

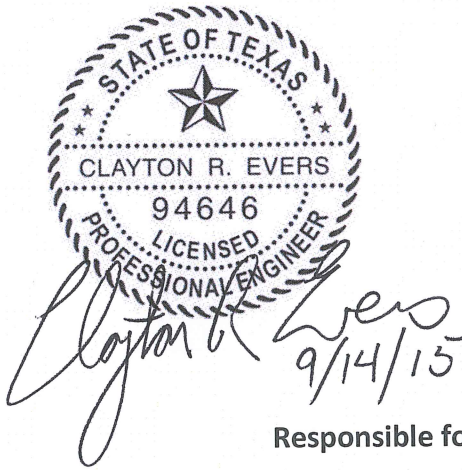


CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS FOR

Primary Clarifier No. 1 Rehabilitation
Project Number WW15-004

VOLUME 1 OF 2

This document was prepared under the direction of and is released for bidding purposes under the authority of:



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City Engineer



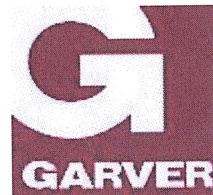
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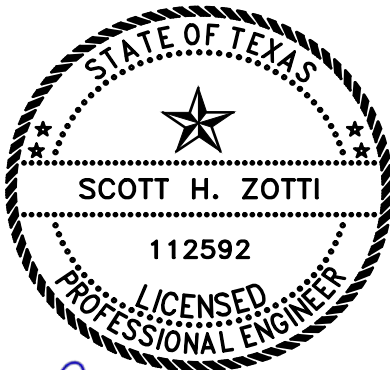
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ADVERTISEMENT FOR BIDS

Sealed Bids for the PRIMARY CLARIFIER NO. 1 REHABILITATION (WW15-004) will be received, by the City of Kilgore, at Kilgore City Hall, 815 N. Kilgore St. Kilgore, TX 75662, until 2:00 PM on Tuesday, October 6, 2015 at which time the bids will be publicly opened and read aloud in the City Council Chambers of Kilgore City Hall.

A mandatory pre-bid conference will be held on September 22, 2015 at 10 AM at the Issuing Office.

The Project consists of:

Rehabilitation of an existing 55 foot diameter primary clarifier located at the City of Kilgore Wastewater Treatment Plant. The rehabilitation consists of removal and disposal of existing mechanical equipment, cleaning, preparing, and repairing of concrete surfaces, and installation of new clarifier mechanisms and associated equipment and appurtenances.

Bids will be received for a single prime Contract. Bids shall be on a lump sum basis, as indicated in the Bid Form.

The Issuing Office for the Bidding Documents is: City of Kilgore, 815 N. Kilgore St. Kilgore, TX 75662. Requests for clarification may be directed to Clay Evers, City Engineer, at (903) 988-4118 or clay.evers@cityofkilgore.com.

Prospective Bidders may examine at no cost the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 8 AM and 5 PM. Bidding Documents may be downloaded online without charge from the City's website at www.cityofkilgore.com and www.ciplist.com. Notification of any revisions to the bid documents will be issued through www.ciplist.com.

The cost of Bidding Documents from the Issuing Office is \$50.00 for a printed set and \$10.00 for an electronic form on compact disc. Cost of Bidding Documents and shipping is non-refundable. Upon Issuing Office's receipt of payment, Bidding Documents will be sent via the prospective Bidder's delivery method of choice. 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 the Bidding Documents will not be available from the Issuing Office.

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.

Successful Bidder will be required to furnish Performance and Payment Bonds and proof of insurance, complying with the General Conditions of the Agreement.

Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Bids will remain subject to acceptance for 60 days after the Bid opening.

Owner: City of Kilgore

By: Deborah Dane

Title: City Clerk

Date: September 12 and September 19, 2015

+ + END OF ADVERTISEMENT FOR BIDS + +

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ARTICLE 1 – DEFINED TERMS

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

A. *Issuing Office* – The office from which the Bidding Documents are to be issued.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement for bids.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, Bidder shall submit with its Bid the Statement of Qualifications as found in Section 00 45 13.

3.02 The criteria which will be used to determine the lowest responsive and responsible Bidder are as follows:

A. Responsive Bidder: Means a Bidder who has submitted a Bid which conforms in all material respects to the Bidding Documents.

B. Responsible Bidder: Means a Bidder who has the capacity and capability in all respects to perform fully the contract requirements and who has the integrity and reliability to assure good faith performance. Among factors to be considered in determining whether the Bidder meets these standards, are:

1. Financial, material, equipment, facility, and personnel resources and expertise necessary to meet contractual requirements;
2. A record of integrity;
3. A record of Successful Completion defined as: completion of a project within a reasonable time and budget;
4. Qualified legally to contract with the Owner, and;
5. Has not failed to supply any necessary information in connection with the inquiry concerning responsibility.

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

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

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

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

4.01 *Site and Other Areas*

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

4.02 *Existing Site Conditions*

- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
1. The Supplementary Conditions identify:
 - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
 - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
 3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract

Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site. Appointments for site visits shall be made by contacting the Issuing Office.
- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

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.

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 mandatory pre-bid conference will be held on September 22nd, 2015 at 10 AM at the Issuing Office.

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.
- 7.03 In the event of a conflict between the plans and specifications, the specifications shall govern.

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 the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain 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, and those “or-equal” or substitute or 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. 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.
- 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.

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 The 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 portions of the 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, without an increase in Bid price.
- 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 not 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.

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 limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 13.04 A Bid by an individual shall show the Bidder’s name and official address.
- 13.05 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.06 All names shall be printed in ink below the signatures.
- 13.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.08 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

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

ARTICLE 14 – BASIS OF BID

14.01 Lump Sum

- A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

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 City of Kilgore, Attn: Deborah Dane, City Clerk, 815 N. Kilgore Street, Kilgore, Texas 75662.
- 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. Said taxes shall not be included in the Bid. Refer to Paragraph SC-7.09 of the Supplementary Conditions for additional information.

**CITY OF KILGORE
PRIMARY CLARIFIER NO. 1 REHABILITATION (WW15-004)**

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

CITY OF KILGORE
ATTN: DEBORAH DANE, CITY CLERK
815 N. KILGORE ST.
KILGORE, TEXAS 75662

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.

2.02 In submitting this Bid, Bidder certifies Bidder is qualified to do business in the State of Texas, as required by laws, rules and regulations or, if allowed by statute, covenants to obtain such qualification prior to contract award.

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:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

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 reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions.

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 anything of value likely to influence the action of a public official in the bidding process;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

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

ARTICLE 5 – BASIS OF BID

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

Base Bid Item No.	Bid Qty	Description (Bidder to write Bid Price in words)	Bid Price
1	1 LS	All Work as defined in the Contract Documents, including bonds and mobilization, for the lump sum of: _____ _____	\$
Total Base Bid Price			\$

Total of Lump Sum Bid = Total Base Bid Price (Bidder to write price in figures and words)

\$

- 5.02 Bidder acknowledges that (1) each lump sum 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.
- 5.03 Bidder accepts the Measurement and Basis of Payment provisions of Paragraph 1.08 of Section 01 29 00: Payment Procedures.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete within 150 calendar days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 180 calendar days after the date when the Contract Times commence to run.
- 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. 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;
- E. Required Bidder Qualification Statement with supporting data.
- F. Vendor Compliance to State Law
- G. Contractor Compliance to Texas Sales Tax Code

ARTICLE 8 – DEFINED TERMS

8.01 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 – VENUE

9.01 Bidder agrees that venue shall lie exclusively in Gregg County, Texas, in which the Owner is located, for any legal action.

ARTICLE 10 – 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)

00 43 13 BID BOND

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

BIDDER (*Name and Address*):

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

OWNER (*Name and Address*):

City of Kilgore
815 N. Kilgore St.
Kilgore, TX 75662

BID

Bid Due Date:

Description (*Project Name— Include Location*):

BOND

Bond Number:

Date:

Penal sum _____ \$ _____
(Words) (Figures)

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

BIDDER

SURETY

Bidder's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

Note: 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.

THE INFORMATION SUPPLIED IN THIS DOCUMENT IS CONFIDENTIAL TO THE EXTENT PERMITTED BY
LAWS AND REGULATIONS

1. SUBMITTED BY:

Official Name of Firm:

Address:

2. SUBMITTED TO:

3. SUBMITTED FOR:

Owner:

Project Name:

TYPE OF WORK:

4. CONTRACTOR'S CONTACT INFORMATION

Contact Person:

Title:

Phone:

Email:

5. AFFILIATED COMPANIES:

Name:

Address:

6. TYPE OF ORGANIZATION:

☐ SOLE PROPRIETORSHIP

Name of Owner: _____

Doing Business As: _____

Date of Organization: _____

☐ PARTNERSHIP

Date of Organization: _____

Type of Partnership: _____

Name of General Partner(s): _____

☐ CORPORATION

State of Organization: _____

Date of Organization: _____

Executive Officers:

- President: _____

- Vice President(s): _____

- Treasurer: _____

- Secretary: _____

☐ LIMITED LIABILITY COMPANY

State of Organization:

Date of Organization:

Members:

☐ JOINT VENTURE

Sate of Organization:

Date of Organization:

Form of Organization:

Joint Venture Managing Partner

- Name:

- Address:

Joint Venture Managing Partner

- Name:

- Address:

Joint Venture Managing Partner

- Name:

- Address:

7. LICENSING

Jurisdiction: _____

Type of License: _____

License Number: _____

Jurisdiction: _____

Type of License: _____

License Number: _____

8. CERTIFICATIONS

CERTIFIED BY:

Disadvantage Business Enterprise: _____

Minority Business Enterprise: _____

Woman Owned Enterprise: _____

Small Business Enterprise: _____

Other (_____): _____

9. BONDING INFORMATION

Bonding Company: _____

Address: _____

Bonding Agent: _____

Address: _____

Contact Name: _____

Phone: _____

Aggregate Bonding Capacity: _____

Available Bonding Capacity as of date of this submittal: _____

10. FINANCIAL INFORMATION

Financial Institution: _____

Address: _____

Account Manager: _____

Phone: _____

INCLUDE AS AN ATTACHMENT AN AUDITED BALANCE SHEET FOR EACH OF THE
LAST 3 YEARS

11. CONSTRUCTION EXPERIENCE:

Current Experience:

List on **Schedule A** all uncompleted projects currently under contract (If Joint Venture list each participant's projects separately).

Previous Experience:

List on **Schedule B** all similar projects completed within the last 5 Years (If Joint Venture list each participant's projects separately).

Has firm listed in Section 1 ever failed to complete a construction contract awarded to it?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Has any Corporate Officer, Partner, Joint Venture participant or Proprietor ever failed to complete a construction contract awarded to them in their name or when acting as a principal of another entity?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

Are there any judgments, claims, disputes or litigation pending or outstanding involving the firm listed in Section 1 or any of its officers (or any of its partners if a partnership or any of the individual entities if a joint venture)?

☐ YES ☐ NO

If YES, attach as an Attachment details including Project Owner's contact information.

12. SAFETY PROGRAM:

Name of Contractor's Safety Officer: _____

Include the following as attachments:

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) OSHA No. 500- Log & Summary of Occupational Injuries & Illnesses for the past 5 years.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all OSHA Citations & Notifications of Penalty (monetary or other) received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide as an Attachment Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) list of all safety citations or violations under any state all received within the last 5 years (indicate disposition as applicable) - IF NONE SO STATE.

Provide the following for the firm listed in Section 1 (and for each proposed Subcontractor furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) the following (attach additional sheets as necessary):

Workers' compensation Experience Modification Rate (EMR) for the last 5 years:

YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____
YEAR	_____	EMR	_____

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT:

List on **Schedule C** all pieces of major equipment available for use on Owner's Project.

I HEREBY CERTIFY THAT THE INFORMATION SUBMITTED HERewith, INCLUDING ANY ATTACHMENTS, IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

NAME OF ORGANIZATION: _____

BY: _____

TITLE: _____

DATED: _____

NOTARY ATTEST:

SUBSCRIBED AND SWORN TO BEFORE ME

THIS _____ DAY OF _____, 20____

NOTARY PUBLIC - STATE OF _____

MY COMMISSION EXPIRES: _____

REQUIRED ATTACHMENTS

1. Schedule A (Current Experience).
2. Schedule B (Previous Experience).
3. Schedule C (Major Equipment).
4. Audited balance sheet for each of the last 3 years for firm named in Section 1.
5. Evidence of authority for individuals listed in Section 7 to bind organization to an agreement.
6. Resumes of officers and key individuals (including Safety Officer) of firm named in Section 1.
7. Required safety program submittals listed in Section 13.
8. Additional items as pertinent.

SCHEDULE A

CURRENT EXPERIENCE

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE B

PREVIOUS EXPERIENCE (Include ALL Projects Completed within last 5 years)

Project Name	Owner's Contact Person	Design Engineer	Contract Date	Type of Work	Status	Cost of Work
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				
	Name: Address: Telephone:	Name: Company: Telephone:				

SCHEDULE C - LIST OF MAJOR EQUIPMENT AVAILABLE

[illegible]

00 45 46.01 VENDOR COMPLIANCE TO STATE LAW

Section 2252.002, Texas Government Code, provides that, in order to be awarded a contract as low bidder, non-resident bidders (out-of-state contractors whose corporate offices or principal place of business are outside of the State of Texas) bid projects for construction, improvements, supplies or services in Texas at an amount lower than the lowest Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid a non-resident bidder in order to obtain a comparable contract in the State in which the non-resident's principal place of business is located. The appropriate blanks in Section A must be filled out by all out-of-state or non-resident bidders in order for your bid to meet specifications. The failure of out-of-state or non-resident contractors to do so will automatically disqualify that bidder.

Check the statement that is correct for Bidder.

- ☐ Non-resident vendors in _____(give state), our principal place of business, are required to be _____percent lower than resident bidders by state law. A copy of the statute is attached.
- ☐ Non-resident vendors in _____(give state), our principal place of business, are not required to underbid resident bidders.
- ☐ Our principal place of business or corporate office is in the State of Texas.

Bidder:

Company Name:	
By:	
Name:	
Title:	
Business Address:	
Phone:	
Fax:	
Email:	

END OF SECTION

AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT

THIS AGREEMENT is by and between the City of Kilgore ("Owner) and _____("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

The Work under this contract consists of the rehabilitation of a 55' diameter primary clarifier located at the City of Kilgore Wastewater Treatment Plant. The rehabilitation consists of removing and disposing all mechanical equipment, cleaning, preparing, and repairing concrete surfaces, and installation of new scraping mechanism and all associated equipment and appurtenances.

