preform fabrication stage through fiber stranding, occurred in the United States.
(g) *Lumber.* All manufacturing processes, from initial debarking through treatment and planing, occurred in the United States.
(h) *Drywall.* All manufacturing processes, from initial blending of mined or synthetic gypsum plaster and additives through cutting and drying of sandwiched panels, occurred in the United States.

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Field Order No. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

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

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

Description:

Attachments:

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

Copy to: Owner

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 12

GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. All work of this section is specifically subject to the General Conditions for the entire project.

B. Provide all items, articles, materials, operations, or methods listed, mentioned, scheduled on the Drawings and/or specified herein including all labor, materials, equipment and incidentals necessary and required for their completion.

1.2 INTENT

A. The intent of the Specifications and drawings is to call for finish work, tested and ready for operation.

B. Any apparatus, appliance, material or service not specified or indicated but necessary to make the work complete and perfect in all respects and ready for operations shall be provided.

C. The Drawings are generally diagrammatic, intended to convey the scope of the work and indicate the general arrangement of equipment and piping and approximate sizes and locations of equipment.

1.3 WORKMANSHIP

A. All work shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineer.

B. The Contractor shall, at all times, keep a competent foreman in charge of the works on the project, and shall facilitate it's inspection by the Engineer.

1.4 RULES AND REGULATIONS

A. All work shall comply with applicable portions of all state or local laws, ordinances, rules and regulations of local utility companies and fire departments, B.O.C.A., National Plumbing Code, recommendations of the National Board of Fire Underwriters, National Electrical Code and all other authorities having jurisdiction.

B. Nothing contained in these Specifications or indicated on the Drawings shall be construed to conflict with applicable portions of any laws, ordinances, rules and regulations.

1. All pressure vessels shall be furnished and installed in strict accordance with the applicable regulations of the state and the ASME codes and shall be equipped with all appurtenances required by the aforesaid codes.

1.5 GUARANTEE

A. Guarantee all work performed and materials and equipment installed to the full extent required by the Drawings and Specifications to be free from inherent defects.

B. Any materials or equipment which are corroded or otherwise damaged, through the Contractor's failure to properly operate and maintain the installation during construction or testing, shall be replaced prior to final acceptance.

C. Keep the work in repair and replace any defective materials, equipment or workmanship upon notice from the Owner's/Engineer's Representative for a period of one year from date of substantial completion.

D. Materials or equipment requiring excessive service during the first year of operation shall be considered defective.

E. The date of acceptance shall be that which appears on the Owner's/Engineer's Certificate of Substantial Completion.

1.6 SEQUENCE OF WORK

A. Refer to the General Supplementary and Special Conditions for timing and coordination of the work.

B. Schedule the work accordingly and coordinate schedule with other Contractors to prevent delay.

1.7 OPERATING AND MAINTENANCE MANUAL

A. Furnish manufacturer's printed operating and maintenance instructions for each piece of equipment furnished under this Division.

B. Each manual shall be suitably and neatly marked to identify the particular equipment furnished and shall include lubricating charts.

C. All instructions and charts shall be bound in appropriate cover binders properly indexed, identified, and titled to provide three complete manuals.

D. Completed manuals shall be submitted to the Engineer for review and approval.

1.8 CUTTING AND PATCHING

A. The Contractor will provide openings in walls, floors, roof, ceilings and partitions to receive pipe lines, ductwork and other apparatus.

B. All sleeves shall be furnished by the Contractor and securely set as required for piping passing through walls, floors, roofs, ceilings and partitions.

C. All anchors and inserts shall be furnished and securely set as required for piping and equipment furnished under this Division.

1.9 SUBSTITUTES

A. Certain items of equipment have been specified by manufacturer's name and model number. It is not the intent to limit the Contractor to the equipment but to establish a type and quality required. The Contractor may substitute equipment of equal quality and capacity and shall be responsible for any changed required to install the substitution. All shop drawings will indicate the substitution and any deviations from the original specification.

B. Added support steel, anchors, braces, etc. required to permit the use of substituted equipment, shall be the cost and installation responsibility of the Contractor.

End of Section

SECTION 01 11 13

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 PROJECT DESCRIPTION

A. The Project consists of the replacement of two submersible sewage pumps and guiderails in an existing precast concrete pump station, replacement level control, pump control panel, and emergency generator, and new metering manhole and SCADA system**.**

1.3 WORK SEQUENCE

A. The sewage pump station must remain in service during the work. The work will be conducted in a sequence and in such a manner as to minimize utility interruptions and to minimize the risk to health and the environment.

1.4 CONTRACTOR USE OF PREMISES

A. General: Limit use of the premises to construction activities in areas indicated; allow for Owner operation.

1. Confine operations to minimum areas necessary and as agreed upon by the Owner and Operator. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

2. Keep driveway and entrances serving the premises clear and available to the Owner. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

3. Disposal of Excess, Unsuitable and/or Waste Materials: Unless otherwise approved by Engineer, all excess, unsuitable or waste materials shall be removed from the project site and shall be lawfully disposed of at Contractor's expense. Do not dispose of material on site, either by burial or by burning.

1.5 OWNER OCCUPANCY

A. Full Owner Occupancy: The Owner will occupy the site during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the work so as not to interfere with the Owner's operations.

1.6 MISCELLANEOUS PROVISIONS

A. The project has been designed and the Contract Documents prepared with the intention that resulting work will comply with applicable local, State, and Federal rules and regulations.

1. Before Substantial Completion inspect, test and adjust performance of every system or facility of the work to ensure that overall performance is in compliance the Contract Documents and all permit requirements.

2. Instruct the Owner's operating personnel (contract operator) on operational requirements needed to maintain compliance.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

Not Applicable

End of Section

SECTION 01 11 14

ITEMS PROVIDED BY OWNER

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section lists the items provided by the Owner for use by the Contractor and stipulates associated responsibilities and limitations.

B. Related requirements specified elsewhere include:

Summary of Work	01 11 13
Measurement and Payment	01 22 13

1.2 OWNER FURNISHED PRODUCTS

A. Owner Responsibilities

1. Provide the Contractor access to the site.

2. Assist the Contractor in locating existing utilities and equipment.

3. Provide the Contractor with an approved location for staging and stockpiling.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

End of Section 01010

SECTION 01 11 17

DRAWINGS AND SPECIFICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section is intended to describe the general intent of the Drawings and Specifications.

B. The Owner will furnish the Contractor up to five (5) copies of the drawings and specifications without charge.

1.2 EXISTING CONDITIONS

A. All existing conditions shown on the drawings are for information purposes only and are based on limited information. The Contractor shall verify existing conditions and shall not be entitled to extra compensation for failure to do so.

1.3 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications are intended to show the general intent of the work. The Owner has contracted for a complete project although every detail, component, fitting and appurtenance may not have been shown. The Contractor shall be responsible for all items necessary to make a complete functional system.

1.4 DIMENSIONS

A. Drawings should not be scaled. All dimensions shall be taken from figured dimensions on the drawings or by actual field measurements. The Contractor shall notify the Engineer immediately of any discrepancy between figured dimensions labeled on the drawings and actual field measurements, whenever such discrepancy may impact the installation or operation of the Work.

End of Section

SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for the measurement and payment of Contract pay items.

1.3 SUBMITTALS

A. See Section 01 33 23

B. Field notes of all measurements for payment purposes.

C. Periodic payment request applications on forms included in the Supplemental General Conditions.

1.4 SCHEDULING

A. Notify Engineer as far in advance as possible of measurements.

B. Allow for and afford Engineer ample time, space and equipment to observe and verify measurements.

1.5 DESCRIPTION

A. For unit price items, the Contractor shall be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made therefore, the Engineer shall make final measurements to determine the quantities of the various items of work accepted as the basis for final payment.

B. For lump sum items, the Contractor shall be paid on the basis of actual work accepted until the work item is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the General Conditions or Supplemental Conditions.

C. All units of measurement shall be standard United States convention as applied to the

specific items of work by tradition and as interpreted by the Engineer.

1.6 MEASUREMENT REQUIREMENTS

A. Where payments are to be made on a unit price or adjustment item unit price basis, notify Engineer so that he may observe existing conditions and the status of work-in-place, and witness measurements being made. Where Engineer has not witnessed required measurements and cannot verify or substantiate quantities, he may not recommend payment for same.

B. Maintain complete and legible field notes for all measured items. Notes shall contain spaces for Contractor's and Engineer's signatures plus additional space for comments. An original and copy shall be made for all notes with the copy being submitted to Engineer. The Engineer's signature shall not be construed as an acceptance of the Work, or the measurements made, but shall mean he was present when the measurements were made.

C. The Owner reserves the right to reject the Contractor's measurement of work-in-place and to have this Work measured by the Engineer or independent party acceptable to the Contractor at the Owner's expense.

1.7 LIMITS OF PAYMENT

A. Payments will be made for the quantities installed and accepted in accordance with the Contract. Upon completion of construction, if actual quantities are different than the quantities estimated in the Bid, the contract unit prices will still prevail, except as follows. When alterations in the quantities of work not requiring Change Orders are ordered and performed, the Contractor shall accept payment in full at the contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving Change Orders will be paid for as stipulated in such Change Orders.

B. The Contractor shall accept as full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to complete the work and for performing all work; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work. No extra payment shall be made to the Contractor for any delays caused by defective workmanship or rescheduling of work by others.

1.8 WORK ELIMINATED FROM CONTRACT

A. Should any work be deleted from the Contract a Change Order shall be issued as stipulated in the General Conditions.

1.9 PARTIAL PAYMENTS

A. Partial payments shall be made monthly as the work progresses. All partial invoices and payments shall be subject to correction in the final quantity invoice and payment. No monthly payment shall be required to be made when, in the judgment of the Engineer, the Work is not proceeding in accordance with the provisions of the Contract.

B. No partial payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of the Contract.

C. Each subsequent Application for Payment shall include an affidavit of the Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of the Contractor's obligations reflected in prior Applications for Payment. The Owner shall have the right to deduct from the next progress payment an amount equal to payment for said material and/or equipment if reasonable and adequate proof is not submitted.

1.10 FINAL PAYMENT

A. The Contractor will prepare a final payment requisition for review by the Engineer for the work performed. Upon approval by the Engineer, the Owner will pay the entire sum found to be due less any retainage provided for in the General Conditions and any previous payments.

1.11 PAYMENT FOR MATERIALS DELIVERED

A. Payment may be made for all or part of the value of materials stored on site. The application for payment shall be accompanied by a summary of materials stored on site that will establish the Owner's title to the materials and protect the Owner's interest therein, including insurance. The amount thus paid by the Owner shall reduce the estimated amounts due the Contractor as the material is incorporated into the Work. Materials stored on site, that have been paid for by the Owner, shall become the property of the Owner and, in the event of default on the part of the Contractor, the Owner may use these materials in the construction of the Work. The Contractor shall be responsible for any damage to, or loss of, any materials.

PART 2 – PRODUCTS

2.1 GENERAL

A. Provide all labor, materials, facilities, measuring devices and all other equipment necessary to perform all measurements for payment purposes.

PART 3 - EXECUTION

3.1 GENERAL

A. Perform all measuring required by this Section.

B. No separate payments will be made for Work under this Contract except for the pay items stipulated in this Part 3. All costs in connection with the Work shall be included in one or more of the pay items as appropriate.

C. The names of pay items in this Section, the Schedule of Values, or the Bid Form may be abbreviated or non-comprehensive and are for general identification purposes of the item only. The names shall not be construed to represent a complete description of all the Work included under each pay item. Refer to the subsequent paragraphs of this Section for more complete descriptions of Work to be included under each Contract pay item.

3.2 LUMP SUM PRICE PAY ITEMS

A. Measurement - no measurements will be made.

B. Payment shall be on a lump sum basis, based on the percentage of work completed and accepted by the engineer for each lump sum pay item.

3.3 UNIT PRICE PAY ITEMS

A. Measurement and payment shall be made by the unit.

3.4 DESCRIPTION OF PAY ITEMS

The following pay items describe the measurement of and payment for the work to be done under the items listed in the Bid.

Item No. 1 -MOBILIZATION

A. Measurement: Mobilization shall consist of preparatory work and operations including but not limited to, the following items:

1. Testing
2. Equipment delivery
3. Sanitary facilities
4. Furnishing of bonds/insurance
5. Temporary water/sewer/drainage service
6. Erosion control
7. All permits and permit conditions
8. Construction signs/Project signs
9. Cooperation with Contractors and others

10. Submittals
11. Exploratory excavations

B. Payment:

1. Payment shall be made at the contract lump sum price, which price shall be full compensation for all costs incurred in furnishing labor, tools, materials and equipment and incidental work item costs for the preparatory work and operations described in the above Measurement section for Mobilization.

2. For the purpose of computing payments, the adjusted contract price shall include all contract unit price and lump sum items except the contract lump sum price Mobilization.

3. Payments shall be made as follows:

   a. First payment of fifty percent (50%) of the contract lump sum price for Mobilization or 2.5 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of five percent (5%) of the total contract price.

   b. Second payment of twenty five percent (25%) of the contract lump sum price for Mobilization or 1.2 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of fifty percent (50%) of the total contract price.

   c. Upon substantial completion of all work on the project, payment of the remainder of the contract lump sum price for Mobilization will be paid.

<u>Item No. 2 –SUBMERSIBLE SEWAGE PUMPS</u>

A. Measurement – Per Lump Sum

Item shall consist of removal and replacement of two existing submersible sewage pumps, guide rails, lifting chains, and hardware as approved by the Engineer.

B. Payments – Payment shall be based on the lump sum price as stated in the bid schedule and the Engineer's estimate of completion. Payment shall include furnishing of all equipment and materials, wetwell cleaning and temporary bypass pumping, start up, delivery to owner and/or disposal of replaced items and all costs associated with the item not paid for under other items.

<u>Item No. 3 –SITE WORK</u>

A. Measurement: Lump Sum

Item shall consist of the installation of a new precast concrete metering manhole with watertight frame and cover, buried conduit, clearing and grubbing, grading, fencing relocation and extension, pump station vent relocation, crushed stone within the fenced enclosure extension, loaming, seeding, and mulching, and restoration of surfaces.

B. Payments – Payment shall be made based on the Lump Sum amount as stated in the bid schedule and the Engineer's estimate of completion. Payment shall all equipment and materials necessary and for all costs associated with the item not paid for under other items.

Item No. 4 –ELECTRICAL

A. Measurement: Lump Sum

Item shall consist of the installation of a new electric service, wiring, control panel, and emergency generator.

B. Payments – Payment shall be made based on the Lump Sum as stated in the bid schedule and based on the Engineer's estimate of completion. Payment shall include furnishing and installing all electrical equipment, removal and delivery of the existing generator to the owner's yard, and for all costs associated with the item not paid for under other items.

Item No. 5 – SCADA System

A. Measurement: Lump Sum

Item shall consist of the installation of a SCADA system, flow monitoring in the metering manhole, and pump level controls.

B. Payments – Payment shall be made based on the Lump Sum as stated in the bid schedule and based on the Engineer's estimate of completion. Payment shall include all equipment, materials and installation and for all costs associated with the item not paid for under other items.

End of Section

SECTION 01 33 23

SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule
2. Submittal schedule
3. Daily construction reports
4. Shop Drawings
5. Product Data
6. Samples

B. Administrative Submittals: Refer to other Division - 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals may include, but are not limited to:

1. Permits
2. Applications for payment
3. Insurance certificates
4. List of subcontractors

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay. Provide six (6) copies of submittals to the Engineer for review.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

End of Section

a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

    a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.

    b. If an intermediate submittal is necessary, process the same as the initial submittal.

    c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.

2. Include the following information on the label for processing and recording action taken.

    a. Project name
    b. Date
    c. Name and address of Engineer
    d. Name and address of Contractor
    e. Name and address of subcontractor
    f. Name and address of supplier
    g. Name of manufacturer
    h. Number and title of appropriate Specification Section
    i. Drawing number and detail references, as appropriate

C. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

1. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document

End of Section

requirements, including minor variations and limitations. Include Contractor's Certification that information complies with Contract Document requirements.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Prepare a fully developed, horizontal bar chart type Contractor's construction schedule. Submit within 15 days of "Notice to Proceed".

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values", if applicable.

2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.

3. Prepare the schedule on a sheet, or series of sheets, of sufficient width to show data for the entire construction period.

4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.

5. Coordinate the Contractor's construction schedule with the schedule of values (if applicable), list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.

C. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.

D. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other activities.

E. Distribution: Following response to the initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.

End of Section

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

F. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 7 days of the date required for establishment of the Contractor's construction schedule.

B. Distribution: Following response to initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis for Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions
2. Identification of products and materials included
3. Compliance with specified standards
4. Notation of coordination requirements
5. Notation of dimensions established by field measurement
6. Sheet Size: Except for templates, patterns and similar full size drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 24" x 36"
7. Submittals: Submit six (6) copies of all information to the Engineer for review.
8. Distribution: Furnish copies of final submittal to installers, subcontractors,

End of Section

suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

9. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.7 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.

1.8 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Reviewed as submitted: Where submittals are marked "Reviewed as submitted," that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. Reviewed – make corrections noted: When submittals are marked "Reviewed – make corrections noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Rejected – revise and re-submit: When submittal is marked "Rejected - revise and resubmit", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay.

PART 2 - PRODUCTS

Not Applicable

End of Section

PART 3 – EXECUTION

Not Applicable

End of Section

SECTION 01 42 16

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Engineer, requested by the Engineer, and similar phrases.

D. Approve: The term approved, when used in conjunction, with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term furnish means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Provide: The term provide means to furnish and install, complete and ready for the intended use.

I. Installer: An Installer is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations.

Installers are required to be experienced in the operations they are engaged to perform.

1. The term experienced, when used with the term Installer means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

    a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

J. Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

4. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the

sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

5. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Engineer for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

F. The following is a partial listing of organizations and their abbreviations which may apply to the Contract Documents.

AA	Aluminum Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ACPA	American Concrete Pipe Assoc.
AGA	American Gas Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIHA	American Industrial Hygiene Assoc.
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	Air conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Assoc.
CBM	Certified Ballast Manufacturers
CE	Corps of Engineers
CFR	Code of Federal Regulations (Available from the Government Printing Office)
CISPI	Cast Iron Soil Pipe Institute
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
DHUD	U.S. Department of Housing and Urban Development
EIA	Electronic Industries Association
EIMA	Exterior Insulation Manufacturers Assoc.
EJMA	Expansion Joint Manufacturers Assoc.
EPA	U.S. Environmental Protection Agency (USEPA)
ETL	Electrical Testing Laboratories, Inc.

FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FHA	Federal Housing Administration
FM	Factory Mutual Laboratories
FS	Federal Specification
GSA	General Services Administration
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IPCEA	Insulated Power Cable Engineers Association
NAPA	National Asphalt Pavement Assoc.
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electric Code (from NFPA)
NECA	National Electrical Contractors Assoc.
NEMA	National Electrical Manufacturers Assoc.
NEWWA	New England Water Works Association
NFPA	National Fire Protection Assoc.
NPCA	National Paint and Coatings Assoc.
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Assoc.
PCI	Precast/Prestressed Concrete Institute
PS	Product Standard
RD	Rural Development
SCS	U.S. Soil Conservation Service
SDI	Steel Door Institute
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USDA	U.S. Department of Agriculture
WWPA	Western Wood Products Association

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. The Engineer has contacted authorities having jurisdiction where necessary to obtain information to prepare Contract Documents. Contact authorities having jurisdiction directly for information and decisions regarding the Work.

B. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need.

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices,

receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

Not Applicable

End of Section

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 01 00

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. The Engineer and Owner have made limited investigations to determine the locations of underground utilities and structures. Because of the nature of subsurface utilities and the difficulty in determining exact locations, the locations as shown on the plans should be considered approximate. Wherever underground utilities are encountered by the Contractor during construction they shall be protected by the Contractor, at his own expense, until the construction work is complete and the existing structures are made secure. Injury to any such utilities/structures caused by or resulting from the Contractor's work shall be repaired at the Contractor's expense. No additional compensation will be allowed for any delays sustained by the Contractor due to any interference from underground utilities.

B. It shall be the Contractor's responsibility to notify Dig Safe and locate all utilities within the construction area prior to proceeding with construction.

C. The restoration of existing property shall be done as promptly as practicable and shall not be left until the end of the construction period.

D. Cooperation with Utilities:

1. The Contractor shall allow the Owner or its agents and other contractors, and public service corporations, or their agents, to enter upon the work for the purpose of constructing, maintaining, repairing, removing, altering or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances as are now located or as may be required or permitted at or on the work by the Engineer.

   The Contractor shall cooperate with all aforesaid parties and shall allow reasonable facilities for the prosecution of any other work by the Owner, or of public service corporation, to be done in connection with this work. Care shall be taken at all times to inconvenience abutters as little as possible.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

End of Section

DIVISION 26 – ELECTRICAL

SECTION 26 00 00

ELECTRICAL WORK

PART 1 – GENERAL

1.1 GENERAL

A. Include Conditions of the Contract and applicable parts of Division - 01.

B. Examine all other sections of the specifications for requirements, which affect the work of this Section, whether or not such requirements are particularly mentioned herein.

C. Coordinate the work of this section with the related work of other trades, and cooperate with such trades to assure the steady progress of all work of this Contract.

D. Where the National Electrical Code appears in this specification, it shall be interrupted to mean the latest edition.

E. The intent of this project is to require all facilities to be completed and fully operational in accordance with the Contract Documents.

1.2 SCOPE

A. The work covered by this Section consists of furnishing all labor, materials, equipment, supplies, devices, electrical apparatus, fixtures, the necessary wiring interconnections for the SCADA panel, and wiring and connection of the facility ancillary equipment, and the performance of all operations necessary for the installation of electrical facilities in and about the structures and around the grounds, as indicated on the Contract Documents. This is for the facilities at the Gordon Pond Brook Wastewater Pumping Station in Woodstock, NH. This shall include the removals of existing electrical installations that are discontinued at this site and modifications to system being modified by the new work.