ARTICLE 2 – THE PROJECT

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

Primary Clarifier No. 1 Rehabilitation

ARTICLE 3 – ENGINEER

- 3.01 The Project has been designed by Garver, LLC. Owner assumes all responsibility for modifications, clarifications, interpretations, adjustments or changes made to the Construction Contract Documents.
- 3.02 The Public Works Department of the City of Kilgore and its designated personnel ("Engineer") have been assigned by the Owner 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 180 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 180 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 Three Hundred Dollars and No Cents (\$300.00) for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
 2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner Three Hundred Dollars and No Cents (\$300.00) 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. However, if the achieved substantial completion date falls after the specified final completion date, liquidated damages as specified in Completion of Remaining Work will immediately begin accruing from the date of substantial completion until final completion is achieved.

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. If the achieved substantial completion date falls after the specified final completion date, these costs will begin accruing immediately from the date of achieved substantial completion.

ARTICLE 5 – CONTRACT PRICE

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

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

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 1st 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. 95 percent of Work completed (with the balance being retainage); and
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions.

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 3 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 reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions.
- 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, if any, 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 (Section 00 52 13)
 - 2. Performance Bond (Section 00 61 13.13)

3. Payment Bond. (Section 00 61 13.16)
4. General Conditions. (Section 00 72 00)
5. Supplementary Conditions. (Section 00 73 00)
6. Specifications as listed in the table of contents of the Project Manual.
7. Drawings.
8. Attached Layouts, Maps, and Photographs.
9. Addenda.
10. Documentation submitted by Contractor prior to Notice of Award.
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 any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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:

_____ The City of Kilgore, Texas _____

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:

_____ 815 N. Kilgore St. _____

_____ Kilgore, TX 75662 _____

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.)

00 61 13.13 PERFORMANCE BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

City of Kilgore
815 N. Kilgore Street
Kilgore, TX 75662

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

SURETY

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

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

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

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:

00 61 13.16 PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

City of Kilgore
815 N. Kilgore Street
Kilgore, TX 75662

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 Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal

Surety's Name and Corporate Seal

By: _____
Signature

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

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

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:

Prepared by



Issued and Published Jointly by



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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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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. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
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.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental

Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond 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 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 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the 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, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 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 special 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.

00 73 00 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

- A. Add the following statement to paragraph 1.01.A.40:
 "Substantial completion shall still require the Contractor to complete the punch list items unless waived by Owner. "
- B. Add a new Paragraph 1.01.A.49:
 "49. Written Amendment – A written statement modifying the Contract Documents, signed by Owner and Contractor on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents."

SC-1.02 TERMINOLOGY

- A. Add a new Paragraph 1.02.B.2 as follows:
 "2. "At no additional cost to Owner", "With no extra compensation to Contractor", "At Contractor's own expense", or similar words mean that the Contractor will perform or provide specified Work and that all cost for performing the Work is included in the Contract Price. "
- B. Delete Paragraph 1.02.C and add the following:
 "C. Day
 - 1. A "calendar day" shall be a day of 24 hours measured from midnight to the next midnight, and is any day of the year, with no days being excluded.
 - 2. A "working day" shall be a day which permits construction of the principal units of the Work for a period of not less than 7 hours between 7:00 a.m. and 6:00 p.m. Working days do not include days on which weather or other conditions not under the control of the Contractor prevent Contractor from working the seven hours defining a working day. Working days do not include Saturdays, Sundays or any of the following holidays: New Year, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving and Christmas Eve and Christmas Day."
- C. Add new Paragraphs 1.02.E.5 and 1.02.E.6 as follows:
 "5. Specifications are written in modified brief style. Requirements apply to all Work of the same kind, class, and type even though the word "all" is not stated."

- “6. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words “furnish”, “install”, “provide”, or similar words include the meaning of the phrase “The Contractor shall...” before these words.”

ARTICLE 2: PRELIMINARY MATTERS

SC-2.03 BEFORE STARTING CONSTRUCTION

- A. Add the following to Paragraph 2.03.A:
 - a. “4. A preliminary schedule of payments showing projected cash flow.”
- B. Delete Paragraph 2.04.A and insert the following in lieu thereof:
 - a. “Before the Contract Times start to run, but after Notice to Proceed is given, a conference attended by 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 and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.”
- C. Add the following subparagraph to 2.05.A:
 - a. “Contractor’s schedule of payments will be acceptable if it provides a reasonable projection of payments in relationship to the progress schedule and schedule of values.”
- D. Add a new paragraph immediately after Paragraph 2.05.A.3:
 - “B. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to the Engineer any conflict, error, ambiguity or discrepancy which the Contractor may discover and shall obtain a written interpretation from the Engineer before proceeding with any Work affected thereby. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Award of the Contract, the Contractor shall be deemed to have included the most expensive item in their Bid.”

ARTICLE 3: DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.01 INTENT

- A. Add the following to Paragraph 3.01.A:

“Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials or equipment required for a complete and functional system even if they are not detailed or specified.

 - 1. The Contract requirements described in the General Conditions, Supplementary Conditions and General Requirements apply to each and all Sections of the Specifications unless specifically noted otherwise.

2. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing Work among Subcontractors, or to establish the extent of Work to be performed by any trade, Subcontractor or Supplier. Specifications or details do not need to be indicated or specified in each specification or drawing. Items shown in the Contract Documents are applicable regardless of location in the Contract Documents.
 3. Standard paragraph titles and other identifications of subject matter in the Specifications are intended to aid in locating and recognizing various requirements of the Specifications. Titles do not define, limit, or otherwise restrict specification text.”
- B. Add new Paragraphs 3.01.F through 3.01.H as follows:
- “F. Comply with the most stringent requirements where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.
 1. Quantity or quality level shown or indicated shall be the minimum to be provided or performed in every instance.
 2. Actual installation must meet or exceed the minimum quality indicated.
 3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.
 4. Refer instances of uncertainty to the Engineer for a decision before proceeding.”
 - “G. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the Project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the Drawings but are not included in the Specifications.”
 - “H. The Contract Documents comprise the entire Agreement between Owner and Contractor. The Contract Documents may be modified only by Field Order, Change Order or Written Amendment.”

SC-3.02 REFERENCE STANDARDS

- A. Add a new Paragraph 3.02.B as follows:
- “B. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than these referenced standards.
 1. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.
 2. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the Work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.
 3. Make copies of reference standards available as requested by Engineer or Owner.”

SC-3.03 REPORTING AND RESOLVING DISCREPANCIES

- A. Delete Paragraph 3.03.A.3 entirely and insert the following in its place:

“3. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Bidding of the Contract, the Contractor shall be deemed to have included the most expensive item, system, procedure, etc. in his Bid.”

SC-3.05 REUSE OF DOCUMENTS

- A. Delete the last sentence of Paragraph 3.05.B entirely and insert the following in its place:

“B. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes, unless specifically prohibited in writing by the Owner for security reasons. If the Owner so directs, Contractor shall surrender all copies of the construction Contract Documents and other related documents, in paper or digital format and remove these documents from computer equipment or storage devices as a condition of final payment.”

ARTICLE 4: COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.05 DELAYS IN CONTRACTOR’S PROGRESS

- A. Add the following to Paragraph 4.05.C.2:

“Adjustments of Contract Times for weather will not be allowed when Contract Times are set forth as calendar days. Abnormal weather conditions will be considered in the event of hurricanes and tornadoes.”

- B. Add the following to Paragraph 4.05:

“H. The Contractor agrees to make no claims for damage for delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Owner’s or Engineer’s agents, and agrees that any such claim shall be fully compensated by an extension of time, as set forth in a Change Order, to complete performance of the Work as provided herein.

I. If, in the opinion of Engineer, Contractor falls behind the accepted Construction Schedule due to actions or neglect of Contractor or Contractor’s agents, servants, employees, officers, subcontractors, directors, or any party contracting to perform part or all of the Work or to supply any equipment or materials, Contractor shall take steps, including, but not limited to, increasing the number of personnel, shifts, and/or overtime operations, days of work, and/or amount of construction equipment until such time as the Work is back on schedule. Contractor shall also submit for review not later than the time of submittal of the next request for partial payment, such supplementary schedule or schedules as may be necessary to demonstrate the manner in which the acceptable rate of progress will be regained, all without additional cost to Owner.”

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

SC-5.01 AVAILABILITY OF LANDS

- A. Add the following to Paragraph 5.01.C:

“A copy of the written agreements for the use of such land shall be provided to the Owner for record purposes.”

SC-5.03 SUBSURFACE AND PHYSICAL CONDITIONS

- A. Add the following new paragraphs immediately after Paragraph 5.03.B:

“C. The following drawings of physical conditions relating to existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities) are known to Owner:

1. City of Kilgore Wastewater Treatment Plant Improvements dated April 3, 1984 as prepared by Kindle Stone & Associates.
2. The Dorr Clarifier Sheet No. 28040 dated January 18, 1951 as prepared by The Dorr Company
3. 55-0 Primary Clarifier Drawing No. 1138-E dated January 10, 1950 as prepared by The Lofland Company.
 - a. None of the contents of such drawings is Technical Data on whose accuracy Contractor may rely.

D. Contractor may examine copies of drawings identified in SC 5.03.C that were not included with the Bidding Documents at Kilgore City Hall, 815 N. Kilgore St., Kilgore, TX 75662 during regular business hours, or may request copies from the Engineer.

SC-5.04 DIFFERING SUBSURFACE OR PHYSICAL CONDITIONS

- A. Amend Paragraph 5.04.A by deleting “promptly” and inserting “promptly but no later than within 24 hours.”

SC-5.05 UNDERGROUND FACILITIES

- A. Amend Paragraph 5.05.B by deleting “promptly” and inserting “promptly but no later than within 24 hours.”

SC-5.06 HAZARDOUS ENVIRONMENTAL CONDITIONS AT SITE

- A. 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

A. 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.”

B. Delete Paragraph 6.02.D entirely.

C. Add the following new paragraph immediately after Paragraph 6.02.J:

“K. Owner shall not be responsible for purchasing and maintaining any insurance to protect the interest of the Contractor, Subcontractors, or others in the Work. The stated limits of insurance required are minimum only. Contractor shall determine the limits that are adequate. These limits may be basic policy limits or any combination of basic limits and umbrella limits. In any event, Contractor is fully responsible for all losses arising out of, resulting from or connected with operations under this Contract whether or not said losses are covered by insurance. The acceptance of certificates or other evidence of insurance by the Owner, Engineer, and/or others listed as additional insured that in any respect do not comply with the Contract requirements does not release the Contractor from compliance herewith.”

SC-6.03 CONTRACTOR’S INSURANCE

A. Add the following subparagraphs to Paragraph 6.03.I:

- a. “6. Contain a cross liability or severability of interest clause or endorsement. Insurance covering the specified additional insureds shall be primary insurance, and all other insurance carried by the additional insureds shall be excess insurance; and
7. With respect to workers’ compensation and employer’s liability, comprehensive automobile liability, commercial general liability, and umbrella liability insurance, Contractor shall require Contractor’s insurance carriers to waive all rights of subrogation against Owner, Engineer, Engineer’s Consultants, and their respective officers, directors, partners, employees, and agents.”

B. 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:

Workers' Compensation, etc.,	
State	Statutory
Applicable Federal (e.g., Longshore)	Statutory
Employers' Liability	
Bodily Injury by Accident	\$500,000
Bodily Injury by Disease - Each Employee	\$500,000
Bodily Injury by Disease - Policy Limit	\$500,000
Insurance shall include a waiver of subrogation in favor of the Additional Insured identified in these Supplementary Conditions.	

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03C of the General Conditions:

Commercial General Liability	
Each Occurrence	\$300,000
Fire Damage	\$100,000
Personal and Advertising Injury	\$600,000
General Aggregate	\$600,000
Products/Completed Operations	\$300,000
Explosion, Collapse, Underground	\$300,000
Note: For contracts that do not require Excess or Umbrella Insurance, the aggregate limits under Commercial General Liability shall be maintained fully available for this Contract by obtaining and maintaining a Designated Construction Project General Aggregate Limit endorsement, or equivalent.	

- a. Contractor's Liability Insurance shall also include completed operations and product liability coverage, and eliminate the exclusion with respect to property under the care, custody and control of Contractor. In lieu of elimination of the exclusion, Contractor may provide and maintain Installation Floater insurance for property under the care, custody, or control of Contractor. The Installation Floater insurance shall be a broad form or "All Peril" policy providing coverage for all materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work.
- Coverage under the Contractors Installation Floater will include:
- i. Faulty or defective workmanship, materials, maintenance or construction.
 - ii. Cost to remove defective or damaged Work from the Site or to protect it from loss or damage.
 - iii. Cost to cleanup and remove pollutants.
 - iv. Coverage for testing and startup.
 - v. Any loss to property while in transit.
 - vi. Any loss at the Site.
 - vii. Any loss while in storage, both on-site and off-site.

- viii. Any loss to temporary project works if their value is included in the Contract Price.
 - b. Coverage cannot be contingent on an external cause or risk or limited to property for which the Contractor is legally liable. Contractor's Installation Floater will provide limits of insurance adequate to cover the value of the installation. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation for those listed as additional insured in these Supplemental Conditions.
3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury	
Combined Single Limit (Bodily Injury and Property Damage)	\$300,000

4. Excess or Umbrella Liability:
Excess or Umbrella Liability is not required for contract values less than \$1,000,000.
5. Contractor's Pollution Liability
Pollution Liability is not required for this contract.
6. Contractor's Professional Liability:

Contractor's Contractual Liability Insurance	
Each Claim	\$1,000,000
Annual Aggregate	\$1,000,000
Note: Coverage must be maintained at least two (2) years after final completion.	

7. Owner and Garver, LLC shall be included as an insured under the CGL, (using ISO Additional Insured Endorsement CG 20 10 11 85 or a substitute providing equivalent coverage), and under the commercial automobile liability (using ISO Additional Insured Endorsement CA 2048 or a substitute providing equivalent coverage), and commercial umbrella, if any. This insurance, including insurance provided under the commercial umbrella, if any, shall apply as primary and non-contributory insurance with respect to any other insurance or self-insurance programs afforded to, or maintained by, Owner.

SC-6.04 OWNER'S LIABILITY INSURANCE

- A. Delete Paragraph 6.04.A entirely and insert the following in its place:
- "A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Contractor shall purchase and maintain for Owner, at no additional cost, Owner's Protective Liability insurance naming Owner as the named insured with insurance that will protect said parties against claims which may arise from operations under the Contract Documents. This coverage shall be from the same company that provides Contractor's liability insurance coverage, and in the same minimum amounts. The Engineer and Engineer's consultants are additional insured

as their interest may appear including their officers, directors, agents and employees.”