B. This work shall include all costs involved in providing new telephone and electrical utility service indicated and distribution at the facility and any costs involved with any other special utilities on the project. Without limiting the work required under this specification section, the following is included:

1. Provision of new electrical and telephone services.
2. Provision of and wiring of all alarm and data interconnections for the new SCADA installation.
3. Provision of lighting fixtures (if any), Surge Protective Devices, disconnects, wiring devices, conduit and wiring, and other electrical equipment and devices.
4. Intercept existing wet well conduits, provide new post mounted terminal boxes, and provide new conduits to new electrical equipment enclosure for wet well electrical devices and equipment.
5. Any other work required to leave a fully operable facilities per Contract Documents.

6. All conduit and wiring associated with SCADA and VFDs. SCADA equipment which is provided under other specifications. VFDs for the Wastewater Pump Station are provided as part of the pump system control panel as specified in that equipment section of the project specifications.
7. All wiring and conduit associated with the new flow meter installation.
7. All demolition and removals of existing, discontinued electrical installations. Contractor to visit the site and determine scope of removals.
8. Any and all conduits and wiring, fully installed, to provide all systems fully operational, whether indicated in detail or not.
9. All conduit and wiring for the Standby Power Installations at the site, including connections to the generator and transfer switch as furnished under specification 26 32 13.
10. Obtain and pay for all required permits, inspections, etc.

1.3 WORK OF OTHER SECTIONS

Refer to other Sections in this specification as appropriate.

33 12 23 BOOSTER PUMPING SYSTEM
26 32 13 STANDBY GENERATOR SYSTEMS
FLOW METER
33 90 10 SCADA SYSTEM

1.4 SUBMITTALS

A. Shop Drawings:

1. Within thirty days after award of the Contract, submit shop drawings in accordance with requirements of the General Conditions and in the manner described therein. Shop drawings shall indicate specifications section and paragraph requiring equipment indicated.

2. Shop drawings are required on all major pieces of equipment in the following list, but not necessarily limited thereto: breakers; contactors; relays of all types involved; push button stations; pull, junction, and terminal boxes; disconnect switches; wiring devices; lighting fixtures and lamps (if any), surge protective device, panelboard, terminal boxes, electrical equipment enclosure and appurtenant equipment etc.

B. Samples:

1. Within thirty days after award of the Contract, submit samples of all materials requested by the Engineer. Samples shall be prepared and submitted in accordance with the requirements of General Conditions, all postage and transportation costs being paid by the Contractor submitting same.

C. Record Drawings:

1. In accordance with requirements of the Supplementary General Conditions, the Subcontractor shall furnish and keep on the job at all times one complete set of blackline prints of the electrical work, on which shall be clearly, neatly and accurately noted, promptly as the work progresses, all architectural and electrical changes, revisions and additions to the work. Wherever work is installed otherwise than as shown on the Contract Drawings, such changes shall be noted.

2. The Subcontractor shall indicate on these prints the daily progress by coloring in the various apparatus and associated appurtenances as they are installed.

3. No approval of requisition for payment for work installed will be given unless supported by record prints as required above.

4. At the conclusion of work, prepare record drawings in accordance with the requirements of the Supplementary General Conditions.

D. Operating Instructions and Maintenance Manual:

1. The Subcontractor shall instruct, to the Owner's satisfaction, such persons as the Owner designates in the proper operation and maintenance of systems and their parts.

2. Parties indicated above sign affidavits stating that the above instructions were given by the Electrical Subcontractor. Final Contract payment will not be released until these affidavits are delivered and accepted.

3. Furnish in accordance with General Conditions operating and maintenance manuals and forward same to the Engineer for transmittal to the Owner.

4. The operating instructions shall be specific for each system and shall include copies of posted specific instructions.

5. For maintenance purposes, provide shop drawings, parts lists, specifications and manufacturer's maintenance bulletins for each piece of equipment. Provide name, address and telephone number of the manufacturer's representative and service company, for each piece of equipment so that service or spare parts can be readily obtained.

E. Manufacturers' Data:

1. Within thirty days of award of Contract, the Subcontractor shall submit for Engineer's approval a complete list of manufacturers' names of all materials and equipment proposed for the project.

2. After approval of the above list, the Subcontractor shall submit for Engineer's approval complete detailed manufacturers' data consisting of bulletins, shop drawings, and parts lists of the materials and equipment to be furnished, as required.

3. Shop drawings and manufacturers' data submitted must bear the Electrical Subcontractor's stamp stating that the shop drawings and data have been checked and meet the plans and specifications before being submitted for Engineer's approval. If this is not done, or if the submitted shop drawings do not indicate the specific item proposed, they will not be considered and will be returned for resubmission. If the shop drawings and data show proposed variations from the requirements of the plans and specifications because of standard practice or other reason, specific mention shall be made of such variations in the letter of transmittal.

4. The Electrical Subcontractor shall assume the entire cost and responsibility for any changes in the work which may be occasioned by approval of materials other than those specified.

5. Errors, omissions, and coordination of shop drawings shall be the sole responsibility of the Subcontractor whether or not the shop drawings are approved.

6. In the event that any specified manufacturer's number has been superseded by a new number since the writing of this specification, the new manufacturer's number shall be immediately submitted to the Engineer for approval. It shall be the responsibility of the Subcontractor to notify the Engineer of any superseded manufacturers' numbers mentioned in these specifications.

1.5 QUALITY ASSURANCE

A. Applicable Standards, Permits and Codes:

1. The installation shall comply with all laws applying to electrical installations in effect in Woodstock, New Hampshire, and with regulations of any other governmental body or agency having jurisdiction, including OSHA; with regulations of the National Electrical Code where such regulations do not conflict with those laws, with the regulations of the electric utility involved, with the telephone utility, and with ASHRAE Standard 70, as amended.

2. File all required notices and plans. Obtain and pay for all permits, inspections, licenses, and certificates required for work under this Section.

3. If any portion of the electrical plans or specifications conflict with any utility standards, laws or ordinances with regard to type of materials, equipment, or fixtures to be used or their installation, the Electrical Subcontractor shall bring it to the Engineer's attention at least seven days before submitting the bid. Otherwise the cost of all work necessary to make the installation comply with said utility standards, laws or ordinances shall be paid by the Electrical Subcontractor and shall become a part of this Contract.

1.6 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. Before submitting prices or beginning work, thoroughly examine the site and the Contract Documents.

B. No claim for extra compensation will be recognized if difficulties are encountered which an examination of site conditions and Contract Documents prior to executing the Contract would have revealed.

1.7 DRAWINGS

A. The Subcontractor shall refer to the electrical drawings and the architectural floor/ site and details for a full comprehension of the extent and detail of the work to be performed. These drawings are intended to be supplementary to the specifications, and any work indicated, mentioned, or implied in either is to be considered as specified by both.

B. All work shown on the drawings is intended to be approximately correct to the scale of the drawings, but figured dimensions and detailed drawings are diagrammatic and are not intended to show every detail of construction or the exact location of equipment. Where building or site work construction makes it advisable or necessary to change the location of equipment, the Subcontractor shall perform such work without cost to the Owner on written request of the Engineer. Any doubt as to the intended location of equipment shall be resolved by the Engineer before proceeding with the installation.

C. The intent is to obtain an electrical installation of all systems, complete in every detail within and about the building/site, and with all facilities properly interconnected with power and telephone. The Electrical Subcontractor shall furnish and install all such parts as may be necessary to complete the systems in accordance with the best trade practice and to the satisfaction of the Engineer. Upon completion, the electrical systems and all equipment throughout the structures shall operate properly and adequately and function as intended.

D. In any discrepancy between requirements of any Section, between notes on the drawings, between drawings, between details in the specifications, or between drawings and specifications, that which is in the best interest of the Owner shall apply.

E. Testing by Contractor: Provide equipment and personnel for operating test of electrical system.

F. Changes by Contractor: The contract drawings indicate the extent and schematic arrangement of the conduit and wiring systems. If changes from the drawings are deemed necessary by the Contractor, submit details of such changes within 30 days of award of Contract. Make no changes without written authorization of Engineer. Where conduit routings are not indicated, coordinate with Engineer, General Contractor, and other Subcontractors to insure no conflicts result from routings selected.

1.8 ELECTRICAL REFERENCE SYMBOLS

A. Standard symbols have been employed where such will meet the need. These are augmented and modified to illustrate as necessary. The chart on the Contract Drawings is intended to illustrate all symbols and explain the function and installation method of the device represented. When not clear, or where one has been inadvertently omitted, it shall be the responsibility of the Electrical Subcontractor to obtain a ruling on the intent before proceeding with any work.

1.9 TEMPORARY POWER

A. The Contractor or Electrical Subcontractor shall furnish and install temporary feeders of proper capacity power required for the project while under construction. Sufficient outlets shall be installed at convenient locations so that extension cords of not over 50 feet will reach all areas requiring power.

B. The General Contractor and all subcontractors shall furnish their own extension cords and such lamps as may be required for their work, and shall pay for the cost of temporary wiring of construction offices or shanties used by them and any temporary wiring of a special nature for light and power required other than that mentioned above.

1.10 GUARANTEE

A. Contractor's guarantee for items furnished covers and includes:

1. Faulty or inadequate design
2. Improper installation
3. Defective workmanship and materials

B. Warranties of Manufacture:

1. Not less than one year
2. As specified
3. As normally supplied if greater than one year

1.11 ALTERATIONS

A. The Contractor shall execute all alterations, additions, removals, relocations or new work, etc., as indicated or required to provide a complete installation in accordance with the intent of the drawings and specifications.

B. Remove all existing equipment and wiring that is to be discontinued.

C. Existing equipment to be discontinued and removed shall remain the property of the Owner and shall be carefully packed and delivered by the Contractor for storage on site by the Owner. If the Owner indicates that any removed materials and/or equipment are not desired for retention by the Owner, the Contractor shall then dispose of such item in a legal and lawful manner.

D. Any existing work disturbed or damaged by the alterations or new work shall be repaired or replaced to the Owner’s satisfaction.

E. Renovations in existing areas are not limited to those noted in Contract Documents. Review the existing facility to determine the full scope of removals and/or relocations as required by the Contract prior to bidding.

1.12 SCHEDULING

A. The Electrical Subcontractor shall schedule his work in accordance with Contract Requirements re any interruption of electrical, telephone, or other services and/or the requirements to maintain project areas or spaces available for the Owner's use during construction.

B. If required to maintain Owner's operations, work may be required to be scheduled when occupants are not in the facility or vicinity. If this occurs this contractor shall provide a suitable work force to accommodate the schedule requirements.

1.13 EQUIPMENT/MATERIAL REMOVED

A. All electrical equipment, etc. removed shall remain the Owner's property, except for any items specifically noted herein. The Bidder is notified herewith that the design may include the reuse of certain components being removed, and possibly other equipment. Damage to items removed and indicated for reinstallation will result in the Bidder being responsible for all costs of acceptable and approved replacements of such damaged items, without added cost to the Owner.

Bidder must field verify scope of removals/demolition of electrical installations.

1.14 HAZARDOUS MATERIALS

The Contractor under this specification section shall review all associated Contract Sections and Conditions to determine whether his work will encounter hazardous materials (asbestos, lead based paint, PCB's, etc.) and shall take all steps to insure his employees are properly trained and equipped for any work he must provide where such materials are known to or found to exist within the existing facility.

If hazardous materials are encountered their removal will be by an appropriately qualified firm and the costs of such removals/abatement will not be the responsibility of the Electrical Subcontractor.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

A. All materials, devices, and equipment, unless specifically accepted, shall be new.

B. Services: Electrical service voltage will be as follows:

Gordon Pond Brook Wastewater Pump Station: 208/120 V, 3 phase, 4 wire, 60 Hz.

2.2 IDENTIFICATIONS

A. All materials shall bear UL labels where such have been established for the particular device.

B. All devices shall show make, type, serial number (where applicable), voltage, amperage, wattage, motor ratings, and all other pertinent data.

C. All wire shall have make, type of insulation, size, and voltage rating clearly marked upon it.

2.3 SLEEVES/JUNCTION BOXES/ANCHORS

A. The Subcontractor shall advise the Contractor of locations for all sleeves, openings, anchors, supports, conduits, and boxes, and shall provide same so that they may be built into the job wherever feasible.

2.4 ACCESS PANELS

A. Not applicable on this project.

2.5 CONDUITS

A. Exterior:

1. Direct buried conduit and conduit in concrete or below concrete floor slabs in earth shall be Schedule 80 PVC or rigid galvanized steel. Where steel is used, it shall be double coated with bitumastic dried at least 24 hours between coats before installation. Where PVC is used, all elbows and/or offsets shall be rigid galvanized steel except that those on electrical service conduits may be PVC where run lengths permit this material by the utility company's standards. Rigid galvanized steel shall be used above grade. Telephone and signal cable conduits may be Schedule 80 PVC, separated from power conduits by not less than 12 inches or as required by the utility standards. Conduits installed within the Wet Well of the pump station shall be internally and externally PVC coated steel.

B. Exterior above grade

1. Exterior exposed conduits shall be rigid galvanized steel. Electrical metallic tubing (EMT) shall NOT be used.

2. Fittings, boxes and related items for work shall be cast metal units as manufactured by Crouse Hinds or approved equal. Bell style boxes will NOT be accepted. Boxes shall be of the same material as the associated conduit.

3. Minimum size of conduit for light and power shall be 3/4", unless otherwise specifically noted.

C. Interior:

1. Interior conduits may be rigid aluminum or rigid galvanized steel.. Interior for this project is limited to wiring within the electrical equipment enclosure.

2. Fittings, boxes, and related items for interior work shall be manufactured by Crouse Hinds, Appleton, or approved equal.

3. Minimum size conduit for light and power wiring shall be 3/4".

D. General:

1. The use of nonmetallic conduit or raceway within any classified area and/or within a building is not permitted.

2. Rigid galvanized conduit shall be manufactured by Youngstown Sheet and Tube Company, or approved equivalent manufacturer..

3. Liquid-tight flexible metallic conduit shall be used to tie in all motors or similar equipment within areas not classified as hazardous environments. Provide minimum 2 ft. diameter loop at all locations. The material provided must be UL labelled.

4. PVC conduit shall be Type II by Cantex Products or approved equal.

5. Rigid aluminum conduit may be used in areas noted above.

6. All terminations of conduits shall have smooth, rounded bushings. All conduit 1" and larger shall have insulation which may be integral with the bushing connector, or an insulated bushing may be added.

7. All rigid conduit joints shall be threaded. Do not use any type of clamp on fittings. All plastic joints shall be cemented or heat welded.

8. Provide expansion fittings on all conduits rising from below grade at the exterior of buildings and/or at any other structure, and elsewhere required by codes and ordinances.

9. Where conduits pass from unheated spaces to within heated spaces they shall be provided with seals in accordance with NEC Article 300.7 (A).

10. PVC coated steel conduit and associated fittings shall be approved equal to Plasti-Bond Red by Robroy Industries.

2.6 WIRE AND CABLE

A. All cable and wire shall comply with the latest requirements and specifications of the NFPA and/or the Insulated Power Cable Engineers Association (IPCEA) and shall be as manufactured by General Cable, General Electric, Anaconda, Phelps Dodge, or approval equal, unless otherwise specified or indicated.

B. All conductors used in the wiring system shall be soft-drawn copper wire having a conductivity of not less than 98% of that of pure copper, unless otherwise indicated or specified. All conductors shall be stranded. Solid conductors are not acceptable for conductors larger than #12 AWG. Aluminum conductors are not permitted.

C. All wire and cable shall be stamped approximately every two feet to indicate voltage, type, temperature rating, UL listing, manufacturers' name, size, etc.

D. All underground conductors shall be installed in conduits. All underground conductors shall enter manholes, building walls, or termination points through a protective galvanized steel conduit sleeve of appropriate size.

E. All cable and wire shall be: 600 volt; installed in approved raceways or conduit; not less than No. l2 AWG (except that No. 14 AWG may be used for control wiring).

F. Insulation for cable and wire shall be as follows:

Wet or Moist Locations	XHHW-2, THWN-2
Feeders to Panels, Service Conductors	XHHW-2

G. All internal wiring to fixtures (if any) shall be minimum, No. 14 AWG, silicon rubber insulated (150°C) with minimum 300 volt insulation.

H. All branch circuit wiring from panelboards to any outlet on the circuit over 50' but under 100' shall be No. 10 AWG for the first half of the circuit, over 100' but under 175', use No. 8 AWG for the first half.

I. The following color code shall be used for all conductors. The colors must be fast, fadeless, and capable of withstanding cleaning.

	208/120 Volt , 3 phase	
Phase A	Black	
Phase B	Red	
Phase C	Blue	
Neutral	White	
Ground	Green	

1. Multi-conductor shielded cables shall be approved equal to GE SI-58760, #16 AWG, with individual grouping shielded or the associated equipment/ system manufacturer's recommended cable.

2. All circuit wires shall be tagged in cabinets, etc., with 1/16" thick tags securely fastened to the conductors with a heavy type of linen wrap at time wires are pulled in and tested. Circuit numbers shall be indicated on the tags. Tags shall not be removed for any reason.

3. At least 8" loops or ends shall be left at each outlet for the installation of devices or fixtures in the future. All wires in outlet boxes not for the connection to fixtures at that outlet shall be rolled up, connected together, and taped.

4. Wires and cables shall be carefully handled during installation.

5. When a lubricant is necessary for pulling wires, it must be listed by UL and be of such consistency that it will leave no obstruction or tackiness that will prevent pulling out old wires or pulling in new wires or additional wires. No soap flakes or vegetable soaps will be permitted.

6. Conductors shall be continuous from panelboard to outlet and from outlet to outlet. No splices shall be made except within junction or outlet boxes.

7. Splices and taps in wires No. 8 AWG and larger shall be made with crimp-on type connectors designed for the purpose. All connections between wires at fixtures and boxes shall be made with UL approved 600 volt pressure connectors equal to ideal "Wire-Nut" or “Wing-Nut” (for general lighting and receptacles only).

8. Type NM, NMC, AC, MC, or similar cables shall not be permitted for use on this project..

9. All conductors and connections shall be free of grounds, shorts and opens.

10. Telephone wiring shall conform to standard utility practices and applicable Code articles.

2.7 OUTLET BOXES

A. All boxes shall be held to wood surfaces by wood screws. On metal surface, boxes shall be held by metal-to-metal screws or by machine bolts. When within 5 feet of chemical tanks or pumps the boxes and attachment devices shall all be stainless steel.

B. Any outside boxes or boxes mounted exposed shall be cast metal type with integral threaded hubs (style similar to Crouse Hinds FS or FD). “Bell” style boxes will not be approved. Boxes on rigid aluminum conduit shall be aluminum.

2.8 PULL BOXES, TERMINAL BOXES, AND JUNCTION BOXES INTERIOR / EXTERIOR

A. Pull boxes, cabinet boxes and junction boxes shall be constructed of code gauge sheet metal to match conduit material used and of not less than the minimum size recommended by the National Electrical Code. Boxes shall be furnished with screw-fastening covers. Where several feeders pass through a common pull box, they shall be tagged to indicate clearly their electrical characteristics, circuit number and panel designation. Where pull boxes must be used in finished areas, the Engineer shall be consulted for the location, style of cover, and finish of box. The location shall always be as inconspicuous as possible. Where shown on the drawings, sizes of pull boxes, terminal boxes and junction boxes shall be followed or next larger standard trade size shall be used. Add pull boxes when such are deemed advantageous. Where required due to length or numbers of degrees of bends of underground conduit runs, underground cast concrete boxes shall be provided. A typical in ground concrete pull box is on the Contract Drawings.

B. Terminal Boxes for post mounting near the wet well shall be NEMA 4XSS, sized per code for all entering and exiting conduits. Each box shall have a separate interior back panel for the

mounting of the required terminal blocks to accommodate all wiring entering and leaving the box involved. Boxes shall have gasketed crew attached covers. Coordinate final position of the post mounted units with the Owner and Project Engineer in the field to insure they do not interfere with facility use and maintenance operations.

2.9 PULLING CABLES

A. All raceways are to be equipped with conductors. Swab all conduits before cable is drawn into them. Any crushed raceways shall be replaced before drawing in cable. Where cable pulling compounds are required, materials specifically intended for that purpose may be utilized.

2.10 DISCONNECTS

A. Where shown on the Drawings, or when NEC required whether or not shown, install disconnect switches appropriate for the application. When serving motors, they shall be motor horsepower rated. Those for equipment outdoors shall be in NEMA 3R or reinforced nonmetallic Krydon enclosures, or as otherwise indicated on Contract Drawings. Disconnect switches shall be pad lockable in "on" and "off" positions. Where noted on Contract Documents provide circuit breakers. 240 and 120 Volt circuit breakers shall have a minimum interrupting rating of 22,000 RMS symmetrical amperes at 240 volts.

B. Switches shall be heavy duty, quick make and break type. They may be non-fused by a solid copper bar, silver plated, heavy duty on motors over 2 HP. For small motors (1/8 HP and less), a toggle switch, motor rated, may be used; otherwise, they shall be similar to Square D Type HU in NEMA 12 or 4X SS enclosures (or as noted). Manual starters with overload protection built in are approved when NEC acceptable.

2.11 OVERCURRENT PROTECTION SERVICES

A. Overcurrent protection for motors is to be in the starters. There is to be protection in each phase wire. Overcurrent protection of conductors is by thermal and magnetic molded case circuit breakers in the panelboards. Where combination starters are used, the breaker is to be a motor circuit protector with only magnetic trips. These must be supplied from a branch circuit protected by a thermal and magnetic trip breaker.

2.12 WIRE CONNECTORS AND DEVICES

A. All wire joints shall be made with a pressure squeezed connector such as T & G Stakon and Ideal, or bolted clamp such as made by Dessert. Twist-on type wire nuts are also permitted for general lighting and receptacle circuits only. Make up to terminals shall be mechanical squeeze connector. Wherever only a screw connector is available, install a conductor terminal like T & G Stakon spade or donut and designed for the application and compression set to the conductor.

B. Cover all joints made with non-insulated clamp devices with Scotch brand plastic electrical tape. Type #88 may be used at any joint and shall be used whenever the temperature of joint or the room is below 50°F. In the summer, or when temperature is above 60°F, new type #33 plus may be used. Triple wrap joints, each wrap having a 50% overlay.