SC-6.06 WAIVER OF RIGHTS

- A. Delete Paragraph 6.06.B entirely.

ARTICLE 7: CONTRACTOR’S RESPONSIBILITIES

SC-7.03 SERVICES, MATERIALS, AND EQUIPMENT

- A. Add the following paragraphs immediately after Paragraph 7.03.C:

“D. Interfaces to Equipment, Instruments, and Other Components:

1. The drawings, specifications, and overall design are based on preliminary information furnished by various equipment manufacturers which identify a minimum scope of supply from the manufacturers. This information pertains to, but is not limited to, instruments, control devices, electrical equipment, packaged mechanical systems, and control equipment provided with mechanical systems.
 2. Provide all material and labor needed to install the actual equipment furnished, and include all costs to add any additional conduit, wiring, terminals, or other electrical hardwired to the work, which may be necessary to make a complete, functional installation based on the actual equipment furnished:
 - a. Make all changes necessary to meet the manufacturer’s wiring requirements.
 3. Submit all such changes and additions to the Engineer for acceptance in accordance with the General Conditions.
 4. Review the complete set of drawings and specifications in order to ensure that all items related to the electrical power and control systems are completely accounted for. Include any such items that appear on drawings or in specifications from another discipline in the scope of Work.
- E. Until Substantial Completion of the Work is acknowledged by Owner, Contractor shall have the responsible charge and care of the Work and of materials to be used herein, including materials for which Contractor has received partial payment or materials which have been furnished by Owner, and shall bear the risk of injury, loss, or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the Work.
- F. Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the Work or the materials occasioned by any cause before the Work’s completion and acceptance and shall bear the expense thereof. Where necessary to protect the Work or materials from damage, Contractor shall, at Contractor’s own expense, provide suitable drainage and erect such temporary structures or rent such structures as are necessary to protect the Work or materials from damage. The suspension of the Work or the granting of an extension of time from any cause whatever shall not relieve Contractor or Contractor’s responsibility for the Work and materials as specified herein.
- G. When the quality of a material, process, or article is not specifically set forth in the Contract Documents, the best available quality of the material, process, or article shall be provided.

H. Delivery and Inspection:

1. Deliver products in undamaged condition, in manufacturer's original container or packaging with identifying labels intact and legible. Include date of manufacture on label."

SC-7.04 "OR-EQUALS"

A. Delete Paragraph 7.04.A and insert the following in lieu thereof:

"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. If the specification or description contains the words, "or equal" or "or equal allowed", 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. Unless these words are specifically written in the description of such item, no substitution is allowed per this Contract. If the item's description is followed by words reading that "no like", "no equivalent", or "no or equal" item is permitted, then no substitution of like items or like manufacturers is allowed as part of this Contract.

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.

SC-7.05 "SUBSTITUTES"

A. Delete Paragraph 7.05.A and insert the following in lieu thereof:

"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, "or equal" or "or equal allowed", or "or equal item is permitted", then no substitution of like items is permitted. If the item's

description includes the words “no substitution is permitted”, “no like”, “no equivalent”, or “no or equal” item is permitted, then no substitution of like items or like manufacturers is allowed as part of this Contract. If the words, “or equal is permitted”, “or equal”, or “like items are 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. 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. If the specification or description contains the words, "or equal" or "or equal allowed", 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. Unless these words are specifically written in the description of such item, no substitution is allowed per this Contract. If the item's description is followed by words reading that "no like", "no equivalent", or "no or equal" item is permitted, then no substitution of like items or like manufacturers is allowed as part of this Contract.

SC-7.09 TAXES

- A. Add a new paragraph immediately after Paragraph 7.09A:
 - "B. Owner is exempt from payment of sales and compensating use taxes of the State of Texas and of cities and counties thereof on all materials to be incorporated into the Work.
 - 1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.
 - 2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies and materials not incorporated into the Work."

SC-7.10 LAWS AND REGULATIONS

- A. Delete the last sentence of Paragraph 7.10.B.

SC-7.11 RECORD DOCUMENTS

- A. Add the following to the section:
 - "B. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final."

SC-7.15 EMERGENCIES

- A. Amend Paragraph 7.15.A by deleting the last sentence and inserting the following in its

place:

"If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the Contractor and that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order, Field Order or Work Change Directive will be issued."

SC-7.18 INDEMNIFICATION

- A. Delete Paragraph 7.18.C entirely.

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

SC-11.07 EXECUTION OF CHANGE ORDERS

- A. Add a new Paragraph 11.07.C as follows:

"C. Contractor assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents unless the variation is specifically approved by Change Order."

ARTICLE 13: COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.01 COST OF THE WORK

- A. Amend Paragraph 13.01.B by deleting the following words in the first sentence:

"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:"

and insert the following in its place:

"those paid for the Work included in the Contract Price, shall include only the following items, and shall not include any of the costs itemized in Paragraph 13.01.C. Contractor shall provide certified payroll records listing personnel classifications and salaries for all individuals involved in additional Work. Salaries for those not included in the certified payroll will be considered as being compensated under Paragraph 13.01.C, and shall include only the following items:"

- B. Amend Paragraph 13.01.B.1 by deleting the following words in the second sentence:

"without limitation superintendents, foreman"

and inserting the following in its place:

"one foreman (unless agreed upon prior to beginning Work)"

- C. Amend Paragraph 13.01.B.1 by deleting the following words in the last sentence: "be included in the above"

and inserting the following in its place:

"not exceed 1.5 times regular pay and shall be included in the above"

- D. Amend Paragraph 13.01.C.1 by adding "superintendents" to the list of excluded personnel in the first sentence.

- E. Amend Paragraph 13.01.E by inserting "and at intervals" in the last sentence as shown below:

“.....and submit in a form and at intervals acceptable to Engineer ...”

SC-13.03 UNIT PRICE WORK

A. Delete Paragraph 13.03.E in its entirety and insert the following in its place:

“E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the extended price of a particular item of Unit Price Work amounts to 10 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and
2. if there is no corresponding adjustment with respect to any other item of Work; and
3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.”

ARTICLE 15: PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.01 PROGRESS PAYMENTS

A. Amend Paragraph 15.01.D.1 by deleting “Ten” and inserting “Thirty” in its place.

B. Amend Paragraph 15.01.E.1 by adding new paragraphs “m”, “n”, “o”, and “p” as follows:

“m. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor;”

“n. failure to submit up-to-date record documents”

“o. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Engineer”

“p. failure to provide project photographs required by the Specifications.”

C. Amend Paragraph 15.01.E.2. by adding “to Owner’s satisfaction.” to the end of the second sentence.

D. Amend Paragraph 14.01.E.3 by deleting “and subject to interest as provided in the Agreement.”

E. Add a new Paragraph 14.01.E.4 as follows:

“4. Owner may permanently withhold payment from Contract Price for:

- a. Liquidated damages incurred by Contractor, or
- b. Compensation for Engineer for overtime charges of Resident Project Representative, third review of submittals, review of substitutions, re- inspection fees, inspections or designs related to correction of defective Work, or other

Services identified as requiring payment by the Contractor.

c. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made."

ARTICLE 16: SUSPENSION OF WORK AND TERMINATION

SC-16.02 OWNER MAY TERMINATE FOR CAUSE

A. Delete Paragraphs 16.02A through 16.02.D and insert the following in lieu thereof:

"A. If Contractor refuses or fails to prosecute the Work or any separable part thereof with such diligence as will ensure the completion of the Work within the Contract Times, or any extension thereof, or fails or refuses to complete such Work within such extension, or if Contractor should be adjudged bankrupt, or if Contractor should make assignment for the benefit of Contractor's creditors, or if Contractor files a petition to take advantage of any debtor's act, or if a receiver should be appointed on account of Contractor's insolvency, or if Contractor or any Subcontractor should violate any provision of the Contract, or if Contractor should persistently refuse or should fail to supply enough properly skilled workmen or proper materials to complete the Work in the time specified, or if Contractor should fail to make prompt payment to Subcontractors or for materials or labor, or if Contractor should disregard laws, ordinances, or instructions given by Owner, Engineer, or Owner's Operating Agent or disregard in any substantial way any provisions of the Contract Documents; Owner may without prejudice to any other right or remedy, serve written notice upon Contractor and Contractor's surety of Owner's intention to terminate the Contract. Such notice will contain the reasons for Owner's intention to terminate the Contract and unless such violations shall cease and satisfactory arrangements for the corrections thereof have been accepted by Owner in writing within 10 days after the service of such notice, the Contract shall upon the expiration of said 10 days cease and terminate. In the event of such termination, the Owner shall immediately serve written notice upon the Surety and Contractor, and Contractor shall be liable for all costs necessary to complete the Work.

B. The Surety shall, after receipt of notification from Owner of termination of the Contract, take over and perform the Work, utilizing a contractor which qualified under the prequalification criteria and which is acceptable to Engineer. The Surety shall, within 10 days after receipt of the notice of termination, provide Owner with written notice of Surety's intent to take over and complete the Work in accordance with the Contract Documents, and shall commence the Work within 10 days thereafter.

C. If the Surety does not reply to the notice of termination, or fails to perform the Work in compliance with the Contract Documents, or provides the Owner with written notice that Surety does not intend to take over and perform the Work to completion, Owner may without prejudice on the part of the Surety, take over the Work and prosecute the same to completion by any method Owner may deem advisable for the account at the expense of Contractor, and the Surety shall be liable to Owner for any excess cost or other damage occasioned Owner thereby. In such event Owner may, without liability for so doing, take possession of and utilize in completing the Work such materials, appliances, plant, and other property belonging to Contractor that may be on the work sites and be necessary therefor. Contractor shall turn over to Owner's Operating Agent all materials and equipment in Contractor's possession that is to be incorporated into the

Project, and shall make arrangements with Owner to turn over any materials or equipment in which Owner has made payment or partial payment but is not in Owner's possession.

D. Upon completion of the Work, if the unpaid balance of the Contract Price exceeds the direct and indirect cost of completing the Work, including, but not limited to, all costs incurred by Owner from professional services and attorneys' fees and all costs generated to insure or bond the Work of substituted contractors or subcontractors used to complete the Work, such excess shall be paid to Contractor. If such costs exceed the unpaid balance, Contractor shall pay the difference to Owner within 30 days upon demand; on failure of Contractor to pay, the Surety shall promptly pay the difference to Owner upon written notice of Contractor's failure of payment. Such difference or any portion thereof not paid by the Contractor or the Surety within the 30 days following the date of mailing of the demand for payment, shall earn interest at the rate of 10 percent per annum or the maximum rate authorized by state law, whichever is lower."

B. Delete Paragraph 16.02.G entirely.

SC-16.04 CONTRACTOR MAY STOP WORK OR TERMINATE

A. Add a new Paragraph 16.04.C as follows:

"C. This Contract may not be assigned in whole or in part by the Contractor without the previous written consent of the Owner."

ARTICLE 17: FINAL RESOLUTION OF DISPUTES

SC-17.02 METHODS AND PROCEDURES

A. Add the following new paragraph immediately after Paragraph 17.01.

"17.02 Arbitration

- A. All matters subject to final resolution under this Article will be decided by arbitration in accordance with Construction Industry Arbitration Rules and Mediation Procedures of the American Arbitration Association subject to the conditions and limitations of this paragraph. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations. The demand for arbitration should include specific reference to Paragraph SC-17.02.D below.
- C. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and
 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.
- D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.
 - E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
 - F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.”

ARTICLE 18: MISCELLANEOUS

- A. Add a new Paragraph 18.02.B as follows:
 - “B. All references and conditions for a “calendar day contract” in the General Conditions and Supplementary Conditions shall apply for a “Fixed Date Contract.” A “Fixed Date Contract” is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual calendar days involved.”
- B. Delete Paragraph 18.08 and replace with the following:

“18.08 Headings

The Article and paragraph headings in this Agreement are inserted for convenience only and do not constitute parts of these General Conditions or as a limitation of the scope of the particular section to which they refer. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either Party.”
- C. Add a new Paragraph 18.09 as follows:

“18.09 Independent Contractor

 - A. Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make commitments of any kind for the other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership or formal business organization of any kind.”
- D. Add a new Paragraph 18.10 as follows:

“18.10 Sovereign Immunity

 - A. The parties agree that the Owner has not waived its sovereign immunity by entering into and performing its obligations under this Agreement.”
- E. Add a new Paragraph 18.11 as follows:

“18.11 Severability

- A. If a court of competent jurisdiction renders any part of this Agreement invalid or unenforceable, that part will be severed and the remainder of this Agreement will continue in full force and effect.”

- F. Add a new Paragraph 18.12 as follows:

“18.12 No Third Party Beneficiaries

- A. Nothing in this Agreement shall be construed to create any right in any third party not a signatory to this Agreement, and the parties do not intend to create any third party beneficiaries by entering into this Agreement.”

END OF SECTION

DIVISION 1
GENERAL REQUIREMENTS

01 11 00 SUMMARY OF WORK

1.00 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS REQUIREMENTS INCLUDED

- A. This Section describes the project in general and provides an overview of the extent of the work to be performed. Detailed requirements and extent of work are stated in the applicable Specification sections and/or shown on the Drawings. The Contractor shall, except as otherwise specifically stated herein or in any applicable parts of these Contract Documents, provide and pay for all labor, materials, equipment, tools, construction equipment, and other facilities and services necessary for proper execution, testing, and completion of the Work.
- B. Any part or item of the work which is reasonably implied or normally required to make each installation satisfactorily and completely operable shall be performed by the Contractor and the expense thereof included in the applicable price bid for the item. All miscellaneous appurtenances and other items of work that are incidental to meeting the intent of the plans and these Specifications, are considered to be included in the applicable price bid for this project, even though these appurtenances and items may not be specifically called for in the Specifications or shown on the Drawings.
- C. Comply with all applicable state and local codes and regulations pertaining to the nature and character of the work being performed.
- D. The Work under this contract consists of the rehabilitation of a 55 foot diameter concrete primary clarifier. The rehabilitation consists of removal and disposal of existing clarifier grout and mechanical and electrical equipment, cleaning, preparing and repairing concrete surfaces, and installation of new clarifier equipment and associated equipment and appurtenances. Contractor shall provide all materials, tools, equipment, labor, superintendence, transportation, and incidentals necessary for the Work as indicated in the Contract Documents.
- E. The Project is located at the City of Kilgore Wastewater Treatment Plant at 2701 Angeline St., Kilgore, TX 75662.

1.02 RELATED REQUIREMENTS

- A. The General Conditions, the Supplementary Conditions, and Division 1 Specifications apply to each specification section.

1.03 CONTRACTS

- A. Construct the Work under a single unit-price or lump-sum contract, as shown on the Bid Form.

1.04 WORK BY OTHERS (NOT USED)

1.05 FUTURE WORK (NOT USED)

1.06 WORK SEQUENCE

- A. Construct the Work in stages to accommodate the Owner's use of the premises during the construction period; coordinate the construction schedule and operations with the Owner's Representative.

1.07 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit his use of the premises for Work and for storage, to allow for:
 - 1. Work by other Contractors.
 - 2. Owner occupancy.
 - 3. Public use.
- B. Coordinate use of premises under direction of Owner's representative.
- C. Assume full responsibility for the protection and safekeeping of Products under this Contract that are stored on the site.
- D. Move any stored Products under Contractor's control that interfere with operations of the Owner or separate contractor.
- E. Obtain and pay for the use of additional storage or work areas needed for operations.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION

3.01 ATTENTION TO WORK

- A. Contractor shall give personal attention to and shall supervise the Work to the end that it shall be prosecuted faithfully. When he/she is not personally on site, a competent superintendent or foreman who shall be the legal representative of the Contractor shall represent him.

3.02 ACCESS TO WORK

- A. The Contractor shall provide access for inspection of the Work by the Owner and/or official Governmental agencies.

END OF SECTION

01 26 00 CONTRACT MODIFICATION PROCEDURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Promptly implement Change Order procedures.
 - 1. Provide full written data required to evaluate changes.
 - 2. Maintain detailed records of work done on a time-and-material/force account basis.
 - 3. Provide full documentation to Engineer on request.
- B. Designate in writing the member of Contractor's organization:
 - 1. Person authorized to accept changes in the Work.
 - 2. Person responsible for informing others in the Contractor's employ of the authorization of changes in the Work.
- C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

- A. Agreement: The amounts of established unit prices.
- B. Conditions of the Contract:
 - 1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
 - 2. Contractor's claims for additional costs.
- C. Section 01 29 00: Payment Procedures.
- D. Section 01 78 39: Project Record Documents.
- E. Section 01 33 00: Submittal Procedures

1.03 DEFINITIONS

- A. Change Order: See General Conditions.
- B. Field Order: A written directive to make immediate changes that may or may not result in a change order.
- C. Work Change Directive: A written order, instructions, or interpretations, signed by Engineer making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.04 PRELIMINARY PROCEDURES

- A. Owner or Engineer may initiate changes by submitting a Proposal Contract Modification (PCM) to Contractor. Request will include:
 - 1. Detailed description of the Change, Products, and location of the change in the Project.
 - 2. Supplementary or revised Drawings and Specifications.
 - 3. The projected time span for making the change and a specific statement as to whether overtime work is, or is not, authorized.
 - 4. A specific period of time during which the requested price will be considered valid.
 - 5. Such request is for information only and is not an instruction to execute the changes or to stop Work in progress.
- B. Contractor may initiate changes by submitting a Contract Modification Request (CMR) to Engineer containing:
 - 1. Description of the proposed changes.
 - 2. Statement of the reason for making the changes.

3. Statement of the effect on the Contract Sum and the Contract Time.
4. Statement of the effect of the work of separate contractors.
5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.
- C. All proposals will be evaluated by the Engineer.
- D. The Contractor may be informed that the proposed modifications are not approved and construction is to proceed in accordance with the Contract Documents.

1.05 DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. Support each quotation for a lump sum proposal and for each unit price that has not previously been established with sufficient substantiating data to allow Engineer to evaluate the quotation.
- B. On request, provide additional data to support time and cost computations including but not limited to:
 1. Labor required.
 2. Equipment required.
 3. Products required.
 - a. Recommended source of purchase and unit cost.
 - b. Quantities required.
 4. Taxes, insurance, and bonds.
 5. Credit for work deleted from Contract, similarly documented.
 6. Overhead and profit.
 7. Justification for any change in Contract Time.
- C. Support each claim for additional costs and for work done on a time and material/force account basis with documentation as required for a lump-sum proposal, plus additional information.
 1. Name of the Owner's authorized agent who ordered the work and date of the order.
 2. Dates and times work was performed and by whom.
 3. Time record, summary of hours worked, and hourly rates paid.
 4. Receipts and invoices for:
 - a. Equipment used, listing dates and times of use.
 - b. Products used with list of quantities.
 - c. Subcontracts.

1.06 PREPARATION AND EXECUTION OF CHANGE ORDERS

- A. Engineer will prepare each Change Order, Field Order, or Work Change Directive per the Articles of the General Conditions.
- B. Form for Change Order: Engineers Joint Contract Documents Committee (ECJDC) Document C-941.
- C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.
- E. The Change Order will be sent to the Contractor for execution with a copy to the Owner recommending approval.
- F. Change Orders can only be approved by the Owner.

1. Work performed on the proposed contract modifications prior to approval of the Change Order will be performed at the Contractor's risk.
2. No payment will be made for work on Change orders until approved by the Owner.

1.07 LUMP SUM/FIXED PRICE CHANGE ORDER

- A. Content of Change Orders will be based on either:
 1. Engineer's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
 2. Contractor's Proposal for a change, as recommended by Engineer.
- B. Owner and Engineer will sign and date the Change Order as authorization for the Contractor to proceed with the changes.
- C. Contractor may sign and date the Change Order to indicate agreement with the terms therein.

1.08 UNIT PRICE CHANGE ORDER

- A. Content of Change Orders will be based on either:
 1. Engineer's definition of the scope of the required changes.
 2. Contractor's Proposal for a change, as recommended by Engineer.
 3. Survey of completed work.
- B. The amounts of the unit prices to shall be:
 1. Those stated in the Agreement.
 2. Those mutually agreed upon between Owner and Contractor.
- C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
 1. Owner and Engineer will sign and date the Change Order as authorization for Contractor to proceed with the changes.
 2. Contractor may sign and date the Change Order to indicate agreement with the terms therein.
- D. When quantities of the items cannot be determined prior to start of the work:
 1. Engineer or Owner will issue a construction change authorization directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.
 2. At completion of the change, Engineer will determine the cost of such work based on the unit prices and quantities used.
 - a. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
 3. Engineer will sign and date the Change Order to indicate his/her agreement with the terms therein.
 4. Owner and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.09 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Request for Payment forms to record each change as a separate item of Work and to record the adjusted Contract Sum.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Time.
- C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 29 00 PAYMENT PROCEDURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit Application for Payment to Engineer in accord with the schedule established by Conditions of the Contract and Agreement Between Owner and Contractor.

1.02 RELATED REQUIREMENTS

- A. Agreement Between Owner and Contractor.
- B. Conditions of the Contract: Progress Payments, Retainages, and Final Payment.
- C. Section 01 29 73: Schedule of Values.
- D. Section 01 77 00: Closeout Procedures.

1.03 FORMAT AND DATA REQUIRED

- A. Submit applications typed on EJCDC Document C-620, Contractor's Application for Payment, with itemized data typed on 8-1/2 x 11" white paper continuation sheets.
- B. Provide itemized data on continuation sheet
 - 1. Format, schedules, line items, and values: Those of the Schedule of Values accepted by Engineer.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form
 - 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - 2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
 - 3. Execute certification with signature of a responsible officer of Contract firm.
- B. Continuation Sheets
 - 1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
 - 2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - a. Round off values to nearest dollar, or as specified for Schedule of Values.
 - 3. List each Change Order executed prior to date of submission at the end of the continuation sheets.
 - a. List by Change Order Number and description, as for an original component item of work.

1.05 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information with a cover letter identifying:
 - 1. Project.
 - 2. Application number and date.
 - 3. Detailed list of enclosures.
 - 4. For stored products:
 - a. Item number and identification as shown on application.

- b. Description of specific material.
 - B. Submit one copy of data and cover letter for each copy of application.
- 1.06 PREPARATION OF APPLICATION FOR FINAL PAYMENT
- A. Fill in Application form as specified for progress payments.
 - B. Use continuation sheet to present the final statement of accounting as specified in Section 01 77 00: Closeout Procedures.
- 1.07 SUBMITTAL PROCEDURE
- A. Submit Application for Payment to Engineer at the times stipulated in the Agreement.
 - B. Number: Two hard copies and one digital of each Application.
 - C. When Engineer finds Application properly completed and correct, he will transmit certificate for payment to Owner with copy to Contractor.
- 1.08 NONPAYMENT FOR REJECTED OR UNUSED PRODUCTS
- A. Payment will not be made for following:
 - 1. Loading, hauling, and disposing of rejected material.
 - 2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
 - 3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
 - 4. Defective Work not accepted by Owner.
 - 5. Material remaining on hand after completion of Work.
- 1.09 MEASUREMENT AND BASIS OF PAYMENT
- A. No separate payment will be made for items not listed in this section. Prices are to include all costs, including overhead, profit, compliance with General Requirements and Technical Specifications and any and all incidentals required to complete the Project as specified in the Contract Documents and as shown on the Schedule of Values, and including the following:
 - 1. Mobilization shall be included in the base bid, and shown on the submitted Schedule of Values. Mobilization includes the work necessary to perform preparatory work and operations in mobilizing for beginning work on the project, including, but not limited to, those operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site and for the establishment of temporary offices, buildings, safety equipment and first aid supplies, and sanitary and other facilities necessary for the start of the work, excluding the cost of construction materials and any other preconstruction expense. Mobilization shall not exceed 5% of the total base bid in the submitted schedule of values.
 - 2. Bonds and Insurance shall be included in the base bid and shown on the submitted Schedule of Values. Bonds and Insurances includes the costs of acquiring, furnishing, and maintaining all required bonds and insurance for the durations specified in the Contract Documents.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 29 73 SCHEDULE OF VALUES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work within 10 days after award of contract.
- B. Upon request of Engineer, support the values with data that will substantiate their correctness.
- C. The Schedule of Values shall be used as the basis for the Contractor's Applications for Payment.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01 29 00: Payment Procedures.

1.03 FORMAT AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on 8-1/2 x 11" white paper. Engineer will consider contractor's standard forms and automated printout for approval upon Contractor's request. Identify schedule with:
 - 1. Title of Project and location.
 - 2. Engineer and Project number.
 - 3. Name and address of Contractor.
 - 4. Contract designation.
 - 5. Date of submission.
- B. For lump sum contracts and items:
 - 1. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
 - 2. Follow the Bid Proposal as the format for listing component items.
 - a. Identify each line item with the number and title of the respective major sections of the specifications.
 - b. Include separate line items for mobilization and bonds and insurance.
 - 3. For each major line item, list sub values of major products or operations under the item.
 - 4. For the various portions of the Work:
 - a. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - b. For items on which progress payments will be requested for stored materials, break down the value into:
 - 1) The cost of the materials, delivered and unloaded, with taxes paid.
 - 2) The total installed value.
 - c. Submit a subschedule for each separate stage of work specified in Section 01 11 00.
 - 5. The sum of all values listed in the schedule shall equal the total Contract Sum.
- C. For unit price contracts and items:
 - 1. Submit a subschedule of unit cost and quantities for:
 - a. Products on which progress payments will be requested for stored products.

2. The form of submittal shall parallel that of the Bid Proposal, with each item identified the same as the line item in the Proposal.
3. The unit quantity of bulk materials shall include an allowance for normal waste.
4. The unit values for the material shall be broken down into:
 - a. Cost of the material, delivered and unloaded at the site, with taxes paid.
 - b. Installation costs, including Contractor's overhead and profit.
5. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values and the Contract Sum.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 30 00 ADMINISTRATIVE REQUIREMENTS

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Administer contract requirements to construct the project. Provide documentation per the requirements of this Section. Provide information as requested by the Engineer or Owner concerning this project.

1.02 RELATED REQUIREMENTS

- A. Section 01 33 00: Submittal Procedures.

1.03 COMMUNICATION DURING THE PROJECT

- A. The Engineer is to be the first point of contact for all parties on matters concerning this project.
- B. The Engineer will coordinate correspondence concerning:
 - 1. Submittals, including requests for payment
 - 2. Clarification and interpretation of the Contract Documents
 - 3. Contract modifications
 - 4. Observation of work and testing
 - 5. Claims
- C. The Engineer will normally communicate only with the Contractor. Any required communication with suppliers or subcontractors will only be with the first involvement of the Contractor.
- D. Written communications are to be directed to the Engineer at the address indicated at the pre-construction Conference. Communications should include as a minimum:
 - 1. Name of the Owner
 - 2. Project name
 - 3. Contract title
 - 4. Project number
 - 5. Date
 - 6. A reference statement
- E. Submit communications on the forms referenced in this Section or in Section 01 33 00.

1.04 PROJECT MEETINGS

- A. Pre-construction Conference
 - 1. Attend a pre-construction meeting.
 - 2. The location of the conference will be determined by the Engineer.
 - 3. The time of the meeting will be determined by the Engineer, but will be after the Notice of Award is issued and not later than fifteen (15) days after the Notice to Proceed is issued.
 - 4. The Owner, Engineer, representative of utility companies, the Contractor's project manager and superintendent, and representatives from major subcontractors and suppliers may attend the meeting.
 - 5. Contractor should provide and be prepared to discuss:
 - a. Preliminary construction and submittal schedule per Section 01 32 26: Construction Progress Reporting.

- b. Schedule of values and anticipated schedule of payments per Section 01 29 73: Schedule of Values.
 - c. List of Suppliers and Subcontractors.
 - d. Contractor's organizational chart as it relates to this project.
 - e. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents, contract modifications and payment requests.
- B. Progress Meetings
 - 1. Attend meetings with the Engineer and Owner:
 - a. Meet on a monthly basis or as requested by the Engineer to discuss the project.
 - b. Meet at the project site or other location as designated by the Engineer.
 - c. Contractor's superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.
 - 2. Provide information as requested by the Engineer or Owner concerning this project.
 - a. Prepare to discuss:
 - 1) Status of overall project schedule.
 - 2) Contractor's detailed schedule for next month.
 - 3) Anticipated delivery dates for equipment
 - 4) Coordination with the Owner.
 - 5) Status of submittals.
 - 6) Information or clarification of the Contract Documents.
 - 7) Claims and proposed modifications to the contract
 - 8) Field observations, problems, or conflicts.
 - 9) Maintenance of quality standards.
 - b. Notify the Engineer of any specific items to be discussed a minimum of one (1) week prior to the meeting.
 - 3. Review minutes of meetings and notify the Engineer of any discrepancies within ten (10) days of the date of the memorandum.
 - a. Following the date, the minutes will stand as shown or as corrected.
 - b. Corrections will be reflected in the minutes of the following meeting.
 - c. Each issue is to be numbered to indicate the meeting number and the issue number. Issues discussed will be documented and old issues will remain on minutes of subsequent meetings until the issue is resolved.
- C. Pre-submittal and Pre-installation meetings
 - 1. Attend pre-submittal and pre-installation meetings as required in the individual technical specifications or as determined necessary by the Engineer (for example, instrumentation, roofing, concrete mix design, etc.).
 - 2. The location of the meeting will be determined by the Engineer.
 - 3. The time of the meeting will be determined by the Contractor when ready to proceed with the associated work, subject to submission of an NBC and acceptance by the Engineer and owner of the proposed time.
 - 4. The Owner, Engineer, the Contractor's project manager and superintendent, and representatives from affected subcontractors and suppliers shall attend the meeting.