2.13 SWITCHES AND PLATES

A. Switches shall be specification grade, 20 amperes at 120/277 volts, with ivory handle, such as Bryant 4901-I or approved equal by Hubbell or Leviton, for SPST applications. All switches shall have clamp type terminals screw set.

B. Mount all switches vertically and at a height of 4'-0" unless otherwise specified.

C. All switches must have machine screw held wire and be back wired. Automatic grips will not be permitted. All switches must be classed as heavy duty.

D. On surface boxes plates shall match the box style for the device installed.

E. Switches and plates shall be a product of Bryant, Hubbell or Leviton.

2.14 CONVENIENCE AND OTHER OUTLETS AND PLATES

A. Convenience outlets shall be duplex, specification grade, ivory face, side wired binding screw type, two pole, three wire, rated 20 amperes at 125 volts, Bryant 5362-I or equal. Use Bryant ivory nylon plates or equal if appropriate for the box utilized. Mount all outlets a minimum of 36" AFF**. It is the intent that ground fault protection be provided by individual Class A, 20 Ampere, 120 volt, GFI receptacles for each device indicated as "GFI" on the Contract Drawings**. They shall be equal to Bryant GFR53FT-I.

B. Mount vertical outlets with grounding slot up. Outdoors, in damp locations, and elsewhere as shown, use weatherproof covers UL listed for conformity with National Electric Code Article 406.8(B) and approved equal to Tay Mac for receptacle "in use" when not attended and "extra duty rated".

C. On exposed FS and FD boxes, use covers as noted above for outdoors.

2.15 MOTORS

A. These specifications relating to motors and motor control apply to all motors and controls furnished by this Section or any other section.

B. Each section supplying motor drive apparatus will be responsible for supplying an electric motor of sufficient size for the duty performed. These shall not be oversized beyond a normal safety factor, except that standard design ratings for next above motor size required will be used. Unless otherwise specified, all motors shall have open frames, Class A insulation and continuous duty classification based on a 40°F ambient temperature of reference.

C. Motors 1/2 HP and larger generally shall be and those smaller may be, 200 volts, three phase. Motors 1/3 HP and smaller shall be l20 volts, single phase, 60 Hertz.

D. Motor Control: Each motor, or group of motors, requiring a single control shall be provided with a suitable controller and devices, which shall perform the functions specified for the respective motors in other sections of these specifications. All controllers shall conform to the adopted standards and recommended practices of the Industrial Control Standards for the National Electrical Manufacturers Association and the Standards for Industrial Control Equipment of Underwriters' Laboratories, Inc.

E. Thermal Overload Protection. Each motor shall be provided with an overload protective device, integral with either the motor or controller. Unless otherwise specified, the protective device shall be of the manually reset type. Manual controllers for motors shall be specifically designed for the purpose, and shall have a HP rating adequate for the motor. Automatic control devices such as thermostats or floats are satisfactory, provided they are designed for that purpose and have an adequate HP rating.

F. All motors shall be high efficiency type, with operating efficiencies qualifying for installation credit by the participating utility company in the area. All motors that are controlled by variable frequency drives (VFD) shall be inverter duty rated.

2.16 SECONDARY SERVICE

A. A new, underground 208/120 volt, three phase, 4 wire, 60 Hz. electric service is required for this project at the Gordon Pond Brook Wastewater Pump Station.

2.17 ELECTRICAL SERVICE AND DISTRIBUTION SYSTEM

A. The local serving electric utility will provide the electrical service of the characteristics as shown on the drawings. The Subcontractor’s work will begin where the utility's work ends.

B. The subcontractor shall furnish all labor, materials, etc. necessary for a complete approved electrical service as required by each facility, including inspection and approval by the state and local inspection departments and the serving utility.

C. The Subcontractor shall notify the Utility in writing, with a copy to the Engineer, no later that ten days after signing construction contracts, as to when the power service will be required for the new facility.

2.18 UNDERGROUND ELECTRICAL SERVICES

A. Underground service shall comply with all the requirements of the National Electrical Code, the standards of the serving electric utility, The National Electrical Safety Code, and state and local enforcing authority.

B. Secondary service shall be cable in rigid conduit to riser at utility pole. Provide rigid galvanized conduit riser at service and entrance equipment to the standards of the serving utility company.

C. Conductors may be run in schedule 80 PVC plastic conduit or rigid galvanized conduit approved for electrical use. Conduit shall be 36" below grade and pitched to drain. The conduit size and material shall conform to the standards of the serving utility.

2.19 PRIMARY POWER SERVICE

A. Primary power to the site will be by the serving utility. The project Owner has a separate agreement with the utility and the Owner pays directly to the utilities for utility cost charges for the utilityies system modifications.

2.20 METERING

A. The Electrical Subcontractor shall furnish and install all equipment and meter trim for metering, in accordance with utility company requirements, except that the utility meter will be provided by the local utility.

B. Where the local utility does not supply meter sockets, the Electrical Subcontractor shall provide them to the local utility's specifications/standards at no additional cost to the Owner.

C. Any utility charges for poles, service cable, meters, etc., in connection with the provision of temporary building power shall be paid in full by the Electrical Subcontractor under this section.

D. Provide any utility required cold transition meter disconnects, meter transformer enclosures, etc. to the utility's specifications and include such in the bid submitted.

2.21 PANELBOARDS

A. Panelboards shall be provided with main lugs or main breakers and branch circuit breakers according to the schedules on the Contract Drawings.

B. The general requirements for panelboards are shown on the drawings including mounting and gutters. Mount the panels 6'-6" up to the top of roughing cabinets. Gutters shall not be less than 5". Breaker frame size is shown on the drawings. Handle ties will not be permitted anywhere. Multi- pole breakers shall have common trip and one handle.

C. All breakers shall be trip-free, suitable for switching, and thermal magnetic. All breakers shall be bolted to bus type secured in place by a holding bolt. "Space" means provision for adding breakers. Breakers or busses shall contain terminations or tappings designed for these attachments. All points of contact between bus and sub-bus shall be copper full tin plated between all contact surfaces. All breakers shall have a minimum interrupting capacity of 22,000 amperes at 240 volts AC for panels on 208 volt systems. If the utility available interrupting current exceeds this value, provide breakers with interrupting capacities that exceed the available utility fault current at the site at no added cost to the project, and provide utility documentation of the available fault current with the shop drawing submittal.

D. Provide a typewritten tabulation indicating fixture outlets, devices, machines, or apparatus served by each breaker and their room location. This shall follow coding on the drawings with breakers numbered from top to bottom. Mount tabulation inside door in a frame for the purpose, with a transparent plastic cover. Panel doors shall be "door-in-door" construction. Enclosure shall be NEMA 1 with the panelboard to be installed within the electrical equipment enclosure.

E. Panelboards provided under this contract shall be a product of Square D, Siemens, Cutler Hammer, or approved equal.

2.22 BALANCING OF LOADS

A. The Contractor shall balance all loads between phases in all panels, etc., around the neutral. Neutral conductors shall be the same size as phase conductors unless specifically noted otherwise. Common neutrals shall not be installed.

B. All circuits shall be distributed about the phases so as to restrict any phase load imbalance to less than 10% at any panelboard.

C. After completion of the installation, record under full load conditions, the current flow in each phase feeder. Submit 4 copies to the engineer giving name and location of each panel, etc.

D. Circuit numbers assigned to home runs and devices on the drawings are for purposes of indicating individual circuits and are intended to correspond with the circuit numbers in the panels. The panelboard directory shall designate each circuit and its associated load. If numbers deviate from the drawings, the as-built drawing shall reflect this.

2.23 LIGHTING FIXTURES

There are specified lighting fixtures for this project in the new electrical equipment enclosure. The following specifications shall apply to their provision and installation.

A. Wire directly to an outlet box for each fixture in and on the enclosure. From outlet into fixture, use No. 14 AWG silicon rubber, color coded to make up to fixture socket or ballast supply leads.

B. The lighting fixtures noted on the drawings are to indicate quality, appearance, lamping, and photometric characteristics acceptable. Alternative fixtures may be proposed for the project where they provide equivalent characteristics, quality and appearance, and subject to approval by the Engineer. Proposed substitutes must be approved by the Owner and the Engineer prior to bid opening. The Subcontractor must provide manufacturer's point-by-point lighting print-outs with manufacturer's fixture cuts for any proposed fixture substitutions. Proposed substitutes must be submitted to permit an Addenda notice of the approval so they must be received by the Engineer not less than 14 working days (Monday - Friday) before bid opening, otherwise they will be rejected.

2.24 LAMPS, DRIVERS, AND ACCESSORIES

There are specified lighting fixtures for the electrical equipment enclosure this project. The following specifications shall apply to their provision and installation.

A. There are no fluorescent fixtures specified for this project.

B. LED light fixtures shall be Reduction of Hazardous Substances (RoHS) compliant and the LED drivers, modules, and housing shall be products of the same manufacturer.

C. LED drivers shall include the following features unless otherwise indicated:

a. Minimum efficiency: 85% at full load.

b. Minimum Operating Ambient Temperature: -20 degrees C. (-4 degrees F).

c. Input voltage: 120 - 277 V (+/- 10%) at 60 Hz.

d. Integral short circuit, open circuit, and overload protection.

e. Power Factor not less than 95%.

f. Total Harmonic Distortion: No greater than 10 %.

g. Comply with FCC 47 CFR Part 15.

D. LED modules shall include the following features unless otherwise indicated:

a. Comply with IES LM-79 and LM-80 requirements.

b. Minimum CRI 80 and color temperature 3000 degrees Kelvin unless otherwise indicated in the fixture schedule.

c. Minimum rated life: 50,000 hours per IES L70.

2.25 TELEPHONE /ALARM SERVICE

A. Provide underground conduit with pull wire/cord for telephone service to telephone company demarcation terminal and from the terminal to the SCADA panel installed within the new electrical equipment enclosure at the Gordon Pond Brook Wastewater Pumping Station. Utility will provide wire, connections and demarcation terminal. Contractor will provide wiring to SCADA panel from the demarcation terminal.

2.26 EMERGENCY LIGHTS, EXIT SIGNS

A. This is not applicable for this project..

2.27 WIRING OF MECHANICAL AND OTHER EQUIPMENT

A. The Electrical Subcontractor shall wire all power to, providing and installing local disconnects for, all mechanical equipment and equipment by other trades or provided by Owner or this section per contract Drawings. This shall include but not be limited to:

Wastewater Pump Control Panel, SCADA panel, Flow Meter, Wet well level control devices, Wastewater pump motors, Surge Protective Devide, etc.

B. Note: Review plans and specifications for all sections providing equipment to be wired to determine special wiring or control requirements to be provided for such under this specification section.

2.28 FUSES (if any)

A. Provide a complete set of fuses for each fusible switch. Time-current characteristic curves of fuses serving motors or connected in series with circuit breakers or other circuit protective devices shall be coordinated for proper operation; submit coordination data for approval. Fuses shall have a voltage rating not less than circuit voltage.

B. Cartridge Fuses, Current-limiting Type (Class R): UL 198E, Class RK-1 time-delay type. Associated fuse holders shall be Class R only.

C. Cartridge Fuses, Current-limiting Type (Classes J and L): UL 198C, Class J for 0 to 600 amps and Class L for 601 to 6000 amps.

2.29 INSTRUMENTATION

A. The subcontractor under this section shall provide all conduit for and install all signal cables for instrumentation provided under all Sections of these specifications, including provision of all required 120 volt power wiring and interconnections of signal cables.

B. Instrumentation includes, but is not limited to: flow meter, wet well level transducer, wet well level back-up float switches, flow meter pit water level float switch.

2.30 BUILDING LOW TEMPERATURE THERMOSTATS

A. This is not applicable for this project.

2.31 STAND-BY POWER SYSTEMS

A. Provide all conduit, wire, and appurtenant items and labor to completely install, connect and test the Stand by Generator, Automatic Transfer Switch, and modifications to the generator base concrete pad as specified in specification Section 26 32 13 of the Contract at the project site.

2.32 WASTEWATER PUMP STATION CONTROL PANEL

A. The General Contractor shall install the factory assembled pumping system. The Electrical Contractor under this specification section shall provide and install all conduits and wiring to provide power to the pump station control panel, wire and connect all alarms and monitoring data to the SCADA panel, and connect the system level transducer and back-up float switches to the pump control panel to start and stop the selected pump operation.

B. The Contractor shall install the pump control panel provided with the pumps in the new electrical equipment enclosure. Coordinate physical panel dimensions with the Contractor providing the control panel.

2.33 SCADA / ALARM SYSTEM

A. The Owner's SCADA system vendor will provide SCADA/Alarm panel and any programming modifications to the Owner's existing system. The panel will accept and provide any power requirements for instrumentation sensors and flow meters as well as monitor and provide alarm to the central SCADA system. Telephone service shall be provided to the SCADA panel for the transmission of data and alarms.

B. Coordinate all conduits and wiring for field connections to the SCADA panel.

C. The Contractor shall install the SCADA panel provided by the SCADA subcontractor in the new electrical equipment enclosure. Coordinate physical panel dimensions with the Contractor providing the control panel.

2.34 SURGE PROTECTIVE DEVICE

A. Provide an SPD unit approved equal to Advanced Protection Technologies, including manufacturer's recommended service overcurrent protective device and all associate wiring, conduit, etc. and install this unit in the new electrical equipment enclosure. The unit shall have an event counter and a dry output contact for future use.

B. The unit shall be rated 320 KA surge capacity (150K L-N, L-G, N-G) for service on 208/120 volt, 60 hertz, 3 phase, 4 wire service. Unit shall have UL suppression voltage ratings of 330 (L-N, L-G, N-G) and 700 (L-L). The maximum continuous operating voltage shall be 150. The unit shall conform to UL 1449 Third Edition, cUL, UL 1283 R/C standards. It shall have a minimum of a 10 year warranty.

2.35 FLOWMETER PIT FLOAT SWITCH

A. Install and wire new High water (flood alarm) float switch with appurtenant components for proper mounting in the new flowmeter pit. Provide conduit and wiring from pit to SCADA panel. Float switch is provided by the SCADA subcontractor.

2.36 TRANSFORMERS

A. This is not applicable for this project.

2.37 EQUIPMENT SUPPORTS

A Provide all structural supports required for proper attachment of all equipment. Wall mounted equipment may be directly secured to walls with approved anchors.

B. Maintain at least ½" air space between equipment and supporting walls. Groups or arrays of equipment may be mounted on adequately sized stainless steel channels, angles or bars. Prefabricated stainless steel channels equal to those manufactured by Unistrut or Kindorf are acceptable.

C. Equipment suspended from ceilings shall be supported by adjustable threaded stainless steel rods of adequate strength. No hangers may be secured to furred or suspended ceilings or attached to or carried through duct work.

D. All fasteners and hardware shall be stainless steel.

2.38 NAMEPLATES

A. Provide nameplates for all items of equipment on all switchgear, motor control centers, panel boards, controllers, selector switches, starters, safety switches, push-button stations, feeder switches and relay and equipment enclosures.

B. Nameplates shall be black laminated plastic or bakelite, approximately 3/4" x 2-1/2"x

1/16"with four edges neatly beveled. Lettering shall be engraved, white, with a height of approximately 3/16" x 1/4".

C. Provide two holes in nameplate and secure to equipment with stainless steel screws. If adequate space is not available on item to which nameplate is to be affixed nameplate may be installed adjacent to and as close to the item as possible, and in a position where it is readily visible.

D. Notations on nameplates shall be exactly the same as corresponding notations that appear on the Drawings. Submit proposed engraving list for approval before obtaining.

2.39 VARIABLE FREQUENCY DRIVES (VFDs)

A. VFDs are provided as part of the new Pump Control Panel as specified in another specification section.

2.40 ELECTRICAL EQUIPMENT ENCLOSURE AND CONCRETE BASE PAD

A. Provide at the electrical service location a new enclosure as shown on Contract Drawings for mounting of utility metering, panelboard, surge protective device, automatic transfer switch, pump control panel, SCADA panel, remote annunciator for generator, and other appurtenant items as applicable.

B. Enclosure shall be per details on Contract Drawings, stainless steel or aluminum construction, and sized for all items noted to be installed within them and have an approximate 20 % space for future equipment additions.

C. Provide all conduit and wiring for connection of all equipment and install service switches, etc. as required.

D. The service enclosure shall be hinged door, free standing, NEMA insulated, stainless steel or aluminum enclosure. The enclosure shall be UL listed. Finish shall be ANSI 61 gray polyester powder interior and with exterior color as selected by Owner.

E. Enclosure shall be fabricated from 12 gauge minimum sheet metal with seams continuously welded and grounded smooth. Unistrut mounting channels shall be welded horizontally to the interior body sides, top, bottom and center to support back panel on which equipment items shall be mounted.

F. The doors shall be mounted on heavy gauge continuous hinges with removable continuous pin. A hasp and staple shall be welded to the door and frame for padlocking and doors shall have a removable print pocket on the inside of the door. Weather tightness shall depend on an oil resistant closed cell gasket retained by steel clips. Door hardware shall provide 3 point latching. Any mullions for multiple door panels must be located such that equipment panel doors for equipment installed within the panel can be opened not less than 90 degrees for service and maintenance purposes.

G. Enclosure shall be equipped with a built-in heaters and adjustable thermostat. Heater shall be sized to maintain 40°F inside panel with an outside ambient temperature of -20°F and a 15 MPH wind. The heater shall include a means of mechanically circulating the air within the enclosure to prevent hot spots. Thermostat shall measure air temperature, not surface temperature. Heaters shall be similar to Hoffman Engineering Co. Series D-AH or approved equal.

H. The enclosure shall be Automatic Signal/Eagle Signal as represented by Ocean State Signal Company or approved equal. **Size shall be as required to accommodate actual equipment to be installed within the enclosure. The noted equipment sizes on the Contract Documents are the best estimates of the designer and must be confirmed by the Contractor under this specification section for sizes of final equipment approved. The Contractor under this specification section shall provide final layout drawings confirming**

appropriate size. The assembly shall be UL labeled as a custom assembly where such label is required by Codes, ordinances, and/or state or local authorities.

I. Enclosure shall be insulated on the inside of all exterior surfaces with 1 inch thick rigid, non-combustible insulation having a maximum thermal conductivity ("K" value) of 0.35 BTU in/hr – ft^2 - degrees F. The insulation shall be furnished with manufacturer's standard all service jacket (ASJ) coverings that do NOT utilize electrically conductive materials. Proposed insulation materials that utilize electrically conductive jacket materials will not be acceptable.

J. Provide a new concrete base pad for the new electrical equipment enclosure. See Contract Drawing for details. Concrete shall be 3000 pound mix. Top of concrete shall be 6 inches above finished grade. new concrete base shall be installed on new 36 inch minimum depth of compacted fill material.

2.41 DELIVERY, STORAGE AND PROTECTION

A. The Subcontractor shall be responsible for the work and equipment until finally inspected, tested and accepted. Carefully store materials and equipment, which are not immediately installed after delivery to the site. Close open ends of work with temporary covers or plugs during construction to prevent entry of obstructing material.

B. Each Subcontractor shall protect work and material of other trades from damage that might be caused by that Subcontractor's work or workers and shall make good a damage thus caused.

PART 3 - INSTALLATION

3.1 GENERAL

A. The entire work provided in this specification shall be constructed and finished in every respect in a workmanlike and substantial manner.

B. The Subcontractor shall obtain detailed information from the manufacturer of apparatus as to the proper method of installing and connecting same. The Subcontractor shall also obtain all information from the Contractor and other Subcontractors that may be necessary to facilitate the work and the completion of the whole project.

C. Before installing any of the work, the Subcontractor shall see that it does not interfere with the clearances required for finished columns, pilasters, partitions, walls, and ceilings, as shown on the Contract Drawings and details.

D. Work installed by the Subcontractor which interferes with or modifies the facility design as shown on the Contract Drawings shall be changed as directed by the Engineer, and all costs incidental to such changes shall be paid by the Subcontractor.

E. In any and all cases of discrepancy in figures, plans or specifications the matter shall be immediately submitted to the Engineer for decision.

3.2 SITE VISITS

A. The Subcontractor will be required to visit the site as the work progresses and to carefully investigate the structural and finished conditions affecting all details of the work, and shall arrange such work required to meet such conditions.

3.3 CUTTING AND PATCHING

A. It is the duty of the Subcontractor to furnish and install all sleeves required in the performance of this Contract and to furnish to the Contractor the size and location of all openings required on the performance of this contract; and it shall be the duty of the Contractor to provide the required openings during building construction.

B. If this Subcontractor fails to provide for all sleeves and openings as required in the performance of this Contract, the Subcontractor shall instruct the Contractor, who shall do such cutting, drilling, patching and grouting and so forth necessary for the proper installation of this Subcontractor's work. The Contractor is to charge this Subcontractor for this work and it shall be done at no additional expense to the owner.

C. Should the Contractor, after having been fully advised by the Subcontractor, fail to arrange for this work, the Subcontractor shall promptly notify the Engineer in writing of such failure. In the event of any disagreement between the Electrical Subcontractor and the Contractor over the foregoing, and in the absence of any written requests or agreements between the two, the decision of the Engineer shall be final.

3.4 ALUMINUM CONDUITS

A. Aluminum conduits may be installed for installations in areas as noted in this specification section, if any..

3.5 INTERIOR CONDUIT SYSTEMS

A. Electrical Subcontractor shall coordinate with Engineer as to locations, sizes and number of conduit sleeves to be installed through cast concrete.

B. Exposed runs of conduit shall have supports not more than 6' -0" apart and shall be installed with runs parallel or perpendicular to walls, structural member, or intersections of vertical planes and ceilings with right angle turns consisting of cast metal fittings or symmetrical bends. Conduit bends and offsets shall be avoided where possible, but where necessary, shall be made with an approved hickey or conduit bending machine. Conduit which has been crushed or deformed in any way shall not be installed. Expansion fittings shall be used to provide for expansion joints. Wooden plugs inserted in masonry or concrete shall not be used to secure conduits or boxes. Conduits shall be supported on approved types of stainless steel wall brackets, ceiling trapeze, straphangers or pipe straps, secured by means of toggle bolts in hollow masonry units, expansion bolts in concrete or brick, machine screws on metal surfaces, and wood screws on wood construction. Provide stainless steel hardware for stainless steel support systems. Conduit shall be installed in such a manner as to insure against trouble from

the collection of condensation, and all runs of conduit shall be so arranged as to be devoid of traps wherever possible. The contractor shall exercise the necessary precautions to prevent the lodgement of dirt, trash, or plaster in conduits, fittings, or boxes during the course of installation. A run of conduit which has become clogged shall be entirely freed of the accumulation or shall be replaced.

C. Conduits shall be securely fastened to all sheet metal outlets, junction boxes, pull boxes, and panelboards with galvanized locknuts and bushings, care being taken to establish a firm mechanical and electrical contact between the box and the conduit.

D. Flexible conduit shall be installed only where necessary to overcome vibration at motor connection, and shall be as short as possible between the motor terminal box and the junction box on the branch circuit rigid conduit. All flexible conduit shall be of the liquid-tight type similar to "Sealtite", with proper fittings. Provide minimum 2 ft. diameter loop.

E. All rigid metallic conduit shall utilize threaded fittings.

F. Pull boxes, junction boxes and cabinet boxes shall be furnished with screw fastened covers. Where pull boxes are used in finished areas, the Engineer shall be consulted as to the location, type of cover, and finish of box and cover. Locations shall be as inconspicuous as possible.

3.6 CONDUCTORS

A. A complete system of conductors shall be installed in the raceway system, except where otherwise noted. Conductors shall be continuous from outlet to outlet, and no splices shall be made except within outlet or junction boxes. Compression type connectors properly taped shall be utilized for all splices.

3.7 OUTLETS

A. Outlets shall be installed in locations as indicated on the Contract Drawings. The Subcontractor shall study the general building plans in relation to the spaces surrounding each outlet in order that the work may fit the other work required by these specifications. Where necessary, the Subcontractor shall relocate outlets so that installed fixtures are symmetrically located according to room layout and will not interfere with other work or equipment.

3.8 DEVICE PLATES

A. Device plates shall be installed on each outlet to suit the device installed therein. Plates shall normally be installed vertically, with an alignment tolerance of 1/16".

3.9 GROUNDING

A. The conduit system and the neutral conductor of the wiring system shall be grounded. The grounded connection between the electric system neutral and the conduit system shall be made at the main electrical service breaker enclosure. A bare copper conductor sized per NEC shall be installed in nonmetallic conduit from the breaker enclosure to the entrance of the water

service. Connection to the water pipe shall be made by a suitable ground clamp or a lug connection to a plugged tee. If flanged pipes are encountered, the connection shall be made with the lug bolted to the street side of the flange connection. The ground shall also be connected to the reinforcing steel in the footing of the building or equipment foundation, any building framing steel (if any), and to 3/4 inch by 10 foot long copperweld ground rods spaced as noted on the Contract Drawings. Connections to the driven ground rods shall be exothermic type.

B. If non-metallic water lines are provided on the project, the ground electrode conductor shall be connected by a process approved equal to "Cadweld" process to copperweld ground rods, ¾" diameter by 10 feet long. Provide certified test of recognized testing agency that ground resistance does not exceed 25 ohms. Provide bonding of any metallic piping systems within the facility.

C. Ground wires shall be grouped and bonded to panel boxes, not to system neutrals. The ground terminal or receptacles shall be bonded to outlet boxes with No. 12 AWG bare or green insulated wire, or other suitable means per the National Electrical Code.

D. Conduit and/or raceway shall not be utilized as the bonding conductor.

E. Where flexible metallic conduit is used, it shall be suitable for grounding service.

3.10 EXPLOSION PROOF REQUIREMENTS

A. If encountered, equipment shall be provided with the appropriate classification for the area involved. The wet well is a classified area.

3.11 PULLING CABLES

A. Cables shall be installed utilizing pulling equipment designed for the types of wireways or conduits installed. Where lubricating material is required, it shall be a material manufactured for and designated by UL label as suitable for the types of insulation involved on the conductors. Care shall be taken during cable pulling not to cause kinks or sharp bends in the conductors. If insulation on conductors is cut or nicked during pulling, the conductors involved shall be removed and replaced at no added cost to the owner. During pulling, the maximum strain applied to the conductors shall not exceed 50% of the ultimate strength of the conductors.

3.12 EXAMINATION AND APPROVAL WORK

A. No work shall be covered before examination and approval by the Engineer and by all inspectors and authorities having jurisdiction. Replace any imperfect or condemned work with work conforming to requirements and satisfactory to the Engineer, without extra cost to the Owner. If work is covered before due inspection and approval, the Subcontractor shall pay all costs of uncovering and reinstating work.

3.13 CLEAN UP AND REPAIR

A. At the completion of the work, the work area shall be left clean. Any damage caused to work of other trades by electrical installation shall be repaired at the expense of the Electrical Subcontractor.

3.14 GUARANTEE

A. Attention is directed to provisions of the General Conditions regarding guarantees and warranties for work under this Contract.

B. Manufacturer shall provide standard guarantees for work under this Section. However, such guarantees shall be in addition to and not in lieu of all other liabilities, which the manufacturer and Subcontractor may have by law or by other provisions of the Contract Documents.

C. All materials, items or equipment and workmanship furnished under this Section shall carry the standard warranty against all defects in material and workmanship for a period of not less than one year from the date of final acceptance of the work. Any fault due to defective or improper material, equipment, workmanship or design which may develop within that period shall be made good, forthwith by and at the expense of the Subcontractor, including all other damage done to areas, materials and other systems resulting from this failure.

D. This Subcontractor shall guarantee that all elements of the systems are of sufficient capacity to meet the specified performance requirements as are set forth herein or as indicated.

E. Upon receipt of notice from the Owner of failure of any part of the systems or equipment during the guarantee period, the affected part or parts shall be replaced by the Subcontractor.

F. This Subcontractor shall furnish, before the final payment is made, a written guarantee covering the above requirements.

End of Section

SECTION 26 32 13

STANDBY GENERATOR SYSTEMS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. Work under this section included the furnishing and installation of a new weather enclosed LP gas/propane fuelled standby generator with noted appurtenances as noted herein at the Woodstock, NH, Gordon Pond Brook Wastewater Pump Station site. Wiring and conduit, etc. are provided under specification Section 26 00 00. Review and coordinate.

B. Work includes General Contractor's provision of modifications to the existing generator concrete pad to accommodate new generator bond-out locations for conduit and fuel connections in accordance with the recommendations of the manufacturer of the new generator.

1.2 QUALITY ASSURANCE

A. Manufacturer: Provide systems for one (1) manufacturer.

B. Warranty: Five (5) years comprehensive warranty equal to Caterpillar's Comprehensive Extended Warranty, from date of start-up on entire standby power system by the system manufacturer, inclusive of parts, labor, travel expenses, etc. without deductibles.

C. NEC Compliance: Comply with applicable standby generator requirements of NEC.

D. NFPA Compliance: Comply with applicable requirements of NFPA requirements of NFPA 37, “Installation and Use of Stationary Combustion Engines and Gas Turbine”. Also fully conform to NFPA 110, Emergency and Standby Power Systems”.

E. UL Compliance: Provide standby generator system components, which are UL listed and labeled. System and all components shall be UL 2200 labeled.

F. ANSI/NEMA Compliance: Comply with applicable requirements of ANSI/NEMA MG 1, “Motors and Generators”, and MG 2, “Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators”.

G. IEEE Compliance: Comply with applicable portions of IEEE Std. 241, “IEEE Recommended Practice for Electric Power Systems in Commercial Buildings” pertaining to standby power. Also comply with IEEE 446. "Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications".

H. All units must conform to all EPA and State of New Hampshire emissions limitations at the site involved, and the manufacturer must provide documented certification of this conformity with shop drawing submittals or the submittals will be rejected without review.

I. Manufacturer's documentation confirming the proposed equipment will comply with requirements of "Technical Bulletin, December 18, 2018" Installation Requirements for Permanently Installed Generators based on the 2017 National Electrical Code" as issued by the NH Electricians Board or any updated release. The requirements stated therein are requirements for the equipment and its installation whether stated further herein or not.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product data, operation and maintenance instruction, and manufacturer's product warranty.

B. Shop Drawings: Submit dimensioned DRAWINGS and wiring diagrams of generator units and accessories including start stop stations, and instruments, showing accurately scaled generator set layout and its spatial relationship to associated equipment, and connections to remote equipment, and connections to remote equipment**. Provide manufacturers computer size verification for unit per loads as indicated in 2.01 below.** Provide generator conforming to loading requirements noted with a maximum allowable peak voltage dip of 15% and maximum frequency dip of 8 Hertz. Shop drawings shall be highlighted or otherwise clearly marked to indicate specific components applicable for each item submitted for review and acceptance.

1.4 SCHEDULING

A. The requirements of this project are that any part of the project shall have on site and operational standby power during any period of time when the utility service is not available due to the construction activities. Work must be scheduled to ensure existing equipment is operational or other bypass installations are operational until the improvements at this location are acceptable and operational.

PART 2 – PRODUCTS

2.1 GENERAL SYSTEM REQUIREMENTS

A. Power: 208/120 volts, 3 phase, 4 wire at Gordon Pond Brook Pump Station

B. Capacity: Sized to start loads as below, in steps as noted:

Gordon Pond Brook Pump Station

Step #1 : One miscellaneous load, single phase, 7 KW

One Pump, 12.1 HP, 3phase with VFD phase convertor/controller

Step #2 : One Pump, 12.1 HP, 3 phase with VFD phase convertor/controller

Provide any required larger unit/system at no added cost to the Owner to comply with the above. Sizing noted in 2.02 is not to be utilized without manufacturer's verification indicating the estimated minimum rating that will be adequate.

C. Generator shall be approved equal to Kohler or Caterpillar (size per print-out recommendation provided by manufacturer; Engineer's initial sizing indicates a 45 KW generator at the Gordon Pond Brook Pump Station site, but this must be verified). Transfer switch shall be rated no less than 200 amperes at Gordon Pond Brook Pump Station site

D. System Components: Provide each entire system furnished by generator manufacturer.

1. L P Gas fueled engine driven generator
2. Engine start/stop controls
3. Automatic transfer switch for automatic starting and stopping of engine and switching load
4. Mounted accessories as specified
5. Properly sized black plastic nameplates with engraved white letters to identify all relays, components, etc.
6. Manufacturer's sound attenuated outdoor enclosure, complete with all ancillary components.

E. Performance Certification: Provide certification of the following by an independent testing lab:

1. Full power rating
2. Stability
3. Voltage and frequency regulation
4. All other certification per NFPA 110.

F. Starting Capability: Unit capable of starting after extended periods at -20°F.

G. Harmonic Interferences: Voltage regulator & electronic governor shall be designed to be immune to SCR and other non-linear load interferences. Generator shall be capable of full capacity with load harmonic distortion caused by SCR and other non-linear loads.

2.2 STANDBY GENERATOR

A. Provide the following Kohler or Caterpillar generator. NOTE: **Where sizing requires a larger unit than indicated to conform with 2.1 (b), the required unit shall be provided at no additional cost. If a greater rated generator is required based on the manufacturer's sizing and the noted loads, the Contractor shall, if necessary, also provide a transfer switch rated for the unit and include any larger conductors and conduits also required.**

B. Controls: Generator mounted control panel for unit with panel lights, safety devices, and engine starting controls, which include, but are not limited to:

1. Battery charge rate ammeter
2. Oil pressure gauge
3. Water temperature gauge
4. Run-stop-remote switch
5. AC voltmeter
6. Voltage adjusting rheostat
7. High water temperature cutout
8. Low water level cutout
9. Emergency latch-relay with manual reset & indicator light
10. Cranking limiter
11. Manual reset circuit breaker
12. Automatic over-speed shutdown
13. Control contacts to control inlet air damper (if required)
14. Generator protective shutdown circuitry for over temperature, over speed, low water level, etc. shall provide non-energized relay outputs for wiring to activate the generator remote annunciator.

C. Equipment: Provide the following for each unit:

1. Muffler, critical (Maximum sound attenuation)
2. Flexible seamless exhaust connection – insulated
3. Vibration isolators
4. Lube oil filter
5. Oil drain plug
6. Fuel filters
7. Battery cables
8. Battery rack
9. Battery charger-float type
10. Generator anti-condensation heater, thermostatically controlled
11. Air cleaner
12. 12/24 volt, heavy duty, cold weather starting battery
13. 12/24 volt Bendix fuel pumps (if required)
14. Air discharge duct adapter (if required)
15. Engine Block heater
16. Flexible fuel supply and/or return line connections

17. Fuel solenoid valve
18. Engine coolant level switch (low level stop)
19. Remote annunciator (NFPA 110, Level 2)
20. Main output circuit breaker
21. 20 A, 120 V duplex GFCI receptacle
22. Radiator fill including glycol
23. Outdoor weather enclosure – manufacturer's super sound attenuated
24. An Emergency Shutdown pushbutton enclosed in a NEMA 4X enclosure secured to the exterior of the generator enclosure by the manufacturer, with protection to inhibit operation by non-authorized persons (break glass or similar enclosure) shall be included.
25. Rodant and reptile screens on all openings in the enclosure
26. Fuel system refill after all testing.

2.3 AUTOMATIC TRANSFER SWITCH (1 Required)

A. General: UL listed (Standard 924) for all classes of load. Life safety transfer switch (if any) shall transfer load within time limits required by codes. Equipment transfer switch shall not transfer loads until a minimum of 15 seconds delay.

B. Operation:

1. Sequence as follows: Sense complete loss of power on any phase and signal generator to start.

    a). When emergency power attains a minimum of 90% of rated speed and voltage, transfer load to emergency power.
    b). Transfer load to normal power when normal power is restored; signal generator to stop.

    Note: It is intended that transfers shall incorporate a "dead band" time in the neutral position in all operations.

C. Obtain operating current for load transfer from source to which load is to be transferred.

D. Emergency Power Malfunction: Automatically disconnect load to allow generator to restart with no connected load. Reconnect emergency power when 90% of rated speed and voltage is attained.

E. Features:

1. Disconnect device: Device to electrically disconnect control section from transfer switch to permit safe access for maintenance or service during normal operation.

2. Test switch: Simulate power outage for operational test of engine, alternator and load transfer control.

3. Float type battery charger: Fused with adjustable charge, rate, millimeter.

4. Cranking limiter: (24/12 volt, 2 wire start) fail to start protection for generator starting system.

5. Operation and selector switch: (24/12 volt, 2 wire start) fail to permit operation of generator at the control site. Provide check, stop, automatic and hand crank functions.

6. Undervoltage Protection: Monitor normal source and start emergency power on partial loss of power on any phase where feedback voltages exist. Provide devices: solid-state voltage sensitive, calibrated dial adjustment, temperature compensated for a maximum deviation of +/- 2 volts from -25°F to +175°F.

7. Time delay to start emergency power: Provide to prevent emergency power from starting during normal voltage fluctuations, adjustable from 1.5 to 15 seconds.

8. Time delay to pick up load: Provide to allow emergency power to operate for a period of time before accepting load, adjustable 5 to 50 seconds.

9. Time delay to retransfer load: Provide to delay retransfer of load to normal power to override initial voltage fluctuations of returning normal power and to provide a minimum period of operating time for emergency power.

    a). Bypass time delay if emergency power fails during delay period; retransfer load immediately to normal power.
    b). Adjustment: 2 to 60 minutes

10. Time delay to stop emergency power: Provide to allow engine to run unloaded before being shutdown after load has been retransferred to normal power, adjustable 2 to 60 minutes.

11. Indicating lights: Provide on enclosure door, label indicate transfer switch position.

Green	-	Normal source
Red	-	Emergency source

12. Automatic engine exerciser: Provide built-in unit to exercise generator weekly for adjustable time periods. Loads to be transferred under exercise mode.

13. Provide circuitry to inhibit “Power Failure” and/or “Generator Run” alarm annunciation under automatic exerciser operation - <u>unless</u> other conditions do simultaneously exist.

14. Provide added auxiliary contacts for purposes required:

    a). Alarm (1)

b). Future (2)

15. Note: Transfers to emergency and from emergency to normal shall have a dead-band period to ensure residual voltages have decayed before new power source is applied or the switch shall include in phase sensing to inhibit reclosing on a system not in synchronization with the unit.

F. Rating and Performance:

1. Continuous duty is a non-ventilated NEMA 1 enclosure.

2. Load: All classes of load including inductive and non-inductive at 600 volts; tungsten lamp load at 250 volts.

3. Close on inrush current of 20 time continuous rating without welding or excessive burning of the contacts.

4. Load switching capability: 15 times continuous rating.

5. Cycles of operation: 600 cycles at rated current at a rate of 6 cycles per minute. One cycle: One complete opening and closing of both sets of contracts on inrush current 10 times continuous rating.

G. Withstand Ratings:

1. Switch withstand rating based on manufacturer's published U/L listing of acceptable protective devices (which limit any fault currents to within switches published withstand rating) must be provided. Contractor and vendor must provide written certification that new (or existing) circuit protective devices ahead of the transfer switches provide proper protection. If they do not do so, the required appropriate devices will be provided and installed under this specification section. Also there shall be a U/L service entrance breaker, per NEC, 2020 edition, ahead of the automatic transfer switch on the utility and also on the generator cables.

H. Construction:

1. General: No wearing surfaces or moving parts requiring routine lubrication or maintenance.

2. Enclosure: NEMA 1 for indoor installation; key operated door locks; swing-out service panel, pre-punched for future addition of control components.

3. Interlocking: Mechanical and electrical interlocking to prevent simultaneous energizing of load by normal and emergency power.

4. Contacts: Double break design for fast arc suppression, solid silver cadmium, completely enclosed in head resistant contact chambers.

2.4 FUEL SYSTEM

A. The fuel system shall be provided by the Owner's propane fuel supplier to the requirements of the generator manufacturer. If the existing underground fuel tank is changed or if new fuel pipe is required from the exiting tank if it is reused, the Contractor shall provide a 4 " PVC pipe sleeve for such new piping to be installed in.

B. Flexible fuel lines shall be furnished with the generator for each fuel connection to the engine.

C. A fuel/water separator (if applicable) shall be provided and mounted on the generator set ahead of engine fuel pump to remove fuel tank condensation and to prevent any water from entering the engine fuel system. The fuel/water separator shall be as manufactured by Racor or approved equal.

2.5 GENERATOR EXHAUST

A. Provide generator exhaust in compliance with manufacturer's recommendations. Provide solid, seamless, welded piping system compatible with ASA125 lb. pipe flange unless manufacturer recommends otherwise. Provide flexible continuous, bellows type stainless steel interlocking joints at least 8 inches long for each engine exhaust outlet. . Use long radius bends only. Provide condensate trap with drain petcock. Provide insulation on all exposed exhaust pipe surface inside the generator sound attenuated enclosure. Provide with critical sound rating.

2.6 MISCELLANEOUS

A. Anchor Bolts: Galvanized steel, as recommended by generator manufacturer.

a. Concrete Base Pad: Provision of modifications to the existing generator concrete pad to accommodate new generator bond-out locations for conduit and fuel connections in accordance with the recommendations of the manufacturer of the new generator.

2.7 RADIATOR

A. Provide initial radiator glycol fill to protect and be suitable for operation to -30°F.

2.8 SOUND ATTENUATED OUTDOOR ENCLOSURE

A. Manufacturer's new aluminum outdoor weather enclosure, with maximum sound attenuation, shall be provided. The maximum combined full load sound level in dBA at 23 feet (7 meters) in all directions from the unit are to be noted in the shop drawing submittal. Finish paint color shall be selected by the Owner from the manufacturer's standard color option.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install as indicated, in accordance with the equipment manufacturer's written instructions, and with recognized industry practices. Comply with NFPA and NEMA standards.

B. Coordinate with other work, including fuel tanks, piping and accessories.

C. Connect fuel piping to standby generator equipment as indicated, and comply with manufacturer's written instructions where not otherwise indicated. Flexible connections are required.

D. Provide initial fuel tank fill and refill after all tests are completed and accepted.

3.2 GROUNDING

A. Provide equipment grounding of engine-generator system in accordance with applicable sections of National Electric Code and details on Contract Drawings.
B. All assembled wiring by the manufacturer shall be grounded as required by Codes.
C. Ground grid at the generator will be by the installing electrical contractor as will all connections to terminals on the equipment that are provided by the manufacturer.

3.3 TESTING

A. After facility circuitry has been energized with normal power source, test engine-generator to demonstrate standby capability and compliance with requirements. Correct malfunctioning conditions, then retest to demonstrate compliance. Test shall conform to NFPA 110 requirements and shall include load bank testing. Full load test shall last a minimum of 4 hours and shall conform to the appropriate Level in NFPA 110.
B. Copies of test reports shall be submitted, by the representatives of the generator and the automatic transfer switch manufacturers, to the Project Engineer after testing is completed and the unit is commissioned and accepted by the Owner.

3.4 SHIPPING AND FREIGHT

A. Unloading and setting of the equipment from the delivery vehicle at the project site is part of the Contractor's work and are to be included in the bid.

B. All freight costs charged for delivery are to be included in the Contractor's bid for the project.

End of Section

DIVISION 31 – EARTHWORK

SECTION 31 08 00

RESTORATION OF SURFACES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work covered in this Section includes the restoration of surfaces and items disturbed during the Work.

B. Related work described elsewhere:

Earthwork	Division 31

1.2 QUALITY ASSURANCE

A. Restoration of surfaces and items shall be done in accordance with the requirements of those authorities having jurisdiction.

B. Existing pavements and bituminous walks shall be replaced using new pavement equal to or better than the existing in quality and thickness, except where otherwise specified. Pavements shall be free from all noticeable sags, humps, cracks, or other defects.

C. Replacement curbing shall be of the same size, material, and appearance as adjoining curbing.

D. Grassed and vegetated areas shall be loamed and replanted with healthy vegetation of a type and quality equal to or superior to existing vegetation.

E. Miscellaneous items including but not limited to mailboxes, fencing, signage, etc. shall be carefully removed and replaced.