1.05 REQUESTS FOR INFORMATION

- A. Submit Request for Information (RFI) to the Engineer to obtain additional information or clarification of the Contract Documents.

1. Submit a separate RFI for each item per Section 01 33 00: Submittal Procedures.
 2. Attach adequate information to permit a written response without further clarification. Engineer will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple submittals due to inadequate information.
 3. A response will be made when adequate information is provided.
- B. Response to an RFI is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents and does not modify the Contract Documents.

1.06 NOTIFICATION BY CONTRACTOR

- A. Notify the Engineer of:
1. Need for testing.
 2. Intent to work outside regular working hours.
 3. Request to shut down facilities or utilities.
 4. Proposed utility connections.
 5. Required observation by Engineer or inspection agencies prior to covering work.
 6. Training.
- B. Provide notification a minimum of two (2) weeks in advance in order to allow Owner and Engineer time to respond appropriately to the notification.
- C. All notifications shall be in writing.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Prepare and submit a progress schedule for the work and update the schedule on a monthly basis for the duration of the project.
- B. Provide schedule in adequate detail to allow Owner to monitor the work progress, to anticipate the time and amount of progress payments, and to relate submittal processing to sequential activities of the work.
- C. Incorporate and specifically designate the dates of anticipated submission of submittals and the dates when submittals must be returned to the Contractor into the schedule.
- D. Assume complete responsibility for maintaining the progress of the work per the schedule submitted.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract
- B. Section 01 11 00: Summary of Work
- C. Section 01 33 00: Submittal Procedures

1.03 FORM OF SCHEDULES

- A. Prepare schedules in the form of a horizontal bar chart.
 - 1. Provide separate horizontal bar for each trade or operation.
 - 2. Horizontal time scale: Identify the first workday of each week.
 - 3. Scale and spacing: Allow space for notations and future revisions.
- B. Format of listings: The chronological order of the start of each item of work.
- C. Identification of listings: By major specification section numbers.

1.04 CONTENT OF SCHEDULES

- A. Construction Progress Schedule: construction by activity.
 - 1. Show the dates for the beginning and completion of each major element of construction. Where applicable, specifically list:
 - a. Site clearing.
 - b. Site utilities.
 - c. Foundation work.
 - d. Structural framing.
 - e. Subcontractor work.
 - f. Equipment installations.
 - g. Finishings.
 - 2. Show projected percentage of completion for each item as of the first day of each month.
- B. Submittals Schedule for Shop Drawings, Product Data, and Samples. Show:
 - 1. The dates for Contractor's submittals.
 - 2. The dates approved submittals will be required from the Engineer.
- C. Prepare and submit subschedules for each separate stage of work specified in Section 01 11 00: Summary of Work or Bid Proposal.

D. Provide subschedules to define critical portions of prime schedules.

1.05 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
 - 1. Major changes in scope.
 - 2. Activities modified since previous submission.
 - 3. Revised projections of progress and completion.
 - 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
 - 1. Problem areas, anticipated delays, and the impact on the schedule.
 - 2. Corrective action recommended and its effect.
 - 3. The effect of changes on schedules of other prime contractors.

1.06 SUBMISSIONS

- A. Submit initial schedules within 15 days after award of Contract.
 - 1. Engineer will review schedules and return review copy within 10 days after receipt.
 - 2. If required, resubmit within seven days after return of review copy.
- B. Submit revised progress schedules with each application for payment. Failure to do so will result in withholding of progress payments.
- C. Submit the number of opaque reproductions that the Contractor requires, plus two copies, which will be retained by the Engineer.

1.07 DISTRIBUTION

- A. Distribute copies of the reviewed schedules to:
 - 1. Job site files.
 - 2. Subcontractors.
 - 3. Other concerned parties.
- B. Instruct recipients to report promptly to the Contractor, in writing, any problems the schedules. Instruct recipients to report promptly to the Contractor, in writing, any problems the schedules.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 32 33 PHOTOGRAPHIC DOCUMENTATION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide a competent photographer to adequately photograph preconstruction conditions, construction progress activities, and post-construction conditions.
- B. Construction activity will not commence prior to preconstruction photographic documentation.
- C. Failure to submit required photographs will delay processing of progress payments.

1.02 RELATED REQUIREMENTS

- A. Section 01 11 00: Summary of Work
- B. Section 01 78 39: Project Record Documents

1.03 SUBMITTALS

- A. Submit photographic documentation on electronic media (CD, DVD, Flash Drive, etc.) as record data.

1.04 USAGE RIGHTS

- A. All photographs become the property of Owner.
- B. Photographs are not to be used by Contractor without express written consent.

2.00 PRODUCTS

2.01 PHOTOGRAPHIC MEDIA

- A. Provide images in digital format (JPG is preferred) produced by a digital camera with a minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 400 dpi.

3.00 EXECUTION

3.01 CONSTRUCTION PHOTOGRAPHS

- A. Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 - 1. Date and Time: Include date and time in file name for each image.
 - 2. Key Plan: Include digital copy of key plan with each electronic submittal; include point of view identification in each photo file name.
 - 3. Field Office Images: Maintain one set of images accessible in the field office at Project Site, available at all times for reference.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Provide construction staking before taking construction photographs.
 2. Take sufficient number photographs to show existing conditions adjacent to property before starting the Work.
 3. Take sufficient photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take photographs of major construction activities corresponding to Schedule of Values during installation or construction.
- E. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents.

END OF SECTION

01 33 00 SUBMITTAL PRODECURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit documentation as required by the Contract Documents and as reasonably requested by the Owner and Engineer to:
 - 1. Record the products incorporated into the Project for the Owner.
 - 2. Provide information for operation and maintenance of the Project.
 - 3. Provide information for the administration of the Contract.
 - 4. Allow the Engineer to advise the owner if products proposed for the project by the Contractor conform, in general, to the design concepts of the Contract Documents.
- B. Contractor's responsibility for full compliance with the Contract Documents is not relieved by the Engineer's review of submittals. Contract modifications can only be approved by Change Order or Field Order.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01 32 16: Construction Progress Schedule.
- C. Section 01 78 39: Project Record Documents.
- D. Designate in the construction schedule, or in a separate coordinated schedule, the dates for submission and the dates that reviewed Submittals will be needed.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Review and certify all submittals prior to submission.
- B. Determine and verify:
 - 1. Field measurements
 - 2. Field construction requirements
 - 3. Location of all existing structures, utilities, and equipment related to the submittals
 - 4. Submittals are complete for their intended purpose
 - 5. Conflicts between the submittals related to the various Subcontractors and Suppliers have been resolved
 - 6. Quantities and dimensions shown on the submittals
- C. Submit information per the procedures described in this section and the detailed specifications.
- D. Furnish the following submittals:
 - 1. As specified in the each Technical Specification.
 - 2. Schedules, data, and other documentation as described in detail in this section or referenced in the General Conditions and Contract Documents.
 - 3. Documentation required for the administration of the Contract.
 - 4. Shop Drawings required for consideration of a contract modification.
 - 5. Submittals as required in the detailed specifications.
 - 6. Submittals not required will be returned without Engineer's review.
- E. Submit a schedule indicating the date submittals will be sent to the Engineer and proposed dates that the product will be incorporated into the project. Make submittals promptly in accordance with the schedule to cause no delay in the Project.

1. Send submittals to the Engineer allowing a reasonable time for delivery, review, and making submittals. Include time for review of a resubmission if necessary. Allow adequate time for the submittal review process, ordering, fabrication, and delivery of the product to not delay progress on the Project.
 2. Schedule submittal to provide all information for interrelated work at one time. No review will be performed on submittals requiring coordination with other submittals. Engineer will return submittals for resubmission as a complete package.
- F. Submit information for all of the components and related equipment required for a complete and operational system in the same submittal.
1. Include electrical, mechanical, and other information required to indicate how the various components of the system function.
 2. Provide certifications, warranties, and written guarantees with the submittal package for review when they are required.
 3. Fabrications or installation of any products prior to the approval of Shop Drawings is done at the Contractor's risk. Products not meeting the requirements of Contract Documents are defective and may be rejected at the owner's option.
- G. Payment will not be made for products for which submittals are required until the submittals have been received. Payment will not be made for products for which Shop Drawings or Samples are required until these are approved by the Engineer.

1.04 QUALITY ASSURANCE

- A. Submit legible, accurate, complete documents presented in a clear, easily understood manner, Submittals not meeting these criteria will be returned without review.
- B. Demonstrate that the proposed products are in full and complete compliance with the design criteria and requirements of the Contract Documents including Drawings and Specifications as modifies by Addenda, Field Orders, and Change orders.
- C. Furnish and install products that fully comply with the information included in the submittal.

1.05 SUBMITTAL PROCEDURES

- A. Transmit all submittals with a properly completed Submittal Transmittal Form. Electronic submittals in PDF format are preferred.
 1. Use a separate transmittal form for each specific product, class of material, and equipment system.
 2. Submit items specified in different sections of the Specifications separately unless they are part of an integrated system.
- B. Assign a submittal number to the documents originated to allow tracking of the submittal during the review process.

1. Assign the number consisting of a prefix, a sequence number, and a letter suffix.

Prefixes shall be as follows:

Prefix	Description	Originator
AP	Application for Payment	Contractor
CO	Change Order	Engineer
CMR	Contract Modification Request	Contractor

CTR	Certified Test Report	Contractor
EIR	Equipment Installation Report	Contractor
FO	Field Order	Engineer
NBC	Notification by Contractor	Contractor
O&M	Operation & Maintenance Manuals	Contractor
PD	Photographic Documentation	Contractor
RD	Record Data	Contractor
RFI	Request for Information	Contractor
SAM	Sample	Contractor
SD	Shop Drawing	Contractor
SCH	Schedule of Progress	Contractor

2. Issue sequence numbers in chronological order for each type of submittal.
 3. Issue numbers for resubmittals that have the same number as the original submittal followed by an alphabetical suffix indicating the number of times the same submittal has been sent to the Engineer for processing. For example: SD 025 A represents shop drawing number 25 and the letter "A" designates this is the second time this submittal has been sent for review.
 4. Clearly note the submittal number on each page or sheet of the submittal.
 5. Correct assignment of numbers is essential since different submittal types are processed in different ways.
- B. Submit documents with uniform markings.
1. Mark submittals to:
 - a. Highlight Contractor's corrections in green.
 - b. Highlight items pertinent to the products being furnished in yellow and delete items that are not when the Supplier's standard drawings or information sheets are provided.
 - c. Cloud items and highlight in yellow where selections by the Engineer or Owner are required.
 - d. Mark dimensions with the prefix FD to indicate field verified dimensions on the Shop Drawings.
 - e. Provide an 8-by-3-inch blank space for Contractor's and Engineer's stamp. Contractor may use a digital certification if this is preferred. This certification must bear a digital signature.
 2. Define abbreviations and symbols used in Shop Drawings.
 - a. Use terms and symbols in Shop Drawings consistent with the Contract Drawings.
 - b. Provide a list of abbreviations and their meaning as used in the Ship Drawings.
 - c. Provide a legend for symbols used on Shop Drawings.
- C. Mark submittals to reference the Drawing number and/or section of the Specifications, detail designation, schedule or location that corresponds with the data submitted. Other identification may also be required, such as layout drawings or schedules to allow the reviewer to determine where a particular product is to be used.

- D. Deliver samples required by the Specifications to the project site. Provide a minimum of two samples.
- E. Construct mock-ups from the actual products to be used in construction per detailed Specifications.
- F. Submit color charts and Samples for every product requiring color, texture, or finish selection.
 - 1. Submit all color charts and Samples at one time.
 - 2. Do not submit color charts and Samples until all record data have been submitted or Shop Drawings for the products have been approved.
 - 3. Submit color charts and Samples not less than 30 days prior to when these products are to be ordered or released for fabrication to comply with the schedule for construction of the Project.
- G. Submit Contract Modification Request per Section 01 30 00: Administrative Procedures to request modifications to the Contract Documents.

1.05 REVIEW PROCEDURES

- A. Shop drawings are reviewed in the order received, unless Contractor request that a different priority be arranged.
- B. Mark a submittal as “priority” to place the review for this submittal ahead of submittals previously delivered. Priority submittals will be reviewed before other submittals for this Project which have been received but not reviewed. Use discretion in the use of “Priority” submittals as this may delay the review of submittals previously submitted. Revise the Schedule of Contractor’s Submittals for substantial deviations from the previous schedule. Review procedures vary with the type of submittal as described in Paragraph 1.06.

1.06 SUBMITTAL REQUIREMENTS

- A. Shop Drawings are required for those products that cannot adequately be described in the Contract Documents to allow fabrication, erection or installation of the product without additional detailed information from the Supplier.
 - 1. Shop Drawings are requested so that the Engineer can:
 - a. Assist the owner in selecting colors, textures or other aesthetic features.
 - b. Compare the proposed features of the product with the specified features so as to advise the Owner that the product does, in general, conform to the Contract Documents.
 - c. Compare the performance features of the proposed product with those specified so as to advise the Owner that it appears that the product will meet the designed performance criteria.
 - d. Review required certifications, guarantees, warranties, and service agreements for compliance with the Contract Documents.
 - 2. Certify on the Contractor’s stamp that the Contractor has reviewed the Shop Drawings and made all necessary corrections as such that the products, when installed, will be in full compliance with the Contract Documents. Shop Drawings submitted without this certification will be returned without review.
 - 3. Submit Shop Drawings for:
 - a. Products indicated in the submittal schedule following this section.
 - b. When a substitution or equal product is proposed in accordance with paragraph 1.08 of this Section.