1.3 SUBMITTALS

A. Submittals shall be submitted in accordance with Section 01 33 23 “Submittals”.

1.4 SCHEDULING

A. All surfaces shall be restores as soon as possible after completion of that portion of the Work.

PART 2 – MATERIALS

2.1 NEW MATERIALS

A. New materials shall comply with the requirements of the authority having jurisdiction.

2.2 REUSED MATERIALS

A. Items such as granite curbs, fencing, signs, walks, etc. which have been disturbed during the Work may be replaced with existing materials when, in the opinion of the Engineer, such materials are in acceptable condition.

PART 3 – EXECUTION

3.1 INSPECTION

A. Prior to restoring any surfaces, carefully inspect the Work to ensure that the work is complete. Unnecessary disturbance of restored surfaces is to be avoided.

3.2 PLANTS

A. Replace in their original locations all surviving, health plants, shrubs, trees, etc. which were removed during installation of the Work.

B. Replace with the same type and size any vegetation which does not survive moving.

3.3 GRASS AND LAWNS

A. Grassed areas are to be restored in accordance with Section 32 92 00 “Loaming, Seeding, and Fertilizing”.

3.4 BITUMINOUS PAVING

A. All Work shall conform to Section 33 31 13 “Bituminous Concrete Pavement – NH”.

B. Replace all pavement markings immediately after installation of new pavement.

3.5 MISCELLANEOUS

A. Replace miscellaneous items such as fencing, gates, signage, mailboxes, etc. in the same location as soon as possible after installation of the Work.

End of Section

SECTION 31 11 00

CLEARING, GRUBBING, and STRIPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protection of existing trees
2. Removal of trees and other vegetation
3. Topsoil stripping
4. Clearing and grubbing
5. Removing above-grade improvements
6. Removing below-grade improvements

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.
2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

2. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.
3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Engineer. Employ a competent arborist to repair damages to trees and shrubs.
4. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

D. Salvageable Equipment and Materials: Carefully remove any items indicated to be salvaged, and store on Owner's premises where indicated or directed.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Do not exceed clearing limits shown on the plans and clear only the minimum area required to install the work. Excessive clearing is to be avoided.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Clearing and Grubbing: Clear indicated areas of site of trees, shrubs and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface. Stockpile separate from other materials to avoid contamination.
2. Use only hand methods for grubbing inside drip line of trees indicated to remain
3. Fill depressions caused by clearing and grubbing operations with common earth, unless further excavation, earthwork or surface treatment is indicated.
   a. Unless indicated otherwise, place fill material in horizontal layers not exceeding one (1) foot loose depth, and compact to a density nearly equal to that of adjacent, original ground.

C. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

3.2 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner's Property: Remove and properly dispose of stumps, waste materials and unsuitable or excess earth materials off site unless otherwise directed by the Engineer.

End of Section

SECTION 31 23 16

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work covered by this Section includes Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and Division 31 Specification Sections.

B. Work performed under this Section is intended to conform with the State of New Hampshire, Department of Transportation, "Standard Specifications for Road and Bridge Construction (latest revision)".

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrade, subbase and base for building slabs, walks, and pavements.
2. Excavating, trenching and backfilling of underground utilities, structures and foundations.
3. Preparing subgrade and installing earthen material courses for site projects.

1.3 DEFINITIONS

A. Borrow consists of approved material required for the construction of fills or other portions of the work, and shall be obtained from approved sources, which sources may be designated in the Contract.

B. Earth consists of clay, loam, sand, gravel, topsoil and other materials not otherwise classified.

C. Excavation consists of removal of material encountered to subgrade elevations or dimensions indicated and subsequent disposal of materials removed, classified as follows:

1. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

    a. Common Earth Excavation consists of all excavation other than Trench Earth Excavation and Rock Excavation.

    b. Trench Earth Excavation consists of excavations for pipelines, cables,

conduits, manholes and other related work where the bottom-width limit of excavation does not exceed 8 feet.

2. Rock Excavation consists of all solid rock which cannot be removed without blasting or ripping. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

    a. Site Rock Excavation consists of all rock excavation other than Trench Rock Excavation and includes the excavation of boulders and parts of masonry structures when found to measure 2 cubic yards or more.

    b. Trench Rock Excavation consists of rock excavation where solid rock and boulders or parts of masonry structures found to measure 1 cubic yard of more are removed from trenches where the bottom-width limit of excavation does not exceed 8 feet.

3. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

    a. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

    b. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

4. Additional Excavation: When excavation has reached required subgrade elevations, notify Engineer, who will observe subgrade conditions. If Engineer believes that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Engineer.

    a. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

D. Subgrade consists of the undisturbed earth or the compacted soil layer immediately below indicated surface treatment systems.

E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. Unstable Material consists of debris, frozen materials, topsoil, quick-sand, and all wet, soft or loose material which does not provide sufficient bearing capacity to satisfactorily support pipes or other work.

G. Unsuitable Material consists of excavated material which does not meet requirements for backfilling purposes and includes solid and loose rock and unstable material.

H. Paved Areas consist of the area which lies directly under a paved surface, whether it is asphalt, concrete, or other paving materials.

I. Select Fill – Consists of Select Earth, imported sand and or other granular materials as specified and/or approved by the Engineer.

J. Earth Overburden – Earth overlying solid rock and in place during blasting operations or earth not classified as Select or Common Earth.

K. Pipe Bedding – Sand, crushed stone, or other processed granular materials as approved by the Engineer. Pipe bedding material(s) shown on the Drawings take precedence over this paragraph.

L. Wood Sheeting and Bracing – Sound timber, free from defects which might impair its strength and effectiveness.

M. Steel Sheeting and Bracing – ASTM A328.

N. Backfill – General – To the extent suitable materials are available, backfill shall consist of excavated material. Where excavation does not provide sufficient approved material, import additional material from off-site.

O. Backfill-Trenches – Select fill from pipe bedding material up to a minimum of 12" over the top of pipe; suitable Common Earth, Select Earth, of Select Fill for the remainder of the trench. Backfill materials shown on the Drawings take precedence over this paragraph.

P. Backfill – Around Structures – In paved areas, Select Fill, or a better material when required, for the full depth. In unpaved areas, Select Fill for the full depth. Backfill materials shown on the Drawings take precedence over this paragraph.

Q. Concrete for Cradles and Encasements – Class C concrete.

1.4 SUBMITTALS

A. Test Reports: Submit the following reports directly to Engineer from the testing services, with copy to Contractor:

1. Certified copies of all results of moisture-density tests and field compaction

density tests.
2. Gradations of materials proposed for use in the Work.
3. Copies of measurements and computed volumes of unstable material removed.
4. Certification from testing laboratory that materials meet permeability requirements at required compaction.
5. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
6. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.5 QUALITY ASSURANCE

A. All fill material shall be subject to the approval of the Engineer.

B. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

C. Testing and Inspection Service: Contractor shall employ and pay for (unless specified otherwise) a qualified independent geotechnical testing laboratory to perform soil testing and inspection service during earthwork operations.

D. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

E. Moisten or dry backfill to the proper moisture content as determined in accordance with ASTM D1577.

1.6 PROJECT CONDITIONS

A. Site Information: Subsurface explorations data, if made available to the Contractor, is for informational purposes only. Conditions are not intended as representations or warranties of accuracy or continuity between subsurface explorations. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test pits, borings or other explorations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional explorations.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate

with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

    a. Provide minimum of 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.

3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work per applicable regulatory requirements.

1. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3. Perform excavation by hand within drip-line of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

E. Maintain excavations and trenches free of groundwater, sewage, storm water, ice and snow.

F. Backfilling with frozen materials or when materials already in place are frozen is not permitted.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Segregate topsoil, excavated materials, and other earth materials on the site to prevent contamination.

B. Store excavated materials meeting the requirements for backfill a sufficient distance away from excavations and trenches to avoid overloading and to prevent slides or cave-ins. Do not store materials on, over, or adjacent to structures or utilities, which may collapse or become damaged due to the added weight. Remove excess excavated material promptly and dispose of off- site.

C. No construction activity, access, storage or other use shall take place beyond the construction easement boundaries.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Common Earth – Clay, loam, sand, gravel, topsoil and similar materials which may contain some stones, pebbles, lumps and rock fragments up to 6" in largest dimension, nut does not contain debris, organic or frozen material.

B. Select Earth – Sand, gravel and similar materials which may contain small amounts of stones, pebbles, or lumps over 1" but not over 2" in largest dimension, but does not contain clay, silt, loam, organic material, debris and frozen material.

C. Sand Buffer and Free Draining Sand: Hard durable natural or washed sand free of deleterious amounts of clay, silt or organic matter.

Gradation:	Passing 3/8" Sieve	=	100%
	Passing No. 4 Sieve	=	95-100%
	Passing No.16 Sieve	=	45-80%
	Passing No. 50 Sieve	=	10-30%
	Passing No.100 Sieve	=	2-10%
	Passing No.200 Sieve	=	0-5%

The calcium carbonate content shall not exceed 15%. The saturated permeability shall not be less than 1×10^{-3} cm/sec when compacted to 95% of the maximum density obtainable at optimum moisture content (as determined by ASTM D1557, Method C).

D. Sand - Conforming to NHDOT Item No. 304.1.

Gradation:	Passing 1/2" Sieve	=	100%
	Passing No. 4 Sieve	=	70-100%
	Passing No.200 Sieve	=	0-12%
	(Based on Fraction Passing No. 4)		

E. Gravel (Bank Run) – Conforming to NHDOT Item No. 304.2.

Gradation:	Passing 6" Sieve	=	100%
	Passing No. 4 Sieve	=	25-70%
	Passing No.200 Sieve	=	0-12%
	(Based on Fraction Passing No. 4)		

F. Screened Gravel – Uniformly graded, clean, hard, and durable particles free from an excess of soft, thin, elongated, laminated, or disintegrated pieces and be free form silt, loam, clay, or organic matter.

Gradation:	Passing 1-1/2" Sieve	=	100%
	Passing 3/4" Sieve	=	90-100%
	Passing 3/8" Sieve	=	0-30%
	Passing No. 4 Sieve	=	0-5%

G. Pea Gravel: Natural stone, washed free of clay, shale and organic matter, graded in accordance with ANSI/ASTM C136 to the following: maximum size 5/8 inch, minimum size 1/4 inch.

H. Crushed Gravel – Conforming to NHDOT Item No. 304.3.

Gradation:	Passing 3" Sieve	=	100%
	Passing 2" Sieve	=	95-100%
	Passing 1" Sieve	=	55-85%
	Passing No. 4 Sieve	=	27-52%
	Passing No. 200 Sieve	=	0-12%
	(Based on Fraction Passing No. 4)		

I. Crushed Aggregate For Shoulders - Conforming to NHDOT Item No. 304.33.

Gradation:	Passing 1-1/2" Sieve	=	100%
	Passing 1" Sieve	=	90-100%
	Passing No. 4 Sieve	=	30-65%
	Passing No. 200 Sieve	=	0-10%
	(Based on Total Sample)		

J. Crushed Stone (Fine) - Conforming to NHDOT Item No. 304.4.

Gradation:	Passing 2" Sieve	=	100%
	Passing 1-1/2" Sieve	=	85-100%
	Passing 3/4" Sieve	=	45-75%
	Passing No. 4 Sieve	=	0-45%
	Passing No. 200 Sieve	=	0-5%
	(Based on Total Sample)		

K. Crushed Stone (Course) – Conforming to NHDOT Item No. 304.5.

Gradation:	Passing 3-1/2" Sieve	=	100%
	Passing 3" Sieve	=	85-100%
	Passing 1-1/2" Sieve	=	60-90%
	Passing 3/4" Sieve	=	40-70%
	Passing No. 4 Sieve	=	15-40%

	Passing No.200 Sieve	=	0-5%
	(Based on Total Sample)		

L. Loam (Topsoil) – Loam shall be the surface layer of natural workable soil containing 3% minimum to10% maximum organic matter (determined by loss by ignition), capable of sustaining the growth of vegetation, with no admixture of refuse or material toxic to plant growth. It shall be relatively free from stones, lumps, stumps or similar objects larger than ½" in greatest diameter, sterile soil, roots and brush. Ordinary sods of herbaceous growth such as grass and non-noxious weeds will be permitted. The loam shall be free from subsoil. The acidity range of the loam prior to treatment as specified herein shall be between pH 5.0 and 6.0 inclusive. Not more than 65% shall pass the No. 200 Sieve as determined by the wash test in accordance with ASTM D 1140. No more than 20% of the material passing the No. 4 Sieve shall consist of clay particles.

M. Silt - Silt Loam or Silt, at least 50% of material by weight shall have a particle size less than 0.05 mm. The material shall be free of debris, frozen material, and stones greater than 3" in largest dimension. The saturated permeability of the compacted material shall not exceed 1 X 10^{-5} as determined by the U.S. Army Corps of Engineers "Falling Head Permeability Test EM1110-2-1906, Appendix 7", when compacted to 85% of the maximum density obtainable at optimum moisture content (as determined by ASTM D1557, Method C).

N. Spalls - Stones or broken rock ranging downward from the maximum size indicated.

O. Stabilization Fabric: "Mirafi Filterweave FW 700" or approved equivalent.

P. Stone Filter Blanket - Clean durable fragments of either ledge rock, boulders or both, reasonably free of thin or elongated pieces and organic material.

Gradation:	Passing 5" Sieve	=	100%
	Passing 4" Sieve	=	85-100%
	Passing 1-1/2" Sieve	=	20-55%
	Passing ¾" Sieve	=	0-25%

Q. Structural Fill – Hard durable particles or fragments of stone, gravel and natural sand free from deleterious amounts of clay, silt or organic matter. At least 30 percent of the materials retained on the No. 4 sieve shall have a fractured face.

Gradation:	Passing 2" Sieve	=	100%
	Passing 1-1/2" Sieve	=	90-100%
	Passing No. 4 Sieve	=	30-60%
	Passing No.100 Sieve	=	0-12%
	Passing No.200 Sieve	=	0-5%
	(Based on Fraction Passing No. 4)		

PART 3 – EXECUTION

3.1 EXCAVATION - GENERAL

A. Notify "Dig Safe" (800-225-4977) of intended excavation.

B. Identify and mark known underground utilities.

C. Identify required lines, levels, contours and datum.

D. Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

E. Do not perform rock excavation work until material to be excavated has been measured and classified by Engineer.

3.2 STABILITY OF EXCAVATIONS

A. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

B. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

1. Provide permanent steel sheet piling or pressure-creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Unless indicated otherwise, cut off tops a minimum of 2.5 feet below final grade and leave permanently in place.

3.3 DEWATERING

A. Prevent surface and ground water from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations without erosion or sedimentation.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to

collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.4 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, shape and stabilize stockpiles as necessary to prevent storm water erosion.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.5 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete form-work, installation of services, and other construction and for inspection.

1. Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. For pile foundations, stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal of concrete form-work, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.6 EXCAVATION FOR PAVEMENTS

A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.7 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches sufficiently wide to provide ample working room but not wider than the maximum width indicated.

B. Where it is necessary for pipes to be laid in fill, place Select fill in uniform horizontal layers not over 6" in compacted thickness. Carry fill up to elevation at least two feet above the elevation of the top of the pipe to be laid and then excavate trench.

C. Bedding requirements are detailed on the plans.

D. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil or compacted bedding material as indicated. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1. Where rock is encountered, carry excavation 6 inches below invert elevation and backfill with a 6-inch layer of stone bedding prior to installation of pipe.

2. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil or compacted bedding material as indicated.

3. For pipes or conduit 6 inches or larger in nominal size, shape trench bottom or bedding to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Where no bedding is indicated, fill depressions with granular fill-sand and tamp. At each pipe joint, dig bell holes to relieve pipe bell of loads to ensure continuous bearing of pipe barrel on bearing surface.

3.8 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.9 REQUIREMENTS PRIOR TO BACKFILLING

A. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.
2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
3. Removal of concrete form-work.
4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and

remove in manner to prevent settlement of the structure or utilities, or leave in place if required.
5. Removal of trash and debris from excavation.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
7. Inspection, testing and approval of subgrade.

3.10 SUBGRADE PREPARATION

A. Clear, grub and dispose of vegetation. Strip humus, excavate unsuitable materials and remove obstructions. Uniformly grade subgrade to indicated lines, grades and acceptable grading tolerances. Grade subgrade to be free of non-draining depressions where practical.

B. When subgrade density is less than that specified under "Compaction" for particular area classification, break up surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Unless otherwise indicated, roughen sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

3.11 GENERAL BACKFILL AND FILL PLACEMENT

A. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

B. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

C. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

D. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

1. Concrete is specified in Division 03.
2. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

3.12 PLACING SUB-PAVEMENT GRAVEL COURSES

A. General: Sub-pavement gravel courses consist of placing subbase and base gravel materials, in layers of specified thickness, over subgrade surface to support pavements.

    1. Refer to other Division 31 sections for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub-pavement gravel courses.

C. Shoulders: Place shoulders along edges of sub-pavement gravel courses to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each sub-pavement gravel course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of sub-pavement gravel.

D. Placing: Place sub-pavement gravel course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-pavement gravel material during placement operations.

    1. When a compacted sub-pavement gravel course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.13 PLACING BUILDING SLAB STRUCTURAL FILL COURSE

A. General: Structural fill course consists of placement of structural fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Placing: Place structural fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

    1. When a compacted structural fill course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.14 BACKFILLING TRENCHES

A. Pipe Bedding – Bedding requirements shall be as shown on the plans. Provide bedding to the spring line of the pipe. Place fill by hand in not greater than 6 inch compacted layers.

B. 12" Over Pipes – Provide 12 inches of Select Fill over the top of the pipe as detailed on the plans. Place fill by hand in not greater than 6 inch layers. Bring Select Fill up evenly on both sides of pipes and carefully and thoroughly compact.

C. Remainder of Trench – Paved Areas – Select Fill, Select Earth, or Common Earth placed no greater than 12 inch compacted layers.

D. Remainder of Trench – Other Areas – Select Fill, Select Earth, or Common Earth placed no greater than 12 inch compacted layers.

3.15 BACKFILLING AROUND STRUCTURES

A. Uniformly spread and deposit backfill in horizontal layers, not over twelve inches in compacted thickness. Take special precautions to prevent damage to new construction.

B. In paved areas, backfill with Select Fill for the full depth. In unpaved areas, backfill with Select Fill, Select Earth or Common Earth.

3.16 SHEETING AND BRACING

A. Provide and maintain adequate sheeting and bracing as required for the safety and protection of the Work, persons and adjacent property and structures in accordance with federal, state and local laws, codes ordinances, and standards.

B. Where sheeting is placed along side pipe and extends below mid-diameter, it shall be cut off and left in place to an elevation not less that one foot above the top of the pipe. The Engineer may, at his discretion, order sheeting and bracing to be cut-off and left in place. Where, in the opinion of the Contractor, damage may result from withdrawing sheeting, he shall immediately notify the Engineer. Sheeting ordered left in place adjacent to piping shall be cut-off at least three feet below grade but not less than one foot above the top of the pipe.

C. Contractor is fully responsible for the design and construction of all sheeting and bracing used and for all damages resulting from improper quality, strength, placing, maintenance or removal of sheeting and bracing.

3.17 UNSTABLE MATERIALS

A. Remove unstable materials in excavations and trench bottoms which are incapable of supporting pipes or structures, to the extent and depths directed by the engineer, and properly dispose of off-site. Refill and compact the excavation as required.

B. Whenever the material encountered is, in the Contractor's opinion, incapable of providing adequate support, he shall immediately notify the Engineer.

3.18 DISPOSAL OF EXCAVATED MATERIALS

A. Excavated materials which meet the requirements for embankment fill or backfill may be used for constructing embankments and backfilling, as possible. Remove excess excavated materials and dispose of off-site.

B. The storing and stockpiling of unsuitable material on-site is not permitted.

3.19 COMPACTION AND MOISTURE CONDITIONING

A. Control soil and fill compaction and moisture conditioning, providing minimum percentage of density specified for each area classification indicated below or in accordance with Section 31 23 23.23. Correct improperly compacted areas or lifts as directed by Engineer if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with ASTM D 1557:

   a. Under structures, building slabs and steps, and pavements, compact top 12 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

   b. Under lawn or unpaved areas, compact top 6 inches of subgrade and each layer of backfill or fill material at 90 percent maximum density.

   c. Under walkways, compact top 6 inches of subgrade and each layer of backfill or fill material at 95 percent maximum density.

2. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.

   a. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

   b. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.20 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed.

1. Perform field density tests in accordance with ASTM D 1556 (sand cone method) or ASTM D 2167 (rubber balloon method), as applicable.

    a. Field density tests may also be performed by the nuclear method in accordance with ASTM D 2922, providing that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. In conjunction with each density calibration check, check the calibration curves furnished with the moisture gages in accordance with ASTM D 3017.

    b. If field tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.

2. Footing Subgrade: For each strata of soil on which footings will be placed, perform at least one test to verify required design bearing capacities. Subsequent verification and approval of each footing subgrade may be based on a visual comparison with related tested strata when acceptable to Engineer.
3. Paved Areas and Building Slab: Perform at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case fewer than three tests. In each compacted fill layer, perform one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case fewer than three tests.
4. Foundation Wall Backfill: Perform at least two field density tests at locations and elevations as directed.
5. Trenches: Perform at least one field density test for each foot of backfill at intervals of approximately 200 feet along trench.
6. Embankments: In each compacted fill layer, perform at least one field density test for every 2,000 sq. ft. of embankment area, but in no case less than three tests.
7. If in opinion of Engineer, based on testing service reports and inspection, subgrade or fills that have been placed are below specified density, perform additional compaction and testing until specified density is obtained.

3.21 GRADING

A. General: Uniformly grade areas within limits of grading, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes and as follows:Lawn or Unpaved Areas: Finish areas to receive loam to within not more than 0.25 foot above or below required subgrade elevations.

1. Walks and Athletic Fields: Shape surface of areas under walks and athletic fields to line, grade, and cross-section, with finish surface not more than 0.10 foot above or below required subgrade elevation.
2. Pavements: Shape surface of areas under pavement to line, grade, and cross-section, with finish surface not more than 0.05 foot above or below required subgrade elevation.

B. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.05 foot when tested with a 10-foot straightedge.

C. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.22 EROSION CONTROL

A. Provide measures as necessary to control all erosion and sedimentation resulting from construction activities as indicated, warranted or required by authorities having jurisdiction.

3.23 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.24 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Do not dispose of spoil materials on or off site in wetlands or other environmentally sensitive areas unless properly permitted through regulatory authorities having jurisdiction and conducted in accordance with the permit conditions thereof.

B. Remove spoil materials and legally dispose of off site.

End of Section

SECTION 31 23 19

DEWATERING

PART 1 – GENERAL

1.1 WORK INCLUDED

Work included under this Section includes the dewatering equipment for the control of ground and surface water entering excavations on the project site.

1.2 RELATED WORK

Excavating, Trenching, and Backfilling	31 23 33
Erosion Control	31 25 00

1.3 QUALITY ASSURANCE

A. The Contractor shall employ whatever means deemed appropriate to control water on the Site. The Owner and Engineer shall not be responsible for the means and methods of dewatering. Unless otherwise noted, dewatering shall be incidental in the work.

B. The Contractor shall keep work free of standing or flowing groundwater, surface water, sewage, snow, or ice. Unless otherwise directed by the Engineer, the placement of work is not permitted.

PART 2 – PRODUCTS

2.1 GENERAL

A. Provide, operate and maintain a dewatering system to remove all water from excavations and trenches including pumps, drains, wellpoints, piping and any other facilities necessary to keep the excavations and trenches free from water.

B. Assure proper permits have been acquired for dewatering of excavations if the discharge from the dewatering operations will reach surface waters or wetlands. Coverage under any of the following permits, and performance of any of the associated sampling requirements, shall be deemed to satisfy this section:

1. U.S. EPA National Pollution Discharge Elimination System (NPDES) Construction General Permit; or
2. US EPA National Pollution Discharge Elimination System (NPDES) Construction Dewatering Permit.

PART 3 – EXECUTION

3.1 PERFORMANCE

A. Keep excavations and trenches dry until the structures, pipes and appurtenances have been completed.

B. Dispose of water pumped or drains from the construction site in a suitable manner to avoid public nuisance, injury to public health, damage to public and private property, and damage to work completed or in progress. Water discharged to a natural drainage course or stream shall pass through a sediment trap prior to discharge. Discharge water from excavations shall be treated to meet applicable treatment performance standards specified in state or federal permits. In no case shall discharges to surface waters exceed state water quality standards for turbidity.

C. All damage from dewatering operations, or the failure of the Contractor to maintain the work in a suitable dry condition shall be repaired by the Contractor, at no additional cost to the Owner,

D. Cofferdams shall be utilized where necessary for the dewatering, control and diversion of water to keep excavations and trenches free of water. Design and construct cofferdams to withstand all imposed loads to prevent injury to persons and property. Construct cofferdams to depths to permit a reasonable change in depths of the work, of sufficient height to prevent flooding, and of such dimensions to give sufficient clearance for construction and inspection.

E. Temporary underdrains – When and where found necessary, install temporary underdrains in the excavation. Surround the underdrain and fill the space between the underdrain and the pipe or structure with crushed stone to prevent the migration of fines.

F. Wellpoint system – If required, dewater the excavations and trenches by an efficient drainage wellpoint system to drain the soil and prevent saturated soils from flowing in to the excavated area.

End of Section

SECTION 31 23 23.23

SOIL COMPACTION

PART 1 — GENERAL

1.1 DESCRIPTION

A. This Section covers the requirements for all soil compaction.

B. Related work specified elsewhere includes:

Earthwork	31 23 16

1.2 QUALITY ASSURANCE

A. The Contractor shall provide at least one person who shall be present at all times during the soil compaction operations and who shall be thoroughly familiar with proper soil compaction techniques.

1.3 SUBMITTALS

A. All submittals shall be in accordance with Section 01 33 23 “Submittals”.

B. Provide six (6) copies of the results of the laboratory sieve analyses, moisture density tests, and any other test results required by this or other Sections.

1.4 JOB CONDITIONS

A. Compaction shall not take place in freezing weather or when materials to be compacted are frozen, too wet or moist, or too dry.

B. Schedule the Work to allow ample time for laboratory tests and to permit the collecting of samples and the performing of field density tests during the backfilling and compaction operations.

PART 2 — PRODUCTS

2.1 COMPACTION

A. Utilize the proper compaction methods and equipment to suit the soils and conditions encountered.

2.2 LABORATORY TESTING

A. Testing performed under this Section shall be by an independent testing firm qualified to provide the necessary services. The firm shall be approved by the Engineer before any testing is performed.

2.3 LABORATORY TEST REPORTS

A. As a minimum, the laboratory testing reports shall contain the following:

1. Laboratory's name.
2. Date, time and specific location from which sample was taken and name of person who collected the sample.
3. Designation of the test method used.
4. A description of the sample, the test, and the test results.
5. The date the test was performed and the person who performed the test.
6. The Project name, identification, and Contractor's name.

PART 3 — EXECUTION

3.1 INSPECTION

A. Verify that layers of material are no thicker than the maximum thickness specified in other Sections.

B. Verify that moisture content is nearly optimum.

C. Do not begin compaction operations until conditions are satisfactory.

3.2 PERFORMANCE

A. Compaction densities shown are percentage of the maximum density obtainable at optimum moisture content as determined by ASTM D1557, Method C (Modified Proctor)

B. Compact each layer of material to the following required densities:

Location	Density
Under concrete slabs, foundations and footings	95%
Backfill around structures	95%
Embankments	90%
Paved areas	95%
Cross country areas	85%

3.3 FIELD QUALITY CONTROL

A. Perform a laboratory moisture density test for each type of soil proposed for use or encountered in the Work. Determine optimum moisture content in accordance with ASTM D1557, Method C.

B. Costs for initial field density tests shall be paid for as in Laboratory Services. Costs for retesting shall be borne by the Contractor. Field density tests shall be performed in accordance with the following average frequencies;

1. Under Structures – One test for every 625 square feet of area of each layer of compacted granular.
2. Around Structure – One test for each foot of backfill at intervals of approximately fifty (50) feet around the structure.
3. Trenches – One test at intervals of approximately 300' along the trench.
4. Embankment – Three tests for each foot of compacted fill.
5. Roads – One test for each layer of compacted f ill and base material at interval s of approximately 300' along the roadway.
6. Parking Areas and Sidewalks – One test for every 750 square foot area at parking areas and one test at intervals of 200' along the sidewalk.

C. Testing frequency indicated in Paragraph 3.3 B is at the discretion of the Engineer and may be decreased as the Project progresses.

D. Field density and moisture testing shall conform to the requirements of ASTM D1556 or D2922 and ASTM D3017. Soils shall be described in accordance with ASTM D2488, Visual-Manual Procedure.

E. Soils not meeting the specified in-place densities shall be excavated and re-compacted at the Contractor's expense.

3.4 COORDINATION

A. Provide all assistance and cooperation during testing and coordinate operations to allow ample time for the required sampling and testing.

End of Section

SECTION 31 25 00

EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work covered by this Section includes the control of erosion, siltation, and sedimentation.

B. Related work described elsewhere:

Earthwork	Division 31

1.2 PROJECT REQUIREMENTS

A. Take every reasonable precaution and do whatever is necessary to avoid any erosion and to prevent silting of rivers, streams, lakes, reservoirs, impoundments, wetlands, drainage ditches and swales.

B. The exposure of uncompleted cut slopes, embankments, trench excavations, and site graded areas shall be kept as short as possible. Initiate seeding and other erosion control measures on each segment as soon as reasonably possible.

C. Adhere to any and all applicable local, state, and federal requirements and permits related to erosion control.

1.3 SEDIMENT CONTROL GUIDELINES

A. U.S. Environmental Protection Agency Publication 430/9-73-007 "Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity."

B. “Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire” Rockingham County Conservation District, August 1992.

1.4 SUBMITTALS

A. The Contractor shall furnish to the Engineer, in writing, his plan for controlling erosion and siltation before beginning the construction work. Said plan shall also include the methods to be utilized for protecting and stabilizing steep slopes, stream banks, and channels which will be affected by the construction work.

B. Where earth disturbance will exceed once acre, the Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) that conforms to the requirements of the USEPA National Pollution Discharge Elimination System (NPDES) Construction General Permit,

or agree to abide by an alternate SWPPP if one has been prepared by the Owner or their agent. In the latter instance, the singing of the SWPPP by the contractor shall constitute such an agreement.

1. Contractor shall prepare and submit a Construction General Permit Notice of Intent form at least 7 days prior to beginning earth disturbance activities, and only after a SWPPP has been prepared. Earthwork shall not commence until the Contractor has received confirmation from EPA that said Contractor has obtained coverage under the Construction General Permit.

C. Acceptance of a plan will not relieve the Contractor of responsibility for completing the work as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dewatering Bag- Dirt Bag as manufactured by ACF or approved equal

B. Erosion Stone- See 02341

C. Matting for erosion control - jute mat or excelsior mat

D. Hay bales - rectangular-shaped bales of hay or straw weighing at least 40 pounds per bale and free from primary noxious weed seeds and rough or woody materials

E. Mulch - Cured hay free from primary noxious weed seeds and rough or woody materials

F. Seed for erosion control shall be annual or perennial ryegrass, and NH Conservation Seed Mix

G. Silt fence: Envirofence as manufactured by Mirafi, Inc. or approved equal.

H. Wattles- Sediment Log as manufactured by the American Excelsior Company or approved equal

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Erosion and sediment controls shall be operated to prevent violations of NH water quality standards (NH Env-Ws 1700).
B. Diverting Surface Water:

1. Perform no earthwork in flowing waters. Build, maintain, and operate all

cofferdams, channels, flumes, slope drains, sumps, and other temporary diversion and protection works needed to divert stream flow, runoff, water from seeps in cut slope, and other surface water through or around the construction site and away from the construction work while construction is in progress.

2. Protect areas where existing stream banks are to be excavated by constructing hay bale dikes at the top of slope to divert storm runoff from the disturbed area and at the toe of the slope to retain sediments.
3. A diversion shall outlet to a durable surface that prevents erosion at the point of discharge.
4. Contain turbid discharge from pumped dewatering operations by a filter bag or a dike located in an upland area at least 20 feet from surface waters or wetlands and constructed to prevent silt from entering the stream and to protect the area of the outlet pipe against erosion by flowing water by the construction of a rock or timber apron.
5. Prior to removal of all sediment control dikes, remove all retained silt, filter bags or other materials at no additional cost to the Owner.

C. Erosion Prevention Provisions:

1. Limit period of time that disturbed soils are exposed to precipitation.

    a. Apply stabilization measures within 72 hours of completing earth disturbing work adjacent to wetlands
    b. Apply stabilization measures within 14 days of finish grading areas that are not adjacent to wetlands

2. Apply matting to seeded slopes steeper than 3:1. Apply mulch to all other seeded slopes.
3. Mulch:

    a. Undertake immediately after each area has been properly prepared.
    b. Place mulch on the seeded areas within 48 hours after seeding.
    c. Apply hay that has been thoroughly fluffed at approximately, but not to exceed, 2 tons per acre unless otherwise ordered.

4. Matting:

    a. Place strips lengthwise in the direction of the flow of water.
    b. Where strips are laid parallel or meet as in a tee, overlap at least 4 inches.
    c. Ends: Overlap at least 6 in., shingle fashion.
    d. The up-slope end of each strip of the matting shall be turned down and buried to a depth of not less than 6 in. with the soil firmly tamped against it.

5. Install rock check dams, hay bale check dams, or other temporary grade controls structures in swales and temporary channels that receive concentrated flow.

D. Sediment Control Provisions:

1. Install silt fence and other perimeter controls at early stages of earth disturbance. As shown on plans and as directed by engineer. Avoid usage where concentrated flow may occur. Back up silt fence with wire backing or hay bales as needed.

2. Install coarse stone tracking pad at site exit to prevent sediments from being tracked onto pavement by construction vehicles. Supplement with street sweeping.
3. Avoid interim grading that concentrates runoff to unstable ground or channels. Utilize temporary water bars or other methods to interrupt long flowpaths on unfinished roads and convey runoff to stable upland areas.
4. Install temporary sediment basins in swales and temporary channels that receive concentrated flow. Locate for convenience of frequent maintenance, but do not site in areas where inadvertent basin breeching would cause safety hazards, property damage, or result in preventable environmental impacts.
5. Place erodable material stockpiles on level ground and away from drainage channels. Install silt fence along downgradient perimeter of stockpile between pile and nearest surface water or wetlands.

E. Winter Erosion Control

1. All proposed vegetative areas which do not exhibit a minimum of 85% vegetative growth by October 15th. Or which are disturbed after October 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or frozen ground and shall be completed in advance of thaw or spring melt events.
2. All ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.
3. After November 15th, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.

3.2 MAINTENANCE

A. Maintain all temporarily stabilized surfaces until they are stable

1. Repair rills that form on gravel stabilized roadways until paving occurs
2. Apply supplemental seed, fertilizer and lime as needed to achieve final stabilization; defined by NHDES as 85% vegetative growth.

B. If any matting staples become loosened or raised or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.

C. Maintain areas mulched or matted, with no extra compensation, until the completion of the Contract.

D. Maintain siltation fence by checking the installation for fallen segments and keep build-up of silt to less than 50% of its height.

E. Check all sediment capturing devices at a regular frequency, after storms, and as dictated by applicable permits. Remove sediments from sediment capturing features when 50% of the devices volume is occupied by sediment and prior to anticipated large storms.

1. Place sediments cleaned from basins and other devices in upland area and out of drainage paths

3.3 REMOVAL OF TEMPORARY WORKS

A. Remove or level and grade to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

End of Section

DIVISION 32 – EXTERIOR SURFACES

SECTION 32 92 00

LOAMING, SEEDING, AND FERTILIZING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work included under this Section includes furnishing all labor, materials, equipment, and incidentals necessary to place topsoil, fertilizer, seed and mulch as required.

1.2 QUALITY ASSURANCE

A. Employ trained personnel experienced in this type of work.

1.3 PRODUCT DELIVERY AND STORAGE

A. Fertilizer shall be delivered to the Site showing the manufacturer's guaranteed analysis and stored so that when used it shall be dry and free flowing.

B. Lime shall be delivered and maintained in a dry, free flowing condition until used.

C. All seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis and stored in a dry, protected place.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Loam shall be the surface layer of natural workable soil containing organic matter, or material generally humus in nature capable of sustaining the growth of vegetation. It shall be free from stones, lumps, stumps, or similar objects larger than 2 inches in greatest diameter, sterile soil, roots, and brush. The loam shall be free from subsoil.

B. The acidity range of the loam prior to treatment as specified herein shall be between pH 5.0 and 6.0 inclusive.

C. The gradation analysis of the loam shall be as follows:

Passing	Percentage
1" Screen	100%
¼" Screen	3 %(max)
No. 100 USS mesh sieve	40 to 60 %

D. Loam shall not be delivered until representative samples proposed for use have been furnished by the Contractor and approved by the Engineer. When requested to do so, the Contractor shall furnish at his own expense, a certified analysis of the loam made by an approved soil testing laboratory.

E. Fertilizer shall be a complete commercial fertilizer, 5-10-10 grade.

F. Lime shall be ground limestone containing not less than 85% calcium and magnesium carbonate.

G. Seed shall be from the same or previous year's crop and shall have not more than 1% weed content. Seed shall also meet the following requirements:

1. Grass seed of the specified mixtures shall be furnished in fully labeled, standard, sealed containers.

2. Percentage and germination of each seed type in the mixture, purity and weed seed content of the mixture shall be clearly stated on the label.

3. Seed shall be furnished on a percentage of live seed basis.

H. Lawn areas shall be seeded with a Class A mixture of the following:

Class A (Lawn Seed)

Species	Minimum Purity % / Minimum Germination %	Lbs/Acre
▪ Kentucky Blue Grass (at least two varieties America, Liberty Crest, Monopoly, etc.)	97/85	105
▪ Creeping Red Fescue	96/85	44
▪ Perennial Rye Grass (Manhattan III, Envy, Fiesta II, Caliente, etc.)	98/90	25
TOTAL		**174**

I. Class B shall normally be used for all slope work. And shall conform to the following:

Class B (Slope Seed)

Species	Minimum Purity % / Minimum Germination %	Lbs/Acre
▪ Creeping Red Fescue	96/85	35
▪ Perennial Rye Grass	98/90	30
▪ Redtop	95/80	5
▪ Alsike Clover	97/90	5
▪ Birdsfoot Trefoil (Empire variety preferred Inoculum)	98/80	5
TOTAL		**80**

J. Red clover and birdsfoot trefoil seed shall include not more than 25% hard seed. If necessary, to meet this requirement extra seed shall be supplied at no expense to the Owner.

K. Inoculum specific to birdsfoot trefoil must be used with this mixture. The inoculum shall be a pure culture of nitrogen-fixing bacteria selected for maximum vitality and the ability to transform nitrogen from the air into soluble nitrates and to deposit them in the soil. The inoculum shall not be used later than the date indicated on the container or later than specified. The inoculum shall be subject to approval.

L. Hay and straw mulch shall consist of mowed and properly cured grass or legume mowings, reasonably free from swamp grass, seeds, weeds, twigs, debris or other deleterious material. It shall be free from rot or mold.

PART 3 – EXECUTION

3.1 GENERAL

A. Loosen any heavily compacted subsoil to a depth of 12 inches. Rake the subgrade of all areas to receive loam and remove rubbish, sticks, roots and stones larger than 2 inches in diameter. Spread and lightly compact loam to finish grade as shown on the Drawings.

B. After the loam is placed and before it is raked to true lines and rolled, spread limestone evenly and thoroughly incorporate into the loam by heavy raking to at least one-half the depth of the loam. The amount of limestone shall be based on a soil test with recommendations from the Engineer.

C. Uniformly spread fertilizer and immediately mix with the loam.

D. Immediately following this preparation, uniformly apply the seed and lightly rake the seed in to the surface. Apply mulches before rolling. Lightly compact the soil using a light weight roller or a tracked dozer run parallel with the slope. Water with a fine spray on a regular basis to ensure germination.

E. Seeding and fertilizing shall be done between April 1 and June 1, between August 15 and October 15, or as directed or permitted. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untellable.

F. Mulching should consist of light and uniform mulch over the area as follows:

Class A areas – use straw mulch
Class B areas – use hay mulch

G. Protect seeded areas from pedestrian and vehicular traffic.

3.2 APPLICATION RATES

A. Spread loam over properly prepared areas to give a covering which will be 4 inches in compacted depth.

B. Apply lime at the recommended rate determined by the Engineer.

C. Apply fertilizer at a rate of 20 pounds per 1,000 square feet.

D. Apply mulch at a rate of 90 pounds per 1,000 square feet.

E. The Engineer reserves the right to vary the amounts of materials used, as required to produce optimum results.

3.3 MAINTENANCE

A. Keep all seeded areas watered, reseeding if and when necessary, until a healthy, uniform growth is established over the entire area.

3.4 GUARANTEE

A. The Contractor shall guarantee for a period of one year from the date of substantial completion that the new grass will be free from dead areas or washout. The Contractor shall reseed areas necessary to establish a firm, healthy stand of grass.

End of Section

DIVISION 33 – UTILITIES

SECTION 33 31 13

SANITARY SEWERS, MANHOLES, and APPURTENANCES - NH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Furnishing and installing sanitary sewers
2. Furnishing and installing building sewer service laterals
3. Furnishing and installing pre-cast concrete manholes
4. Furnishing and installing manhole frames and covers
5. Miscellaneous sewerage system appurtenances
6. Testing

1.3 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division - 01 Specification Sections.

1. Name, address and telephone number of suppliers of all manufactured products.

2. Product data containing information and instructions relating to the storage, handling, installation, and inspection of furnished pipe, fittings and appurtenances.

3. Pipe and fitting manufacturers' Certificate of Compliance with specified standards and tests for each lot of pipe and fittings supplied. Immediately turn certificates over to Engineer. Materials delivered to the job site without accompanying certificates will be subject to rejection.

4. Shop drawings and technical data for pre-cast concrete sanitary manholes, including frames and covers, pipe penetration and wall joint sealing systems, and water proof coatings.

5. Certified copy of all leakage tests including all failures and retests.

1.4 QUALITY ASSURANCE

A. Pipe and fittings shall be produced in a plant of recognized reputation that is regularly engaged in the production of pipe conforming to the specified standards. Pipe and pipe fittings of the same type shall be the product of a single manufacturer.

B. All pre-cast concrete manhole sections and all castings shall be the product of a single manufacturer who can furnish evidence of satisfactory experience in the production of high quality products of the type indicated and specified.

C. Provide at least one skilled mason who shall be present at all times during the installation of inverts, shelves and chimneys and who shall personally direct the masonry work performed under this Section.

D. Comply with applicable regulations and standards of all local, state, and federal regulatory authorities having jurisdiction.

1.5 DELIVERY, STORAGE AND HANDLING

A. Carefully handle all pipes and fittings when loading and unloading. Lift pipes by hoists or lower on skid-ways in manner to avoid shock. Lower pipe into trench with suitable equipment as recommended by manufacturer. Do not dump or drop pipe or fittings. Those that are dumped or dropped are subject to rejection by Engineer.

B. Each length of pipe delivered to the job site shall be clearly marked with the name of the manufacturer, class of pipe and pipe diameter. Store in accordance with manufacturer's recommendations.

C. Pre-cast manhole sections shall not be shipped until the concrete has attained a compressive strength of 3,000 psi or until 5 days after fabrication, whichever is longer.

D. All pre-cast manhole sections shall be lifted and moved by use of suitable lifting slings, plugs, and holes so as not to damage ship-lap joints or edges.

E. All materials found at anytime during the work to be defective will be rejected, marked and promptly removed from the job site.

1.6 PROJECT CONDITIONS

A. Verify existing utility and connection locations and elevations. Affirm that sewerage system piping may be installed in compliance with original design and referenced standards. Immediately notify the Engineer of any conflicts which may require design modifications and do not initiate or resume construction until such conflicts have been resolved.

1. Locate existing sanitary sewerage system piping and structures that are to be abandoned and closed.

1.7 SEQUENCING AND SCHEDULING

A. Coordinate construction schedule, service interruptions, traffic control, leakage testing and project start-up with Owner, Engineer and regulatory authorities having jurisdiction.