4. Include a complete description of the material or equipment to be furnished. Information is to include:
 - a. Type, dimensions, size, arrangement, model number, and operational parameters of the components.
 - b. Weights, gauges, materials of construction, external connections, anchors, and supports required.
 - c. Performance characteristics, capacities, engineering data, motor curves, and other information necessary to allow a complete evaluation of mechanical components.
 - d. All applicable standards such as ASTM or Federal specification numbers.
 - e. Fabrication and installation drawings, setting diagrams, manufacturing instructions, templates, patterns, and coordination drawings.
 - f. Wiring and piping diagrams and related controls.
 - g. Mix designs for concrete, asphalt, or other materials proportioned for the Project.
 - h. Complete and accurate field measurements for products which must fit existing conditions. Indicate on the submittal that the measurements represent actual dimensions obtained at the site.
5. Provide all required statements of certification, guarantees, extended service agreements, and other related documents with the Shop Drawing. The effective date of these documents shall be the date of acceptance of the work by the Owner.
6. Comments will be made on items called to the attention of the Engineer for review and comment. Any marks made by the Engineer do not constitute a blanket review of the submittal or relieve the Contractor from responsibility for errors or deviations from the Contract requirements.
 - a. Submittals that are reviewed will be returned with one or more of the following designations:
 - 1) Approved: Submittal is found to be acceptable as submitted.
 - 2) Approved as Noted: Submittal is acceptable with corrections or notations made by Engineer and may be used as corrected.
 - 3) Revise and Resubmit: Submittal has deviations from the Contract Documents, significant errors, or is inadequate and must be revised and resubmitted for subsequent review.
 - 4) Not Approved: Products are not acceptable.
 - b. Drawings with a significant or substantial number of markings by the Contractor may be marked "Approved as Noted" and "Revise and Resubmit." These drawings are to be revised to provide a clean record of the submittal.
 - c. Dimensions or other data that do not appear to conform to the Contract Documents will be marked as "At Variance With" (AVW) the Contract Documents or other information provided. The Contractor is to make revisions as appropriate to comply with Contract Documents.
- B. Certifications, Warranties and Service Agreements include documents as specifies in the detailed specifications, as shown in the submittal schedule or as follows:
 1. Certified Test Report (CTR): A report prepared by an approved testing agency giving results of tests performed on products to indicate their compliance with the specifications.
 2. Certification of Local Field Service (CLS): A certified letter stating that field service is available from a factory or supplier approved service organization located within a 300

- mile radius of the project site. List names, addresses, and telephone numbers of approved service organizations on or attach it to the certificate.
3. Extended Warranty (EW): A guarantee of performance for the product or system beyond the normal 1 year warranty described in the general Conditions. Issue the warranty certificate in the name of the Owner.
 4. Extended Service Agreement (ESA): A contract to provide maintenance beyond that required to fulfill requirements for warranty repairs, or to perform routine maintenance for a definite period beyond the warranty period. Issue the service agreement in the name of the Owner.
 5. Certification of Adequacy of Design (CAD): a certified letter from the manufacturer of the equipment stating that they have designed the equipment to be structurally stable and to withstand all imposed loads without deformation, failure, or adverse effects to the performance and operational requirements of the unit. The letter shall state that mechanical and electrical equipment is adequately sized to be fully operational for the conditions specified or normally encountered by the product's intended use.
 6. Certification of Applicator/Subcontractor (CSQ): A certified letter stating that the Applicator or Subcontractor proposed to perform a specified function is duly designated as factory authorized and trained for the application of the specified product.
- C. Submit record data to provide information to allow the Owner to adequately identify the products incorporated into the project and allow replacement or repair at some future date.
1. Provide record data for all products per the Specifications. Record data is not required for items for which Shop Drawings and/or operations and maintenance manuals are required.
 2. Provide information only on the specified products. Submit a Contract Modification Request for approval of deviations or substitutions and obtain approval by Field Order or Change Order prior to submitting record data.
 3. Provide the same information required for Short Drawings.
 4. Record data will be received by the Engineer, logged, and provided to Owner for the Project record.
 - a. Record data may be reviewed to see that the information provided is adequate for the purpose intended. Inadequate drawings may be returned as unacceptable.
 - b. Record data is not reviewed for compliance with the Contract Documents.
Comments may be returned if deviations from the Contract Documents are noted during the cursory review performed to see that the information is adequate.
- D. Provide Samples for comparison with products delivered to the Site for use on the Project.
1. Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product, with integrally related parts and attachment devices.
 2. Indicate the full range of color, texture, and patterns.
 3. Dispose of Samples when related Work has been completed and approved, and disposal is requested by the Engineer. At owner's option Samples will become the property of the Owner.
- E. Construct mock-ups for comparison with the Work being performed.
1. Construct mock-ups of the size or area indicated in the detailed Specifications.
 2. Construct mock-ups complete with texture and finish to represent the finished product.
 3. Protect mock-ups until Work has been completed and accepted by the Owner.

4. Dispose of mock-ups when related Work has been completed and disposal is approved by the Engineer.
- F. Submit Operation and Maintenance manuals (O&M) for all equipment, mechanical devices, or components described in the Contract Documents. Include copies of approved Shop Drawings in the manual.
- G. Submit Request for Information (RFI) in accordance with Section 01 30 00: Administrative Requirements.
- H. Submit a Schedule of Values in accordance with Section 01 29 73: Schedule of Values
- I. Application for Payment (AP) in accordance with Section 01 29 00: Payment Procedures.
- J. Submit Progress Schedules (SCH) in accordance with Section 01 32 26: Construction Progress Reporting.
- K. Submit Certified Test reports (CTR) from independent testing laboratories in accordance with Section 01 40 00: Quality Requirements.
 1. Submit test reports for material fabricated for this project with Shop Drawings for that product.
 2. Submit test reports produced at the point of production for standard production products with the record data for that product.
- L. Submit a list of Suppliers and Subcontractors as record data in accordance with Section 01 30 00: Administrative Requirements.
- M. Submit Equipment Installation Reports (EIR) in accordance with Section 01 75 00: Starting and Adjusting.
- N. Submit Notifications by Contractor (NBC) in accordance with Section 01 30 00: Administrative Requirements.
- O. Submit Photographic Documentation (PD) in accordance with Section 01 32 33: Photographic Documentation.
- P. Submit Process Performance Bonds (PPB) in accordance with the "Supplementary Conditions" and the detailed equipment specifications.

1.07 REQUESTS FOR DEVIATION

- A. Submit requests for deviation from the Contract Documents for any product that does not fully comply with the Contract Documents.
- B. Include the amount of cost savings to the Owner for deviations that result in a reduction in cost.
- C. A Change Order or Field Order will be issues by the Engineer for deviations approved by the Owner. Deviations from the Contract Documents may only be approved by Change order or Field Order.

1.08 SUBMITTALS FOR EQUAL NON SPECIFIED PRODUCTS

- A. The products of the listed suppliers are to be furnished where detailed specifications list sever manufacturers but do not specifically list "or equal" or "or approved equal" products. Use of any products other than those specifically listed is a substitution and must be approved per Paragraph 1.09.
- B. Contractor may submit other manufacturers' products that are in full compliance with the specification where detailed specifications list one or more manufacturers followed by the phase "or equal" or "or approved equal."
 1. Submit Shop Drawings of adequate detail to documents that the proposed product is equal or superior to the specified product.

2. Prove that the product is equal. It is not the Engineer's responsibility to prove the product is not equal.
 - a. Indicate on a point by point basis for each specified feature that the product is equal to the Contract Document requirements.
 - b. Make a direct comparison with the specified manufacturer's published data sheets and available information. Provide this printed material with the submittal.
 - c. The decision of the Engineer regarding the acceptability of the proposed product is final.
3. Provide a typewritten certification that, in furnishing the proposed product as an equal, the Contractor:
 - a. Has thoroughly examined the proposed product and has determined that it is equal or superior in all respects to the product specified.
 - b. Has determined that the product will perform in the same manner and result in the same process as the specified product.
 - c. Will provide the same warranties and/or bonds as for the product specified.
 - d. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the product into the construction and will waive all claims for additional Work which may be necessary to incorporate the product into the project which maybe subsequently become apparent.
 - e. Will maintain the same time schedule as for the specified product.
4. A modification request is not required for any product that is in full compliance with the Contract Documents.

1.09 SUBMITTALS FOR SUBSTITUTIONS

- A. Substitutions are defined as any product that the Contractor proposes to provide for the Project in lieu of the specified product.
- B. Submit the following for consideration of approval of a Supplier or product which is not specified:
 1. Contract Modification Request for deviation from the Contract Documents per paragraph 1.07.
 2. Prove that the product is acceptable as a substitute. It is not the Engineer's responsibility to prove the product is not acceptable as a substitute.
 - a. Indicate on a point by point basis for each specified feature that the product is acceptable to meet the intent of the Contract Documents requirements.
 - b. Make a direct comparison with the specified Suppliers published data sheets and available information. Provide this printed material with the submittal.
 - c. The decision of the Engineer regarding the acceptability of the proposed substitute product is final.
 3. Provide a written certification that, in making the substitution request, the Contractor:
 - a. Has determined that the substituted product will perform in substantially the same manner and result in the same ability to meet the specified performance as the specified product.
 - b. Will provide the same warranties and/or bonds for the substituted product as specified or as would be provided by the manufacturer of the specified product.
 - c. Will assume all responsibility to coordinate any modifications that may be necessary to incorporate the substituted product into the project and will waive all claims for

additional Work which may be necessary to incorporate the substituted product into the project which may subsequently become apparent.

d. Will maintain the same time schedule as for the specified product.

1.10 WARRANTIES AND GUARANTEES

- A. Submit warranties and guarantees required by the Contract Documents with the Shop Drawings or record data.
- B. Provide additional copies for equipment and include this additional copy in the Operation and Maintenance Manuals.
- C. Provide a separate manual for warranties and guarantees.
 - 1. Provide a log of all products for which warranties or guarantees are provided, and for all equipment. Index the log by Specification section number on forms provided by the Engineer.
 - 2. Indicate the start date, warranty or guarantee period and the date upon which the warranty or guarantee expires for products or equipment for which a warranty or guarantee is required.
 - 3. Indicate the data for the start of the correction period specified in the general Conditions for each piece of equipment and the date on which the specified correction period expires.
 - 4. Provide a copy of the warranty of guarantee under a tab indexed to the log.

1.11 RESUBMISSION REQUIREMENTS

- A. Make all corrections or changes in the submittals required by the Engineer and resubmit until approved.
- B. For Shop Drawings:
 - 1. Revise initial drawings or data and resubmit as specified for the original submittal.
 - 2. Highlight in yellow those revisions which have been made in response to the first review by the Engineer.
 - 3. Highlight in blue any new revisions which have been made or additional details of information that has been added since the previous review by the Engineer.
- C. For Samples:
 - 1. Submit new Samples as required for the initial Sample.
 - 2. Remove Samples which have been rejected
- D. For mock-ups:
 - 1. Construct a new mock-up as initially required.
 - 2. Dispose of mock-ups which have been rejected.
- E. Pay for excessive review of Shop Drawings.
 - 1. Excessive review of Shop Drawings is defined as any review required after the original review has been made and the first resubmittal has been checked to see that corrections have been made.
 - 2. Pay cost for the additional review to the Owner on a monthly basis as billed by the Owner.
 - 3. Need for more than one resubmission or any other delay of obtaining Engineer's review of submittals, will not entitle the Contractor to an extension of Contract Time. All costs associated with such delays shall be at the Contractor's expense.

1.12 ENGINEER'S DUTIES

- A. Review the submittals and return with reasonable promptness.
- B. Affix stamp, indicate approval, rejection, and the need for resubmittal.
- C. Distribute documents.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 35 53 SECURITY PROCEDURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide a project security program to:
 - 1. Protect Work, stored products, and construction equipment from theft and vandalism.
 - 2. Protect premises from entry by unauthorized persons.
- B. Comply with local and homeland security requirements.

1.02 RELATED REQUIREMENTS

- A. Section 01 51 00: Temporary Utilities.
- B. Section 01 56 00: Temporary Barriers and Enclosures

1.03 MAINTENANCE OF SECURITY

- A. Initiate security program in compliance with Owner's system, prior to job mobilization.
- B. Maintain security program throughout construction period until Owner occupancy or Owner acceptance eliminates the need for Contractor security.
- C. Contractor is responsible for taking adequate measures to protect the Owner's facilities, the cost of which is included in the Contractor's overhead.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 40 00 QUALITY REQUIREMENTS

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Control the quality of the Work and verify that the Work meets the standards of quality established in the Contract Documents.
 - 1. Inspect the Work of the Contractor, Subcontractors and Suppliers. Correct defective Work.
 - 2. Inspect products and materials to be incorporated into the project. Ensure that Suppliers of raw materials, parts, components, assemblies, and other products have adequate quality control systems to ensure that quality products are produced. Provide only products that comply with the Contract Documents.
 - 3. Provide and pay for the services of an approved professional materials testing laboratory acceptable to the Owner to ensure that products proposed for use fully comply with the Contract Documents.
 - 4. Provide all facilities and calibrated equipment required for quality control tests.
 - 5. Provide consumable construction materials of adequate quality to provide a finished product that complies with the Contract Documents.
 - 6. Perform tests as indicated in this and other sections of the specifications. Schedule the time and sequence of testing with the Owner. All quality control testing is to be observed by the Owner or designated representative.
 - 7. Maintain complete inspection and testing records at the site and make them available to Owner and Engineer.
- B. Technical specifications govern if any requirements of this section conflicts with the requirements of the technical specifications.

1.02 QUALITY ASSURANCE ACTIVITIES BY THE OWNER

- A. Owner will perform its own quality assurance test independent of the Contractor's Quality Control Program or as otherwise described in the Contract Documents. Provide labor, materials, tools, equipment, and related items for testing by the Owner including, but not limited to temporary construction required for testing and operation of new and existing utilities. Assist the Owner and Engineer, and testing organizations in performing quality assurance activities.
 - 1. Provide access to the Work and to the Supplier's operations at all times Work is in progress.
 - 2. Cooperate fully in the performance of sampling, inspection, and testing.
 - 3. Furnish labor and facilities to:
 - a. Provide access to the work to be tested.
 - b. Obtain and handle samples for testing at the project site or at the source of the product to be tested.
 - c. Provide calibrate scales and measuring devices for the Owner's use.
 - d. Facilitate inspections and tests.
 - e. Provide adequate lighting to allow Owner observations.
 - f. Store and cure test samples.
 - 4. Furnish copies of the tests performed on materials and products.