B. Coordinate building sewer service lateral construction with interior building sanitary sewerage piping.

C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. General: Provide pipe and pipe fitting materials compatible with each other.

B. Ductile-Iron Pressure Pipe: AWWA C151, Class 52, for push-on joints.

1. Lining: AWWA C104, cement lining.
2. Gaskets: AWWA C 111, rubber.
3. Ductile-Iron Fittings: AWWA C110, ductile-iron, or AWWA C153, ductile-iron compact fittings.

    a. Lining: AWWA C104, cement lining.
    b. Gaskets: AWWA C111, rubber.

C. PVC (Polyvinyl Chloride) Sewer Pipe and Fittings:

1. Gravity Sewer - ASTM D 3034, SDR 26, elastomeric gasket joints. Gaskets to meet ASTM F 477, elastomeric seal.
2. Force Main (Pressure) Sewer – ASTM D 2241 or ASTM D 1785, SDR 26, elastomeric gasket joints.

D. Non-pressure Couplings: Rubber or elastomeric sleeve and stainless steel band assembly fabricated to match outside diameters of pipes to be joined.

1. Sleeves: ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2. Bands: Stainless steel, one at each pipe insert.

E. Non-pressure Joint Seals: Rubber or elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.

1. Gaskets: ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2.2 MANHOLES

A. Precast Concrete Manholes: ASTM C 478, pre-cast reinforced H-20 loading rated concrete, of depth indicated with provision for rubber gasket joints.

1. Base Section: 6-inch minimum floor thickness and 5-inch minimum thickness for walls and base riser section, and having a base section with integral floor.

2. Riser Sections: 5-inch minimum thickness; 48-inch minimum diameter, and barrel heights to provide depth indicated.

3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated.

4. Horizontal Joint Sealant: Double row, Bitumastic.

5. Pipe Connectors: Lock-Joint Flexible Manhole Sleeve or Kor-N-Seal Joint Sleeve, for each pipe connecting to base section.

6. Inverts and Shelves: Brick paved.

7. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.

8. Bricks: Bricks for shelves, inverts, and grade adjustment shall conform to Env-Wq 704.13 (a) (9), Grade SS hard brick. No more than five (5) brick courses shall be allowed for grade adjustment.

9. Manhole Mortar: Mortar for pointing and sealing manholes shall conform to Env-Wq 704.13 (c).

10. All manholes shall be water proofed, at the factory, with two seal coats applied to the exterior of the manhole in accordance with the seal coating manufacturer's recommendations. Water proofing shall be masonry seal MSP-1 waterproofing material as made by the Masonry Seal Foundation, 7500 West Ridge Road, Elyria, Ohio, or Foundation Coating 47-461 as made by TNEMEC. Exterior of all joints shall be coated with waterproofing after setting.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

C. Precast Concrete Structure Steps: Manholes shall not be provided with steps. Steps for other structures, if required shall be as follows: Stainless steel or plastic covered steel or plastic shaped so they cannot be pulled out of the concrete wall in which they are secured. All steps shall meet the requirements of ASTM C478 for load carrying capacity and pull-out resistance and steps shall not be secured with mortar. The steps shall have a drop section or raised abutments to prevent sideways slippage off the step, the foot contact surface shall have non-skid safety serrations and steps shall be approximately 14" X 10".

D. Manhole Frames and Covers: ASTM A 48, Grade 30, heavy-duty, grey cast iron, H-20 loading rated, 30-inch minimum clear opening, 6-inch minimum riser with 4-inch minimum width flange, and 31-3/4-inch diameter cover, indented top design, with 3-inch lettering "SANITARY SEWER" cast into cover, coal tar epoxy coated.

1. Standard Frame and Cover: Quality Water Products, Style 30, or equivalent.

2. Water-Tight Frame and Cover: Quality Water Products, Style C-47 WT, or equivalent

2.3 IDENTIFICATION

A. Metallic-Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid green in color with continuously printed caption in black letters "CAUTION - SEWER LINE BURIED BELOW."

PART 3 - EXECUTION

3.1 PREPARATION OF FOUNDATION FOR BURIED SANITARY SEWERAGE SYSTEMS

A. Grade trench subgrade to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials below subgrade to depth directed by Engineer. Refill to subgrade with course gradation crushed stone or screened gravel.

C. Place stone bedding and shape bottom of trench to fit bottom of pipe. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the bedding.

3.2 PIPE APPLICATIONS FOR UNDERGROUND SANITARY SEWERS

A. Gravity Sewers: PVC SDR 26 sewer pipe and fittings or DI Class 52 pressure pipe and fittings, materials and sizes as indicated on plan profile drawings.

B. Building Sewer Service Laterals: PVC SDR 26 sewer pipe and fittings, 4-inch minimum diameter.

3.3 INSTALLATION - GENERAL

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Place stone haunching and chink pipe to grade. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Place and compact initial backfill and suitable backfill materials as indicated in “Section 31 23 16 – Earthwork".

C. Use manholes for changes in direction and at all main intersections. Use wye or tee fittings for branch connections, except where direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

E. When installing below pavement sewers at depths less than 6-feet or cross-country sewers less than 4-feet, install 2-inch thick extruded polystyrene insulation 6 inches over piping. Width of insulation shall be a minimum of 24 inches, centered on the centerline of pipe. Joints between sheets shall be covered with a 12-inch long sheet of insulation, centered on the joint. Any variation from the minimum depth requirements (six feet under pavement or four feet under cross country areas) must be granted a waiver prior to construction in accordance with the requirements of Env-Wq 716.02.

F. Install building sewer service laterals, of sizes and in locations indicated or directed. Plug service at street right-of-way, connect to existing building sewer or terminate or connect to building sanitary drains at a point 5 feet beyond foundation exterior wall, as indicated or directed.

G. When installing building sewer service laterals at depths less than 3 feet, install 1-inch-thick extruded polystyrene over piping. Width of insulation shall extend minimum of 12 inches beyond each side of pipe. Install directly over and center on pipe center line.

H. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.

3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. Join and install ductile-iron pipe with ductile-iron push-on joint fittings and rubber gaskets in accordance with AWWA C600.

B. Join and install PVC pipe as follows:

1. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212.

2. Installation in accordance with ASTM D 2321.

C. Join different types of pipe with standard manufactured couplings and fittings intended for that purpose.

3.5 MANHOLES

A. General: Install manholes complete with accessories as indicated. Utilize overlapping joint type for pre-cast concrete construction. Construct continuous brick paved inverts and shelves between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.

B. Place pre-cast concrete manhole sections as indicated, and install in accordance with ASTM C 891.

C. Provide a double row of bitumastic joint sealant at horizontal wall section joints.

D. Apply bituminous mastic coating at joints of sections.

3.6 INSTALLATION OF IDENTIFICATION

A. Install continuous plastic metallic lined underground warning tape during back-filling of trench for underground water service piping. Locate 2-feet above pipe crown and centered on pipe.

3.7 FIELD QUALITY CONTROL

A. Perform testing of sewer system in accordance with local authorities having jurisdiction.

B. Gravity Sewer Testing: All new gravity sewers shall be tested for water tightness by the

use of low-pressure air tests. The Engineer shall observe all testing. Low-pressure air testing shall be in conformance with ASTM F 1417-92 (2005) "Standard Test Methods for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air"; or Uni-Bell PVC Pipe Association Uni-B-6, "Low–Pressure Air Testing of Installed Sewer Pipe" (1998). All new gravity sewer pipes shall be cleaned and visually inspected using a lamp and shall be true to line and grade following installation and prior to use. All new gravity sewer pipe shall be deflection tested not less than 30 days nor more than 90 days following installation. The maximum allowable deflection of flexible sewer pipe shall be 5% percent of average inside diameter. A rigid ball or mandrel with a diameter of at least 95% of the average inside pipe diameter shall be used for testing pipe deflection. The deflection test shall be conducted without mechanical pulling devices. Sections which do not permit ball passage shall be reinstalled to attain satisfactory results

C. Force Main and Low Pressure Sewer Testing: Force mains shall be tested in accordance with Section 4 of AWWA C600-05 "Installation of Cast Iron Water Mains and Their Appurtenances", at a pressure equal to the greater of 150 percent of the design operating total dynamic head or at least 100 psi. The Engineer shall observe all testing.

D. Manhole Testing

(a) Manholes shall be tested for leakage using a vacuum test in accordance with the ASTM C1244 standard in effect when the testing is performed. A manhole may be backfilled prior to performing a vacuum test, but if the manhole fails the vacuum test, backfill shall be removed so repairs to the manhole can be made from the outside of the manhole prior to retesting.
(b) The manhole vacuum test shall conform to the following:

(1) The initial vacuum gauge test pressure shall be 10 inches Hg; and

(2) The minimum acceptable test hold time for a 1-inch Hg pressure drop to 9 inches Hg shall be:

a. Not less than 2 minutes for manholes less than 10 feet deep in depth;
b. Not less than 2.5 minutes for manholes 10 to 15 feet deep; and
c. Not less than 3 minutes for manholes more than 15 feet deep;

(c) The manhole shall be repaired and retested if the test hold times fail to achieve the acceptance limits specified in (b), above.
(d) Inverts and shelves shall not be installed until after successful testing is completed.
(e) Immediately following completion of the leakage test, the frame and cover shall be placed on the top of the manhole or some other means used to prevent accidental entry by unauthorized persons, children, or animals, until the contractor is ready to make final adjustment to grade.

E. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses.

1. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.

2. Flush piping between manholes, if required by local authority, to remove collected debris.

F. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.

2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects correct such defects, and re-inspect.

3.8 PROTECTION OF WATER SUPPLIES

A. There shall be no physical connection between a public or private potable water supply system and a sewer or sewer appurtenance which would permit the passage of sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer or sewer manhole.

B. No sewer shall be located within the well protective radii established in Env-Ws 300 for any public water supply wells or within 100 feet of any private water supply well.

C. Sewers shall be located at least 10 feet horizontally from any existing or proposed water main.

D. A deviation from the separation requirements of B or C above shall be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed in accordance with the force main construction requirements specified in Env-Wq 704.06.

E. Whenever sewers must cross water mains, the sewer shall be constructed as follows:

1. Vertical separation of the sewer and water main shall be not less than 18 inches, with the water above sewer; and,

2. Sewer joints shall be located at least 6 feet horizontally from the water main.

End of Section

SECTION 33 32 17

FACTORY-BUILT SEWAGE PUMP STATION WITH DUPLEX SUBMERSIBLE PUMPS

PART 1 – GENERAL

1.1 SUMMARY

A. Work under this section includes furnishing and installing two (2) new submersible sewage pumps, slide rails, floats, pressure transducer, and flow metering manhole and meter in an existing sewage pump station as indicated on the project drawings, herein specified, as necessary for proper and complete performance.

1.2 RELATED DOCUMENTS

Publications listed below form part of this specification to extent referenced in the text by basic designation only. Consult latest edition of publication unless otherwise noted.

A. American National Std. Institute (ANSI) / American Water Works Assoc. (AWWA)

1. ANSI B16.1	Cast iron pipe flanges and flanged fittings.
2. ANSI/AWWA C115/A21.51	Cast/ductile iron pipe with threaded flanges.
3. ANSI 253.1	Safety Color Code for Marking Physical Hazards.
4. ANSI B40.1	Gages, Pressure and Vacuum.
5. AWWA C508	Single Swing Check Valves.

B. American Society for Testing and Materials (ASTM)

1. ASTM A48	Gray Iron Castings.
2. ASTM A126	Valves, Flanges, and Pipe Fittings.
3. ASTM A307	Carbon Steel Bolts and Studs.
4. ASTM A36	Structural Steel.

C. Institute of Electrical and Electronics Engineers (IEEE)

1. IEEE Std 100	Standard Dictionary of Electrical Terms.
2. IEEE Std 112	Test Procedure for Polyphase Induction Motors.
3. IEEE Std 242	Protection of Industrial and Control Power Systems.

D. National Electric Code (NEC) / National Electrical Manufacturers Assoc. (NEMA)

1. NEC	National Electrical Code.
2. NEMA Std MG1	Motors and Generators.

E. Miscellaneous References

1. Ten-State Standards	Recommended Standards for Sewage Works.
2. Hydraulic Institute	Std for Centrifugal, Rotary and Reciprocating Pumps.
3. ISO 9001	International Organization for Standardization.

1.3 SYSTEM DESCRIPTION

A. Contractor shall furnish and install two (2) submersible sewage pumps, guide rails, stainless steel hardware, and piping in accordance with requirements listed under PART 2 - PRODUCTS of this section.

B. Performance Criteria

1. Pumps must be designed to handle raw, unscreened, domestic sanitary sewage. Pumps shall have a four inch discharge connection. Each pump shall be selected to perform under following operating conditions:

Capacity (GPM)	500
Total Dynamic Head (FT)	50

C. Utility Power Requirements

1. Site power furnished to the pump station shall be three phase, 60 hertz, 230/460 volts, 4 wire, maintained within industry standards. Phase-to-phase unbalance shall not exceed 1% average voltage as set forth in NEMA Standard MG-1. Control voltage shall not exceed 132 volts.

1.4 SUBMITTALS

A. General: Provide submittals in accordance with Specification 01 33 23.

B. Product Data

1. Submittal shall include shop drawings and support data as follows: Catalog cuts sheets reflecting characteristics for major items of equipment, materials of construction, major dimensions, motor and v-belt drive data, pump characteristic curves showing the design duty point capacity (GPM), head (FT), and hydraulic brake horsepower (BHP). Electrical components used in the motor branch and liquid level control shall be fully described.

C. Shop Drawings

1. Shop drawings shall provide layout of mechanical equipment locations for station.

D. Provide operations and maintenance manuals for the pump station equipment and appurtenances.

1. Operation shall be in accordance with written instructions provided by the pump manufacturer. Comprehensive instructions supplied at time of shipment shall enable personnel to properly operate and maintain all equipment supplied. Content and instructions shall assume operating personnel are familiar with pumps, motors, piping and valves, but lack experience on exact equipment supplied.

2. Documentation shall be specific to the equipment supplied and collated in functional sections. Each section shall combine to form a complete system manual covering all aspects of equipment supplied by the manufacturer. Support data for any equipment supplied by others, even if mounted or included in overall design, shall be provided by those supplying the equipment. Instructions shall include the following as a minimum:

    a). Functional description of each major component, complete with operating instructions.

    b). Instructions for operating pumps and pump controls in all modes of operation.

    c). Calibration and adjustment of equipment for initial start-up, replacement of level control components, or as required for routine maintenance.

3. Support data for commercially available components not produced by the manufacturer, but supplied in accordance with the specifications, shall be supported by literature from the prime manufacturer and incorporated as appendices.

4. Electrical schematic diagram of the pump station's circuits shall be in accordance with NFPA 70. Schematics shall illustrate, to the extent of authorized repair, pump motor branch, control and alarm system circuits including interconnections. Wire numbers and legend symbols shall be shown. Schematic diagrams for individual components, not normally repairable by the station operator, need not be included. Details for such parts shall not be substituted for an overall system schematic.

5. Mechanical layout drawing of the pump station and components shall provide installation dimensions and location of all pumps, motors, valves and piping.

6. The Contractor shall be responsible for preparing an operation and maintenance manual for all pump stations in accordance with NHDES requirements as outlined in Env-Wq 705.10 Sewage Pumping Station Operation and Maintenance Manual.

    The manual shall be provided to the Engineer for review and approval and shall be required prior to Issuance of a Certificate of Substantial Completion of the pump

station. Upon review and approval of the manual by the Engineer, the Contractor shall supply five (5) copies of the manual in three ring binders.

1.5 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Upon request from the Engineer, the pump manufacturer shall prove financial stability and ability to produce the pumps within the specified delivery schedules. Evidence of facilities, equipment and expertise shall demonstrate the manufacturer's commitment to long term customer service and product support.

B. Pump Performance Certifications

1. Solids Handling Capability - All internal passages, impeller vanes, and recirculation ports shall pass a three inch spherical solid. Smaller internal passages that create a maintenance nuisance or interfere with pump performance shall not be permitted.

C. Manufacturer's Start-up Services: The manufacturer's technical representative shall inspect the completed installation, correct or supervise the correction of any defect or malfunction, and instruct operating personnel in the proper operation and maintenance of the equipment as described in Part 3 of this section.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. The pumps and controls have been designed around Sulzer ABS submersible pumps. In the event the Contractor obtains the Engineer's approval for equipment substitution, the Contractor shall, at his own expense, make all resulting changes to the enclosures, piping or electrical systems as required to accommodate the proposed equipment. Revised detail drawings illustrating the substituted equipment shall be submitted to the Engineer prior to acceptance.

B. It will be assumed that if the cost to the Contractor is less for the proposed substitution, then the contract price shall be reduced by an amount equal to the savings.

2.2 PUMP DESIGN

1. Pumps shall be Sulzer ABS XFP100E CB1 non-clog explosion proof wastewater pumps. Pump motors shall be 12.1 HP, 230/460V, 3 Phase, 1,771 RPM. Pump controls will require 230V three phase power.

2.3 VALVES AND PIPING

A. The existing pump station discharge risers, piping, check valves, and gate valves shall remain in service. The new sewage pumps shall be provided with new SCH 40 steel slide rails, top brackets, bottom base elbows, new stainless steel lifting chains and stainless steel bolts and hardware.

B. Piping

1. Flanged pipe shall be centrifugally cast, ductile iron, complying with ANSI/AWWA A21.51/C115 and Class 52 thickness.

2. Flanges shall be cast iron Class 125 and comply with ANSI B16.1.

3. Pipe and flanges shall be threaded and suitable thread sealant applied before assembling flange to pipe.

4. Bolt holes shall be in angular alignment within 1/2 degree between flanges. Flanges shall be faced with a gasket finish having concentric grooves a minimum of 0.01 inch deep by approximately 0.03 inch wide, with a minimum of three grooves on any given surface spaced a maximum of 1/4 inch apart.

C. Supports and Thrust Blocks: Contractor must ensure all pipes connected to the pump station are supported to prevent piping loads from being transmitted to pumps or station piping.

2.8 EMERGENCY OPERATION

A. The pump station shall be provided with a permanent, independent propane emergency generator with adequate fuel to run for 96 hours.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Manufacturer shall provide written instruction for proper handling. Immediately after off-loading, Contractor shall inspect equipment for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

3.2 INSTALLATION

A. Install, level, align, and complete as indicated on project drawings. Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery.

B. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to station control panel.

C. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.

3.3 FIELD QUALITY CONTROL

A. Operational Test

Prior to acceptance by Owner, an operational test of all pumps and control systems shall be conducted to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating characteristics.

After construction debris and foreign material has been removed from the wet well, Contractor shall supply clear water volume adequate to operate station through several pumping cycles. Observe and record operation of pumps, suction and discharge gage readings, ampere draw, pump controls, and liquid level controls. Check calibration of all instrumentation equipment, test manual control devices, and automatic control systems. Be alert to any undue noise, vibration or other operational problems.

B. Manufacturer's Start-up Services

Coordinate station start-up with manufacturer's technical representative. The representative or factory service technician will inspect the completed installation. He will calibrate and adjust instrumentation, correct or supervise correction of defects or malfunctions, and instruct operating personnel in proper operation and maintenance procedures.

3.4 CLEANING

A. Prior to acceptance, inspect and remove from the job site all tools, surplus materials, scrap and debris.

3.5 PROTECTION

A. The pump station should be placed into service immediately. If operation is delayed, maintain provisions for temporary pumping. Open motor circuit breakers and protect station controls and interior equipment from cold and moisture.

End of Section

SECTION 33 90 10

SCADA SYSTEM

PART 1 –GENERAL

1.1 SCOPE OF WORK

A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install, calibrate, test, start-up and place in satisfactory operation a complete Supervisory Control and Data Acquisition (SCADA) System, including work necessary, if any, to interface with existing SCADA at the wastewater treatment facility.

B. SCADA system shall be designed to control, monitor, store, display and log process and equipment operating information and to perform various process control functions and generate various reports.

C. Specifications of this Section and the other SCADA standards that illustrate and describe the minimum overall SCADA system functional and operational requirements.

D. Any exceptions the CONTRACTOR may wish to take to these standards require the review and preapproval of the Engineer.

1.2 QUALITY ASSURANCE

A. General:

1. The SCADA system shall be furnished by a single supplier who shall assume responsibility for providing a complete and integrated system.
2. All equipment, components and materials required shall be furnished by the single supplier who shall assume the responsibility for adequacy and performance of all items.
3. The supplier shall identify those system components which are not of their manufacture.
4. All control panels will be UL listed.

B. Supplier's Minimum Qualifications: Supplier shall;

1. Be a financially sound firm having at least five years continuous experience in designing, implementing, supplying and supporting instrumentation and control systems that are comparable to the SCADA system in terms of hardware, software, cost and complexity.

2. Have manufactured and supported standard lines of digital processing and control equipment and application software continuously for the last five years.
3. Have or will use a UL approved panel shop.

1.3 SUBMITTALS

A. Shop Drawings:

1. General:
   a. Shop Drawings submittals shall be in accordance with the requirements of the Contract Documents.
   b. Shop Drawings preparation shall not commence until after the Pre-Submittal Conference specified below.
   c. Manufacture of the SCADA System shall not commence until related submittals have been approved by the ENGINEER.
   d. Shop Drawings shall be submitted in complete packages grouped to permit review of related items as generally outlined in Paragraph 1.5.A.3, below.
   e. Review of Shop Drawings will be for conformance with Contract Documents and with regard to functions specified to be provided.
   f. Final and approved copies of all Shop Drawings shall be provided electronically
   g. Product information for all sensors/transducers and field and panel instruments. Specification Forms for Process Measurement and Control Instruments, Primary Elements and Valves shall be submitted using ISA standard forms in accordance with ISA Standard S20, include the following:

      1) Manufacturer's product name, serial number and model number
      2) Instrument tag number from Contract Documents
      3) Manufacturers standard catalog product data
      4) Description of construction features
      5) Performance and operation data
      6) Installation and mounting details, instructions and recommendations
      7) Service requirements
      8) Dimensions
      9) Range of each device and calibration information
      10) Descriptions of materials of construction and a listing of NEMA ratings for all equipment

2. SCADA System Information:

   a. System Description:

      1) Detailed block diagram showing system hardware configuration and identifying model numbers of system components
      2) Software language and organization

3) Format, protocol and procedures for data highway communications and local communications with input/ output modules and peripheral devices.
4) Operator Interface Terminal details
5) Control and failure modes
6) On-line and off-line capabilities for programming, system utilities and diagnostics
7) Input/output point listing with I/O module cross-reference identification for each distributed controller
8) Data base listing including all input/output points
9) Suggested detailed format and configuration of all log reports, alarm summaries, printer outputs, screen displays and graphics
10) List of spare parts and test equipment

b. Equipment Hardware:

1) Layout drawings showing front and rear plan views to scale of all processing equipment, I/O components, power supplies and peripheral devices
2) Construction details, features and procedures
3) Interconnection diagrams including termination details.
4) Plans showing equipment layout in control panels
5) Installation requirements, instructions and/or recommendations

c. Software Description:

1) Standard technical documentation covering all aspects of the distributed control system software functions and capabilities, including instruction set description and programming procedures related to control, monitoring, display, logging, reporting and alarming functions.
2) Standard technical and instructional documentation covering software for utility, system support, system documentation, display, communications, data logging and storage and diagnostic functions.
3) Detailed functional descriptions of application programs explaining control, display, logging and alarming features to be provided and functions to be performed.
4) Documentation describing memory type, size and structure and listing size of system memory, I/O and Data Table memory and size of memory available for control programs. Also, define estimated control program memory requirements and processor execution times and program scan times to perform the display, logging, reporting and alarm functions required.
5) Documentation describing central monitoring station main and secondary memory types, size and requirements to perform the display, logging, reporting and alarming functions required.

6) Documentation for all PLC programming and Operator Interface Terminal (OIT) software configuration including features and capabilities, screen display and printout examples of a fully annotated and cross-referenced ladder diagram and the ladder diagram elements.

7) Documentation of all PLC programs including the databases to establish communication between the PLC and SCADA System that are provided independent of this Contract.

d. Panels, Consoles and Cabinets Information:

1) Layout Drawings include the following:

a) Front, rear, and internal panel views to scale.
b) Dimensional information.
c) Tag number and functional name of components mounted in and on panel, console or cabinet.
d) Product information on all panel components.
e) Nameplate location and legend including text, letter size and colors to be used.
f) Location of anchoring connections and holes.
g) Location of external wiring and/or piping connections.
h) Mounting and installation details.
i) Proposed layouts and sizes of graphic display panels.
j) Calculations for heating and cooling.
k) Subpanel layouts and mounting details for all items located inside control panels.
l) Calculations of estimated electrical power demand and expected run time of the Uninterruptible Power Supply (UPS).

2) Wiring and/or piping diagrams include the following:

a) Name of panel, console or cabinet
b) Wiring sizes and types
c) Piping sizes and types
d) Terminal strip numbers
e) Color coding
f) Functional name and manufacturer's designation for components to which wiring and piping are connected.

3) Electrical control schematics in accordance with NFPA 79 Standards for all circuits indicated in the Contract Documents. No typical wiring diagrams will be acceptable and no tables or charts to describe wire numbers will be acceptable.

4) Stock list or Bill of Materials for each panel including tag number, functional name, manufacturer's name, model number and quantity for all components mounted in or on the panel or enclosure.

e. Instrument loop diagrams for all analog display, control and I/O loops prepared using ISA standard symbols in accordance with ISA Standard S5.4, include the following:

1) Instrument tag numbers from Contract Documents.
2) Functional name of each item.
3) Manufacturer's model, serial number, product, or catalog number for each item.
4) Location of each item.
5) Signal type and calibrated range, scale, and set point for each item, as applicable.
6) Transmitter output drive and receiver input impedances. Show total loop impedance and reserve.
7) Identification of all loop and instrument energy sources.

f. SCADA I/O Loop Wiring Diagrams: Prepare drawings on a module-by-module basis and include the following information:

1) Rack numbers, slot number, module type and module terminal point numbers. Also, include location and identification of all intermediate panel terminal block and strip numbers to which I/O wiring and power supply wiring is connected. Identify all power supply circuit numbers and ratings.
2) Wiring sizes, types, wire numbers and color-coding.
3) Location, functional name, tag numbers and manufacturer model numbers of panel and field devices and instruments to which I/O wiring is connected. For discrete I/O devices use NFPA 79 electrical symbols tagged with designation as shown.
4) Manufacturer's data sheets and catalog literature.
5) Description of on-line diagnostic tests and off-line tests.
6) Dimensional data of equipment.
7) Addressing card and system layout, including special configuration rules and limitations.
8) Interface and cable data.
9) Hardware manuals.
10) Electrical characteristics and protection provided for each component.
11) Indicated modularity of I/O modules.
12) Manufacturer's installation instructions for grounding and power conditioning requirements.
13) Description of how faults are detected, isolated and corrected.

B. System Operation and Maintenance Manuals:

1. Furnish Operation and Maintenance Manuals (3 copies) for the SCADA system in accordance the requirements below:
2. The Operation and Maintenance Manuals shall include the following:

    a. Name, address and telephone number of the SCADA supplier's local service representative.
    b. Complete list of supplied system hardware parts with full model numbers referred to system part designations, including spare parts and test equipment provided.
    c. Copy of all approved submittal information and system Shop Drawings as specified herein with corrections made to reflect actual system as tested and delivered to the site for installation. Half-size black line reproductions shall be provided for all Shop Drawings larger than 11 by 17-inches.
    e. Complete up-to-date system software documentation.
    f. Manufacturer's Original Copies of Hardware, Software and Installation, Assembly and Operations Manuals for the distributed control system central monitoring stations, control panels, air conditioners and peripheral devices, and all other control system components. Manuals shall include the following information:

        1) General descriptive information covering the basic features of the equipment.
        2) Physical description covering layout and installation requirements and all environmental constraints.
        3) Functional and operational descriptions covering the procedures for programming, operation, start-up, shutdown, and calibration of the distributed control system equipment and explaining how the various control functions are performed.
        4) Principles of operation explaining the logic of operation; provide information covering operation to a component level.
        5) Maintenance procedures covering checkout, troubleshooting, and servicing; checkout procedures shall provide the means to verify the satisfactory operation of equipment, troubleshooting procedures shall serve as a guide in determining faulty components and servicing procedure shall cover requirements and recommended time schedule for calibration, cleaning, lubrication and other housekeeping and preventive maintenance procedures.
        6) Wiring, schematic and logic diagrams.
        7) Safety considerations relating to operation and maintenance procedures.

    g. System Software Documentation: Software documentation shall include the following as a minimum for as-built conditions:

1) Complete hard copies of all ladder diagram and function block programming. Documentation shall include complete external and internal I/O coil, contact and signal cross-referencing, addressing and rung numbering. Documentation shall clearly distinguish between internal and real I/O and shall also incorporate extensive English language to identify contact, coil and signal functions and for labeling and description of program, sub-program and rung purpose and action.
2) Complete listing of external and internal I/O address assignments, register assignments and preset constant values along with functional point descriptions. Also, list all unused/undefined I/O and data table registers available.
3) Complete hard copies of all program documentation for all types of programs.
4) Detailed system memory map defining memory segments used and spare memory segments available for system memory, I/O tables, Data Tables and control program.
5) Complete database listing including listings for log, report and alarm file setups.
6) Hard copies of all system graphic displays and formats for all logs, reports and the alarm summary.
7) Complete documented PLC Programs and OIT Programs for each station. Complete backup file of the SCADA System along with a copy of the profacy files, Win 911 files, XLReporter Files will be placed on a flash drive. Any Logins and password used on the computer or in any device in the SCADA System will be listed in the Oand M Manual and show as a Note document on that flash drive titled as PASSWORDS. Panel Drawings will be placed on the flash drive and the software's name that it was created in.

C. Record Drawings and Documentation:

1. CONTRACTOR and SCADA system supplier shall revise all system Shop Drawings, submittals and software documentation to reflect as-built conditions in accordance with the requirements of the Contract Documents and the supplemental requirements below.
2. Half-size black line prints of wiring diagrams applicable to each control panel shall be placed inside a clear plastic envelope and stored in a suitable print pocket or container inside each control panel.

D. Reports:

1. Two copies of the following reports shall be submitted to ENGINEER:

    a. Factory Test Reports if specified in Section 13402, SCADA System, Factory Testing.

1.4 GENERAL DESIGN REQUIREMENTS

A. Gordon Pond Brook Wastewater Pump Station

All old control panels shall be removed. The PLC shall be mounted in a control cabinet with a NEMA 4X enclosure rating with the 10 inch OIT mounted through the outer door. The control cabinet shall be UL 508 listed as an assembly. Communication between panel and SCADA Central Station shall be by dialup telephone. Provide 2 modems for communications. Provide uninterruptible power for controls. The operational control selection shall be able to set either locally via the OIT or remotely via the SCADA system at the SCADA Central Station at the Woodstock Wastewater Treatment Facility.

1. Pump Control

The PLC shall control the two submersible sewage pumps at the pump station. Each pump will have a Hand Off Auto soft switch. They will have a lead selection 1 Alternate 2. In Alternate the pumps will switch after cycle and will skip any pump not in auto or is failed (overload tripped). In Hand the well will start. In auto, operation will be based (start and stop) on wetwell level with setpoints. The pumps will be interlocked with the low wetwell level float alarm. All pump run indications will be trended on the SCADA. Indicators for lead or lag status will be displayed and pump in Hand Off or Auto.

2. Flow Meter (Transit Time)

a. Flow meter Controller will be mounted in the above ground enclosure with the sensor leads going down to the pit to be mounted on the pipe.

b. Flow rates and total flows will be for each pump run Trending and totals will be for each pump and a total for the station. Trending Flows, Totals Continuous, daily, totals will be trended.

c. Report for daily flow totals and run time for each pump, and total flow for the station. The report will be a yearly report with monthly tabs.

3. Wetwell Level (KPSI or Keller Level transmitter). Water level in wetwell will have trending.

4. Alarms with enables and disables from OIT and WWTP

a. Pump station power status alarm

b. Pump failures alarms

c. High and low wetwell alarms with setpoints

d. Communication failure alarm

Pump 1 VFD Fault
Pump 2 VFD Fault
Pump 1 Seal leak
Pump 2 Seal leak
Pump 1 Over Temp
Pump 2 Over Temp
Power Fail
UPS Fail

Generator Run
Level Transducer Fail
Flow Meter pit flood alarm
Communication fail alarm at the WWTP 1 hour timer
Local Beacon Light with an enable or disable from OIT or SCADA

5. SCADA

The existing SCADA is iFix with Win911 alarming and XLReporter for reports. All monitoring, adjustments, alarms, and reports will be integrated with the existing SCADA System. The station will be represented on its own screen. On the plant overview a representation of the wetwell level (with level indication) and the 2 pumps with run status will be added.

A communication screen will be provided on the SCADA showing good and bad communication messaging (resettable), percent error rate, and polling time. This screen will have the telephone numbers that are being used.

6. Monitoring

Wetwell Level
Flow GPM
Pump 1 Run
Pump 1 VFD Speed
Pump 1 Amps
Pump 2 Run
Pump 2 VFD Speed
Pump 2 Amps

7. Controls Soft controls on OIT and SCADA

Pump 1 Hand Off Auto
Pump 1 Hand Speed Setpoint and Auto Speed Setpoint
Pump 2 Hand Off Auto
Pump 2 Hand Speed Setpoint and Auto Speed Setpoint
Lead Pump Select 1 Alt 2 Alt is Alternate each cycle
Pump Lead Start set point
Pump Lead Stop set point
Pump Lag Start set point
Pump Lag Stop set point

8. Totals

Station Flow Total
Station Flow Today
Station Flow Yesterday
Pump 1 Flow Total
Pump 1 Flow Today
Pump 1 Flow Yesterday
Pump 2 Flow Total
Pump 2 Flow Today
Pump 2 Flow Yesterday

Pump 1 Run Hours
Pump 1 Run today
Pump 1 Run yesterday
Pump 2 Run Hours
Pump 2 Run today
Pump 2 Run yesterday
Generator Run Hours
Generator Run today
Generator Run yesterday

9. Backup System
If the High Float is activated it will start both pumps and shut off both pumps on a low float, bypassing the PLC and all other controls. They will send a digital signal to both VFDs to run them at a preset speed. Once the low float is operated it will try to use the normal controls. If the High float is activated it will start the backup system again. The Low Float will shut down the pumps even if working from level control.

10. Communications
Dial up Telephone with modems. The circuit will remain active all of the time. If it gets disconnected the connection will try to reconnect after 5 minutes.

11. On SCADA
All of the Station information plus trending (charts) for all of the Monitor points and all total points. All setpoints and controls will work from the OIT or the WWTP SCADA

12. Field Items to provide:
Dial up modems
Clamp on Flow meter
Wetwell Level Transmitter 0-20 Feet
Floats - 2 for Wetwell, 1 for flow meter pit, 3 total
Local Alarm Light

13. Inputs and outputs to control panel
Inputs from wetwell Intrinsically Safe Isolation
High float
Low float
Level transmitter
Seal Leak from each pump
Motor Over Temperature from each pump
Flood alarm float in flow meter pit
From the VFDs (2each)
Run status
Fault alarm
Speed feedback
Amps feedback

14. Outputs

To VFDs (2each)

Start

Analog Speed control

Preset speed for backup system (digital)

Local alarm light

15.Control Panel - Will have a bypass relay to bypass the UPS on a UPS failure.

A. PLC and OIT

1. PLC processor will be Allen Bradley Micrologix 1400 model 1766-L32BWA or approved equal.

2. OIT display will be a minimum of 10 inch C-more EA9-T10WCL or approved equal.

B. SCADA

1. Existing GE iFix SCADA Software

2. All trending will be done on the SCADA. All Trends will added to the existing trending format

3. Alarms will sent from the SCADA using the existing WIN-911 software. All alarms will have an enable disable capability on the OIT and SCADA that will be enabled and disabled from both locations.

4. Reports will be done on the SCADA using existing XLReporter software.

C. Power Supplies:

1. All electrically powered equipment and devices shall be suitable for operation on 115 volt +10 percent, 60 Hz +2 Hz power. If a different voltage or closer regulation is required, a suitable regulator or transformer shall be provided.

2. Appropriate power supplies shall be furnished by Contractor for all two wire transmitters, loops for monitoring discrete inputs and all necessary outputs. Power supplies shall be mounted in enclosures and installed in the appropriate control room or field panel.

3. Design all power supplies for a minimum of 130 percent of the maximum simultaneous current draw.

4. Furnish a power on-off switch or an air circuit breaker for each item requiring electrical power.

5. Provide isolation transformers, line voltage regulators and power distribution panels for the distributed digital portions of the SCADA system to eliminate electrical noise and/or transients entering on the primary power line.

D. Signal Requirements:

1. The control system shall be designed to use 4 to 20 mADC analog signals, unless otherwise specified.

2. Provide signal converters and repeaters where required. Analog inputs to the distributed control system shall be through appropriate repeaters to provide signal isolation where series looped with other devices and to allow the loop to maintain integrity even if the SCADA system is out of service. Power supplies shall be sized adequately for signal converter and repeater loads.

3. Signals shall be isolated from ground.

4. Signals shall not have a transient DC voltage exceeding 300 volts over one millisecond nor a DC component over 300 volts.
5. The system and associated input/output wiring will be used in a plant environment where there can be high energy AC fields, DC control pulses, and varying ground potentials between the sensors/transducers or input contact locations and the system components. The system design shall be adequate to provide proper protection against interferences from all such possible situations.
6. All panels are to provide separate grounding terminals for signal ground and signal shields.
7. All field dry contacts (sourced by 120 VAC from each PLC control cabinet) shall not be neutral switched.
8. Remotely powered 120 VAC field signaling shall be isolated via an interposing 120VAC relay within the PLC control cabinet.
9. All Analog signals leaving the building will have surge protection.

B. Miscellaneous:

1. All instrumentation and SCADA System components shall be heavy-duty types, designed for continuous service in a municipal water utility environment. The system shall contain products of a single manufacturer, when possible, and consist of equipment models that are currently in production. All equipment provided shall be of modular construction and be capable of field expansion through the installation of plug-in circuit cards and additional cabinets as necessary. Design all logic and control loops to fail-safe.
2. All instrumentation and SCADA System components shall be designed to return automatically to accurate measurement within 60 seconds upon restoration of power after a power failure or when transferred to standby power supply or within limit stated by equipment manufacturer.
3. Surge protection shall be provided for all instruments and all other SCADA System components that could be damaged by electrical surges.
4. All field-mounted instruments and SCADA System components shall be designed for installation in humid and corrosive service conditions. All field mounted instrument enclosures, junction boxes and appurtenances shall conform to NEMA 4X requirements, unless otherwise specified.
5. All relays with interconnections to field devices shall be wired through terminal blocks. Terminals as part of the relay base are not an acceptable alternate.
6. All panel mounted instruments, switches, and other devices shall be selected and arranged to present a pleasing coordinated appearance. All front of panel mounted devices shall be of the same manufacturer and model line.
7. All components furnished, including field and rear of panel instruments, shall be tagged with the item number and nomenclature as shown on the Contract Documents.
8. Ranges and scales specified herein shall be coordinated to suit equipment actually furnished.
9. Field-mounted devices shall be treated with an anti-fungus spray.
10. Field-mounted devices shall be protected from exposure to freezing temperatures.

C. Environmental Conditions:

1. The control system shall be designed and constructed for continuous operation under the following temperature and humidity conditions:

    a. Control Rooms:

        1) Ambient Temperature: 60ºF to 80ºF normal range; 40ºF to 105ºF occasional maximum extremes.
        2) Relative Humidity: 80 percent, normal; 95 percent maximum.

    b. Indoor locations for digital processing equipment hardware, control panels and instruments:

        1) Ambient Temperature: 40ºF to 120ºF.
        2) Relative Humidity: 98 percent maximum.

    c. Outdoor locations for instruments:

        1) Ambient Temperature: -10ºF to 120ºF.
        2) Relative Humidity: 100 percent maximum.

D. System Designs:

1. Range, scale and set point values specified in other applicable sections are for initial setting and configuration. Coordinate to these values with actual equipment furnished to implement proper and stable process action as systems are placed in operation.
2. For any items where ranges, scales and set points may not have been specified, CONTRACTOR shall submit a recommendation to ENGINEER for review.

PART 2 –PRODUCTS

2.1 POWER SUPPLIES

A. General: Single unit and multiple unit power supplies, located in control room panels, remote terminal units and field panels as required.

B. Single Unit Required Features:

1. Solid state circuitry.
2. DIN Rail mounting.
3. Input Power: 120 VAC ±10 percent, 60 Hz.
4. Output Power: 24 VDC or as required.

5. Line/Load Regulation: ±0.005 percent.
6. Ripple: 0.25 mV RMS.
7. Polarity: Floating output.
8. Ambient Temperature: -4 degrees F to 160 degrees F
9. Response Time: <20µS.
10. Overload Protection: Internal preset.
11. Include mounting brackets, fuse, and mating connector for AC power plug.

C. Multiple Unit Required Features:

1. Solid state circuitry.
2. Standard 19-inch RETMA (EIA) rail mounting.
3. Input Power: 120 VAC ±10 percent, 60 Hz.
4. Output Power: 24 VDC or as required.
5. Polarity: Floating output.
6. Ambient Temperature: 14 degrees F to 160 degrees F
7. Response Time: <20µS.
8. Include over-voltage protection, output current limiting protection, provisions for paralleling power supplies and front panel mounted indicating fuses.
9. If the power supplies are connected in parallel, provide isolation diodes in series with the positive lead of each of the parallel connected power supplies.
10. Connections:

    a. Twist-lock AC power connector.
    b. DC power terminal strip.

D. Products and Manufacturers:
Provide Sola / Hevi-Duty or equal.

2.2 UNINTERRUPTIBLE POWER SYSTEM

A. Uninterruptible Power System (UPS) shall be furnished to provide a reliable source of uninterruptible power with no break in AC output power during a complete or partial interruption of incoming line power. UPS shall include audio/visual alarms. UPS shall be UL listed.

B. Rating: 120 VAC, 60 Hz, 1.4KVA/1.0KW minimum to provide uninterrupted conditioned power, fully loaded conditions for 4 hours minimum.

C. Description: On line dual track power conditioner and true (0 ms transfer time) uninterruptible power supply providing isolation, line regulation and conditioning, using sealed 48 VDC maintenance free batteries and switch mode power supply for uninterrupted power with 0.5 to 0.7 power factor and 2.7 to 3.5 crest factor.

D. Required Features:

1. Lighting and Surge Protection: Inherent 2000: One spike attenuation.
2. Regulation: One to three percent load regulation with less than 2pF effective coupling capacitance for line to load.
3. Output Waveform: Computer grade sine wave with three percent maximum single harmonic and five percent maximum total harmonic distortion.
4. Output Frequency: 60 Hz ±0.5 Hz.
5. Operating Temperature: 34 degrees F to 104 degrees F.
6. Relative Humidity: Five to 90 percent non-condensing.
7. Computer Interface: RS232 port for display of 22 meter functions and 15 alarm functions.
8. Input Protection: Independent battery charger fuse and DC fuses.
9. Output Protection: Inherently current limited ferro-resonant transformer.
10. Battery Charger: Two-step charger, 8 A and 2 A.
11. AC Input: 120 VAC, 60Hz, single phase, +15 percent, -20 percent.
12. AC Output: 120 VAC, 60Hz, single phase, +3 percent, -3 percent.

E. Products and Manufacturers: Provide Liebert or approved equal.

PART 3 –EXECUTION

3.1 INSTALLATION

A. Install each item in accordance with manufacturers' recommendations and in accordance with the Contract Documents.

B. All items shall be mounted and anchored in accordance with the manufacturer's recommendations.

3.2 START-UP, CALIBRATION, TESTING AND TRAINING

A. Provide complete start-up, calibration, and testing and for systems and equipment provided under this section.

B. Provide four (4) hours of on-site training after acceptance of the system for operator training, control and monitoring modifications, and report generation assistance.

End of Section