5. Provide adequate quantities of representative product to be tested to the laboratory at the designated location.
 6. Give the Engineer adequate notice before proceeding with work that would interfere with testing.
 7. Notify the Owner and Engineer and the testing laboratory prior to the time that testing is required. Lead time is to be adequate to allow arrangements to be made for testing.
 8. Do not proceed with any work until testing services have been performed and results of tests indicate that the work is acceptable.
 9. Provide complete access to the Site and make Contract Documents available.
 10. Provide personnel and equipment needed to perform sampling or to assist in making the field tests.
 11. Quality assurance testing performed by the Owner will be paid for by the Owner, except for verification testing performed by the Owner, which shall be paid for by the Contractor as described in paragraph 1.06.
- B. Quality assurance activities of the Owner or Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the purpose of monitoring the results of the Contractor's work to see that it is in compliance with the requirements of the Contract Documents.
- C. Quality assurance activities of the Owner and Engineer or non-performance of quality assurance activities:
1. Do not relieve the Contractor of its responsibility to perform Work and furnish materials and products and constructed Work conforming to the requirements of the Contract Documents.
 2. Do not relieve the Contractor of its responsibility for providing adequate quality control measures.
 3. Do not relieve the Contractor of its responsibility for damage to or loss of the material, product, or Work before Owner's acceptance.
 4. Do not constitute or imply Owner's acceptance.
 5. Do not affect the continuing rights of the Owner after Owner's acceptance of the completed Work.
- D. The presence or absence of the Owner's Representative does not relieve the Contractor from any contract requirements, nor is the Owner's Representative authorized to change any term or condition of the Contract Documents without the Owner's written authorization in a Field Order or Change Order.
- E. Failure on the part of the Owner or Engineer to perform or test products or constructed works in no way relieves the Contractor of the obligation to perform work and furnish materials conforming to the Contract Documents.
- F. All materials and products are subject to the Owner's quality assurance observations or testing at any time during preparation or use. Material or products which have been tested or observed or approved by owner at a supply source or staging area may be re-observed or re-tested by owner before or during or after incorporation into the Work, and rejected if they do not comply with the Contract Documents.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 and shall include:

1. Test reports per Paragraph 1.07 of this specification. Reports are to certify that products or constructed Works are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.
2. Provide Certified Test Reports on materials or products to be incorporated into the Project. Reports are to indicate that material or products are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.

1.04 STANDARDS

- A. Testing laboratories shall comply with the ACIL (American Council of Independent laboratories) "Recommended Requirements for Independent Laboratory Qualifications."
- B. Perform testing per recognized test procedures as listed in the various sections of the specifications, standards of the State Department of Highways and Public Transportation, American Society of Testing Materials (ASTM), or other testing associations. Perform tests in accordance with published procedures for testing issues by these organizations.

1.05 DELIVERY AND STORAGE

- A. Handle and protect test specimens of products and construction materials at the Site in accordance with recognized test procedures.

1.06 VERIFICATION TESTING

- A. Provide verification testing when tests indicate that materials or the results of construction activities are not in conformance with Contract Documents.
- B. Verification testing is to be provided at the Contactor's expense to verify products or constructed works are in compliance after correction have been made.
- C. Tests must comply with recognized methods or with methods recommended by the testing laboratory and approved by the Engineer.

1.07 TEST REPORTS

- A. Test reports are to be prepared for all tests.
 1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:
 - a. Name of the Owner, project title and number, equipment installer and general contractor.
 - b. Name of the laboratory, address, and telephone number.
 - c. Name and signature of the laboratory personnel performing the test.
 - d. Description of the product being sampled or tested.
 - e. Date and time of sampling, inspection, and testing.
 - f. Date the report was issued.
 - g. Description of the test performed.
 - h. Weather conditions and temperature at time of test or sampling.
 - i. Location at the site or structure where the test was taken.
 - j. Standard or test procedure used in making the test.
 - k. A description of the results of the test.
 - l. Statement of compliance or non-compliance with the Contract Documents.
 - m. Interpretations of test results, if appropriate.

2. Submit reports on tests performed by Contractor or his suppliers or vendors per Section 01 33 00.
3. Engineer will prepare test reports on test performed by the Engineer.
- B. Distribute copies of the test reports to the Engineer within 24 hours of completing the test. Flag test reports with results that do not comply with Contract Documents for immediate attention. Hard copies of test reports are to be distributed to individuals designated at the pre-construction conference.
- C. Payment for Work subject to testing may be withheld until the Contractor's quality control test reports of the Work are submitted to the Owner's Representative.

1.08 NON-CONFORMING WORK

- A. Immediately correct any Work that does not comply with the Contract Documents or submit a written explanation of why the Work is not to be corrected immediately and when corrective action to the Work will be performed.
- B. Payment for non-conforming Work shall be withheld until Work is brought into compliance with the Contract Documents.

1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

- A. The testing laboratory representatives are limited to providing consultation on the test performed and to an advisory capacity.
- B. The testing laboratory is not authorized to:
 1. Alter the requirements of the Contract Documents.
 2. Accept or reject any portion of the Work.
 3. Perform any of the duties of the Contractor.
 4. Stop the work.

2.00 PRODUCTS

2.01 TESTING APPARATUS

- A. Furnish testing apparatus and related accessories necessary to perform the tests.

3.00 EXECUTION

3.01 QUALITY CONTROL PROGRAM

- A. Perform quality control observations and testing as required in each section of the specifications and where indicated on the drawings.
- B. Provide a quality control program that includes the following phases for each definable Work task. A definable Work task is one which is separate and distinct from other tasks, has separate control requirements, maybe be provided by different trades of disciplines, or may be work by the same trade in a different environment.
 1. Planning Phase. Perform the following before beginning each definable Work task:
 - a. Review the contract drawings.
 - b. Review submittals and determine that they are complete in accordance with the Contract Documents.
 - c. Check to assure that all materials and/or equipment have been tested, submitted, and approved.

- d. Examine the work area to assure that all required preliminary work has been completed and complies with the Contract Documents.
 - e. Examine required materials, equipment, and sample work to assure that they are on hand, conform to submittals, and are properly stored.
 - f. Review requirements for quality control inspection and testing.
 - g. Discuss procedures for controlling quality of the work. Documents construction tolerances and workmanship standards for the Work task.
 - h. Check that the portion of the plan for the Work to be performed incorporates submittal comments.
 - i. Discuss results of planning with the Owner and Engineer. Conduct a meeting attended by quality control personnel as applicable, and the foreman responsible for the Work task. Instruct applicable workers as to the acceptable level of workmanship required in order to meet the requirements of the Contract Documents. Document the results of the preparatory phase actions by separate meeting minutes prepared by the quality control manager and attached to the quality control report.
 - j. Do not move to the next phase unless results of the investigations required for the planning phase indicate that requirements have been met.
2. Work Phase. Complete this phase after the Planning Phase:
- a. Notify the Owner and Engineer at least 24 hours in advance of beginning the Work and discuss the review of the planning effort to indicate that requirements have been met.
 - b. Check the Work to ensure that it is in full compliance with the Contract Documents.
 - c. Verify adequacy of controls to ensure full compliance with Contract Documents.
 - d. Verify that established levels of workmanship meet acceptable workmanship standards. Compare with required sample panels as appropriate.
 - e. Repeat the initial phase for each new crew to work onsite, or any time acceptable specifies quality standards are not being met.
3. Follow-up Phase. Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements:
- a. Make checks daily and record observations in the quality control documentation.
 - b. Conduct follow-up checks to correct all deficiencies prior to the start of additional Work tasks that may be affected by the defective Work. Do not build upon nor conceal non-conforming work.
 - c. Conduct a review of the Work one month prior to the expiration of the correction period prescribed in the General Conditions with the Owner and Engineer. Correct defects noted during the review.
- C. Conduct additional planning and review if:
- 1. The quality of on-going work is unacceptable.
 - 2. Changes are made in applicable quality control staff, onsite production supervision or work crew.
 - 3. Work on a task is resumed after a substantial period of inactivity.
 - 4. Other quality problems develop.

END OF SECTION

1.00 GENERAL

1.01 SPECIFICATION TERMINOLOGY

- A. "Engineer" or "Construction Manager" means Owner Representative.
- B. "Furnish" means to supply, deliver, and unload materials and equipment at the project site ready to install.
- C. "Install" means the operations at the project site including unpacking, assembly, erection, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning, training, and similar operations required to prepare the materials and equipment for use, verify conformance with Contract Documents and prepare for acceptance and operation by the owner.
- D. "Provide" means to furnish and install materials and equipment.
- E. "Perform" means to complete the operations necessary to comply with the Contract Documents.
- F. "Indicated" means graphic representations, notes, or schedules on drawings, or other requirements in Contract Documents. Words such as "show", "noted", "scheduled", are used to help locate the reference. No limitation on the location is intended unless specifically noted.
- G. "Specified" means written representations in the bid documents or the technical specifications.
- H. "Regulation" means laws, statutes, ordinances, and lawful orders issues by authorities having jurisdictions, as well as, rules, conventions, and agreements within the construction industry that control performance of work, whether they are lawfully imposed by authorities having jurisdiction or not.
- I. "Installer" means an entity engaged by Contractor, either as an employee, subcontractor, or sub-subcontractor to install materials and/or equipment. Installers are to have successfully completed a minimum of five projects similar in size and scope to this project, have a minimum of five years of experience in the installation of similar materials and equipment, and comply with the requirements of the authority having jurisdiction.
- J. "Manufacturer" means an entity engaged by Contractor, as a subcontractor, or sub-subcontractor to furnish materials and/or equipment. Manufacturers are to have a minimum of five years of experience in the manufacture of materials and equipment similar in size, capacity, and scope to the specified materials and equipment.
- K. "Project site" means the space available to perform the work, either exclusively or in conjunction with others performing construction at the project site.
- L. "Testing laboratory" means an independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report and interpret the results of those inspections or tests.
- M. "Listed" means equipment is included in a list published by a nationally recognized laboratory which makes periodic inspection of production of such equipment and states that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
- N. "Labeled" means equipment that embodies a valid label, symbol, or other identifying mark of a nationally recognize testing laboratory such as Underwriters laboratories, Inc., and

production is periodically inspected in accordance with nationally recognized standards or tests to determine safe use in a specified manner.

- O. "Certified" used in context with materials and equipment means the material and equipment has been tested and found by a nationally recognized testing laboratory to meet specification requirements, or nationally recognized standards if requirements are not specified, and is safe for use in the specified manner. Production of the equipment must be periodically inspected by a nationally recognized testing laboratory and the equipment must bear a label, tag, or other record of certification.
- P. "Certified" used in context with labor performance or ability to install materials and equipment means that the abilities of the proposed installer have been tested by a representative of the specified testing agency authorized to issue certificates of competency and has met the prescribed standards for certification.
- Q. "Certified" used in context with test reports, payment requests, or other statements of fact means that the statements made on the document are a true statement as attested to by the certifying entity.

1.02 SPECIFICATION SENTENCE STRUCTURE

- A. Specifications are written in modified brief style. Requirements apply to all work of the same kind, class, and type even though the word "all" is not stated.
- B. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words "furnish", "install", "provide", or similar words include the meaning of the phrase "The Contractor shall..." before these words.
- C. It is understood that the words "directed", "designated", "requested", "authorized", "approved", "selected", or other similar words include the meaning of the phrase "by the Engineer" after these words unless otherwise stated. Use of these words does not extend the Engineer's responsibility for construction supervision or responsibilities beyond those defined in the General Conditions.
- D. "At no additional cost to Owner", "With no extra compensation to Contractor", "At Contractor's own expense", or similar words mean that the Contractor will perform or provide specified operation of work without any increase in the Contract Amount. It is understood that the cost for performing all work is included in the amount bid and will be performed at no additional cost to the owner unless specifically stated otherwise.

1.03 DOCUMENT ORGANIZATION

- A. The contract requirements described in the General Conditions, Supplementary Conditions, and Division 01 apply to each and all specification sections unless specifically noted otherwise.
- B. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing work among subcontractors, or to establish the extent of work to be performed by any trade, subcontractor, or vendor. Specifications or details do not need to be indicated or specified in each specification or drawing. Items shown in the contract documents are applicable regardless of location in the Contract Documents.
- C. Capitalizing words in the text does not mean that these words convey special or unique meanings or have precedence over other parts of the Contract Documents. Specification text governs over titling and it is understood that the specification is to be interpreted as a whole.

- D. Drawings and specifications do not indicate or describe all of the work required to complete the project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials, or equipment required for a complete and functional system even if they are not detailed or specified.

1.04 INTERPRETATIONS OF DOCUMENTS

- A. Comply with the most stringent requirements where compliance with two (2) or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.
 - 1. Quantity or quality level shown or indicated shall be minimum quality indicated, or it may exceed that minimum within reasonable limits.
 - 2. Actual installation may comply exactly with minimum quality indicated, or it may exceed that minimum within reasonable limits.
 - 3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.
 - 4. Refer instances of uncertainty to the Engineer for a decision before proceeding.
- B. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the drawing but are not included in the specifications.

1.05 REFERENCE STANDARDS

- A. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than the referenced standards.
 - 1. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.
 - 2. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the work except as otherwise limited by the Contract Documents. The Engineer determines whether code or standard, or which of several are applicable.
- B. Consider a referenced standard to be the latest edition with supplements or amendments when a standard is referred to in an individual specification section but is not listed by title and date.
- C. Trade association names and title of general standards are frequently abbreviated. Acronyms or abbreviations used in the Contract Documents mean the recognized name of trade association, standards generating organization, authority having jurisdiction, or other entity applicable in the context of the Contract Documents. Refer to "Encyclopedia of Associations," published by Gale Research Company.
- D. Make copies of reference standards available as requested by Engineer or Owner.

1.06 SUBSTITUTIONS AND EQUAL PRODUCTS

- A. Provide materials and equipment manufactured by the entities specifically listed in each technical specification section. Submit a Contractor's Modification Request per Section 01

33 00, for substitution of materials and equipment of manufacturers not specifically listed or for materials and equipment that does not strictly comply with the Contract Documents.

1.07 SUBSTITUTIONS AND EQUAL PRODUCTS

- A. Contractor may provide “equal” products manufactured by manufacturers other than those specifically listed in the technical specification section unless it is specifically stated that only the materials and equipment of the specified manufacturers shall be provided. Provide Submittals for proposed “equal” non-specific products per Section 01 33 00 for any materials or equipment not specifically listed. Submit a Contractor’s Modification Request for substitution of materials and equipment of other manufacturers or for materials and equipment that does not strictly comply with the Contract Documents. A Field Order or Change Order will be issued if the contract modification is approved.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

01 51 00 TEMPORARY UTILITIES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install, and maintain temporary utilities required for construction; remove on completion of Work.

1.02 RELATED REQUIREMENTS

- A. Section 01 11 00: Summary of Work.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with federal, state, and local codes and regulations and with utility company requirements.

2.00 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company to provide service required for power and lighting, and pay all costs for service and for power used.
- B. Install circuit and branch wiring with area distribution boxes located so that power and lighting are available throughout the construction by use of construction-type power cords.
- C. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILATION

- A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.
- B. Provide adequate forced ventilation of enclosed areas for curing of installed materials to disperse humidity and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
- C. Portable heaters shall be standard approved units complete with controls.
- D. Pay all costs of installation, maintenance, operation, removal, and consumed fuel.

2.04 TEMPORARY WATER

- A. Arrange with Owner to provide water for construction purposes; pay all costs for installation, maintenance, removal, and service charges for water used.
- B. Install branch piping with taps located so that water is available throughout the construction by the use of hoses. Protect piping and fittings against freezing.

2.05 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean, and maintain facilities and enclosures.
- C. Existing facilities may NOT be used during the construction period.

3.00 EXECUTION

3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore existing facilities, if any, used for temporary services to specified or original conditions.
- D. Restore permanent facilities, if any, used for temporary services to specified condition.
 - 1. Prior to final inspection, remove temporary lamps and install new lamps.

END OF SECTION

01 54 00 CONSTRUCTION AIDS

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install, and maintain required construction aids; remove on completion of Work.

1.02 RELATED DOCUMENTS

- A. Section 01 11 00: Summary of Work.

2.00 PRODUCTS

2.01 MATERIAL, GENERAL

- A. Materials may be new or used if suitable for the intended purpose but must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required by personnel and to facilitate execution of the Work: scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoist, cranes, chutes, and other such facilities and equipment.

3.00 EXECUTION

3.01 PREPARATION

- A. Consult with Engineer and review site conditions and factors that affect construction procedures and construction aids, including adjacent properties and public facilities that may be affected by execution of the Work.

3.02 GENERAL

- A. Comply with applicable requirements specified in sections of Divisions 2 through 44.
- B. Relocate construction aids as required by progress of construction, by storage or work requirements, and to accommodate legitimate requirements of Owner and other contractors employed at the site.

3.03 REMOVAL

- A. Completely remove temporary materials, equipment, and services in the following circumstances:
 - 1. When construction needs can be met by use of permanent construction.
 - 2. At completion of Project.
- B. Clean and repair damage caused by installation or use of temporary facilities.
 - 1. Remove foundations and underground installations for construction aids.
 - 2. Grade areas of site affected by temporary installations to required elevations and slopes, and clean the area.
- C. Restore existing facilities used for temporary purposes to specified or original condition.
- D. Restore permanent facilities, if any, used for temporary purposes to specified condition.

END OF SECTION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide, operate, and maintain equipment, services, and personnel with traffic control and protective devices as required to expedite vehicular traffic flow on haul routes, at site entrances, on onsite access roads, and in parking areas.
- B. Remove temporary equipment and facilities when no longer required; restore grounds to original or to specified conditions.

1.02 RELATED DOCUMENTS

- A. Section 01 56 00: Temporary Barriers and Enclosures.
- B. Section 01 57 00: Temporary Controls.

1.03 TRAFFIC SIGNALS AND SIGNS

- A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control or affected by Contractor's operations.
- B. Provide traffic control and directional signs, mounted on barricades or standard posts
 - 1. At each change of direction of a roadway and at each crossroads.
 - 2. At detours.
 - 3. At parking areas.

1.04 FLAGMEN

- A. Provide qualified and suitably equipped flagmen when construction operations encroach on traffic lanes, as required for regulation of traffic.

1.05 FLARES AND LIGHTS

- A. Provide flares and lights during periods of low visibility:
 - 1. To clearly delineate traffic lanes and to guide traffic.
 - 2. For use by flagmen in directing traffic.
- B. Provide illumination of critical traffic and parking areas.

1.06 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.
- B. Monitor parking of construction personnel's private vehicles
 - 1. Maintain free vehicular access to and through parking areas.
 - 2. Prohibit parking on or adjacent to access roads or in nondesignated areas.

1.07 HAUL ROUTES

- A. Consult with governing authorities, establish public thoroughfares that will be used as haul routes and site access.
- B. Confine construction traffic to designated haul routes.

- C. Provide traffic control at critical areas of haul routes to expedite traffic flow and to minimize interference with normal public traffic.

2.00 PRODUCTS

2.01 Traffic Control Devices

- A. All traffic control means, methods, and equipment shall comply with “Texas Manual on Uniform Traffic Control Devices”.

3.00 EXECUTION (NOT USED)

END OF SECTION

01 56 00 TEMPORARY BARRIERS AND ENCLOSURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install, and maintain suitable barriers as required to prevent public entry and to protect the Work, existing facilities, trees, and plants from construction operations; remove when no longer needed or at completion of work.

1.02 RELATED DOCUMENTS

- A. Section 01 11 00: Summary of Work.
- B. Section 01 54 00: Construction Aids.
- C. Section 01 58 00: Project Identification.

2.00 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used if suitable for the intended purpose but must not violate requirements of applicable codes and standards.

2.02 FENCING

- A. Materials to Contractor's option, minimum fence height six feet.

2.03 BARRIERS

- A. Materials to Contractor's option, as appropriate to serve required purpose.

3.00 EXECUTION

3.01 GENERAL

- A. Install facilities of a neat and reasonable uniform appearance, structurally adequate for required purposes.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by progress of construction.

3.02 FENCES

- A. Prior to start of work at the Project site, install enclosure fence with suitably locked entrance gates. Locate as shown on drawings.

3.03 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants at site that are designated to remain and those adjacent to site.
- B. Consult with Engineer and remove agreed-on roots and branches that interfere with construction
 - 1. .Employ qualified tree surgeon to remove and to treat cuts.
- C. Provide temporary barriers to a height of six feet around each or each group of trees and plants.
- D. Protect root zones of trees and plants.

1. Do not allow vehicular traffic or parking.
 2. Do not store materials or products.
 3. Prevent dumping of refuse or chemically injurious materials or liquids.
 4. Prevent ponding or continuous running water.
- E. Carefully supervise excavating, grading and filling, and subsequent construction operations to prevent damage.
 - F. Replace, or suitably repair, trees and plants designated to remain that are damaged or destroyed due to construction operations.

3.04 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed and when approved by the Engineer.
- B. Clean and repair damage caused by installation, fill and grade areas of the site to required elevations and slopes, and clean the area.

END OF SECTION

01 57 00 TEMPORARY CONTROLS

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide and maintain methods, equipment, and temporary construction as necessary to provide controls over environmental conditions at the construction site and related areas under Contractor's control; remove physical evidence of temporary facilities at completion of work.
- B. Construct temporary impounding works, channels, diversions, furnishing and operation of pumps, installing piping and fittings, and other construction for control of conditions at the Site. Remove temporary controls at the end of the Project.
- C. Provide a Storm Water Pollution Prevention Plan in accordance with TCEQ General Permit TXR150000, file required legal notices and obtain required permits prior to beginning any construction activity.
- D. Provide labor, materials, equipment, and incidentals necessary to prevent storm water pollution for the duration of the Project. Provide and maintain erosion and sediment control structures as required to preventive sediment and other pollutants from the Site from entering any storm water system, including open channels. Remove pollution control structures when no longer required to prevent storm water pollution.
- E. Cost for Temporary Controls as described in this section and provided by Suppliers and Subcontractors as described in this section are to be included in the Cost of Work.

1.02 RELATED DOCUMENTS

- A. Section 01 11 00: Summary of Work.
- B. Section 01 54 00: Construction Aids.
- C. Section 01 58 00: Project Identification.

1.03 SUBMITTALS

- A. Provide copies of notices, records and reports required the Contract Document or regulations as Record Data in accordance with Section 01 33 00-Submittal Procedures.
- B. Provide documents requiring approval by the Owner or Engineer as Shop Drawings in accordance with Section 01 33 00: Submittal Procedures.

1.04 DUST CONTROL

- A. Provide positive methods and apply dust control materials to minimize raising dust from construction operation, and provide positive means to prevent airborne dust from dispersing into the atmosphere.

1.05 WATER CONTROL

- A. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties.
 - 1. Control fill, grading, and ditching to direct surface drainage away from excavations, pits, tunnels, and other construction areas and to direct drainage to proper runoff.
- B. Provide, operate, and maintain hydraulic equipment of adequate capacity to control surface and ground water.

- C. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas.

1.06 DEBRIS CONTROL

- A. Maintain all areas under Contractor's control free of extraneous debris.
- B. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, and along access roads and haul routes.
 - 1. Provide containers for deposit of debris as specified in Section 01 74 00: Cleaning and Waste Management.
 - 2. Prohibit overloading of trucks to prevent spillage on access and haul routes.
 - a. Provide periodic inspection of traffic areas to enforce requirements.
- C. Schedule periodic collection and disposal of debris as specified in Section 01 74 00: Cleaning and Waste Management.
 - 1. Provide additional collections and disposal of debris whenever the periodic schedule is inadequate to prevent accumulation.

1.07 POLLUTION CONTROL

- A. Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations.
- B. Provide equipment and personnel, perform emergency measures required to contain any spillages and to remove contaminated soils or liquids.
 - 1. Excavate and dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.
- C. Take special measures to prevent harmful substances from entering public waters.
 - 1. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams or in sanitary or storm sewers.
- D. Provide systems for control of atmospheric pollutants.
 - 1. Prevent toxic concentrations of chemicals.
 - 2. Prevent harmful dispersal of pollutants into the atmosphere.

1.08 EARTH CONTROL

- A. Remove excess soil, spoil materials and other earth not required for backfill at the time of generation. Control stockpiled materials to eliminate interference with Contractor and Owner's operations.
- B. Dispose of excess earth off the Site. Pay cost for disposal unless otherwise noted. Provide written approval by the property owner for all disposal on private property, and approval by the Owner if such disposal affects the use of Site or other easements.

1.09 STORM WATER POLLUTION CONTROL

- A. Comply with the current requirements of TPDES General Permit No. TXR15000 (General Storm Water Permit) set forth by the Texas Commission on Environmental Quality for the duration of the Project.
- B. Develop Best Management Practices in accordance with local and state and industry guidelines.
- C. Submit copies of the reports to the Engineer as Record Data in accordance with Section 01 33 00: Submittal Procedures.

- D. Pay all costs associated with complying with the provisions of the General Storm Water Permit. Assume solely responsible for implementing, updating, and modifying the General Storm Water Permit per regulatory requirements the Storm Water Pollution Prevention Plan and Best Management Practices.
- E. Return any property disturbed by construction activities to either specified conditions or preconstruction conditions as set forth in the Contract Documents. Provide an overall erosion and sedimentation control system that will protect all undisturbed areas and soil stockpiles/spoil areas. Implement appropriate Best Management Practices and techniques to control erosion and sedimentation and maintain these practices and techniques in effective operating condition during construction. Permanently stabilize exposed soil and fill as soon as practical during the Work.
- F. Assume sole responsibility for the means, methods, techniques, sequences, and procedures for furnishing, installing, and maintaining erosion and sedimentation control structures and procedures and overall compliance with the General Storm Water Permit. Modify the system as required to effectively control erosion and sediment.
- G. Retain copies of reports required by the General Storm Water Permit for 3 years from date of final completion.

2.00 PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used if suitable for the intended purpose but must not violate requirements of applicable codes and standards.
- B. Provide materials that meet regulatory requirements.

3.00 EXECUTION

3.01 PROJECT REVIEW

- A. Prior to the preconstruction conference, the Contractor shall meet with the Engineer and go over in detail the expected problem areas in regard to erosion control work. Different solutions should be discussed so that the best method might be determined. It is the responsibility of the Contractor to develop an erosion control plan acceptable to the Engineer.

3.02 PRECONSTRUCTION CONFERENCE

- A. At the preconstruction conference, the Contractor shall submit for acceptance his schedule for accomplishing temporary and permanent erosion control work as is applicable for clearing and grubbing, grading, bridges and other structures at watercourses, construction and paving. He also shall submit for acceptance his proposed method for erosion control on haul roads and borrow pits and his plan for disposal of waste materials. No work shall be started until the erosion control schedules are submitted and the Engineer has accepted methods of operations.

3.03 CONSTRUCTION REQUIREMENTS

- A. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, the surface of erodible earth material exposed by excavation and borrow and fill operations and to direct the Contractor to provide immediate permanent or

temporary pollution control measures to prevent contamination of adjacent streams or other watercourses, lakes, ponds, or other water impoundment. Such work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains and use of temporary mulches, mats, seeding or other control devices or methods to control erosion. Cut and fill slopes shall be seeded and mulched as the excavation proceeds to the extent directed by the Engineer.

- B. The Contractor shall be required to incorporate all permanent erosion control features into the project at the earliest practicable time as outlined in his accepted schedule. Temporary pollution control measures shall be used to correct conditions that develop during construction that were not foreseen during the design stage, that are needed prior to installation of permanent pollution control features, or that are needed temporarily to control erosion that develops during normal construction practices but that are not associated with permanent control features on the project.
- C. Where erosion is likely to be a problem, clearing and grubbing operations should be scheduled and performed so that grading operations and permanent erosion control features can follow immediately thereafter if the project conditions permit; otherwise, erosion control measures may be required between successive construction stages. Under no conditions shall the surface area of erodible earth material exposed at one time by clearing and grubbing exceed 750,000 square feet without approval of the Engineer.
- D. The Engineer will limit the area of excavation, borrow and embankment operations in progress commensurate with the Contractor's capability and progress in keeping the finish grading, mulching, seeding, and other such permanent pollution control measures current in accordance with the accepted schedule. Should seasonal limitations make such coordination unrealistic, temporary erosion control measures shall be taken immediately to the extent feasible and justified.
- E. Under no conditions shall the amount of surface area or erodible earth material exposed at one time by excavation or fill within the project area exceed 750,000 square feet without prior approval by the Engineer.
- F. The Engineer may increase or decrease the amount of surface area of erodible earth material to be exposed at one time by clearing and grubbing, excavation, borrow, and fill operations as determined by his analysis of project conditions.
- G. In the event of conflict between these requirements and pollution control laws, rules or regulations, or other federal, state, or local agencies, the more restrictive laws, rules and regulations shall apply.

END OF SECTION

01 58 00 PROJECT IDENTIFICATION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide temporary on-site informational signs to identify key elements of construction facilities.
- B. Remove signs on completion of construction.
- C. Allow no other signs to be displayed.

1.02 RELATED DOCUMENTS

- A. Section 01 11 10: Summary of Work.
- B. Section 01 51 00: Temporary Utilities.
- C. Section 01 55 26: Traffic Control.

1.03 INFORMATIONAL SIGNS

- A. Painted signs with painted lettering or standard products.
 - 1. Size of signs and lettering: as required by regulatory agencies, or as appropriate to usage.
 - 2. Colors: as required by regulatory agencies, otherwise of uniform colors throughout Project.
- B. Erect at appropriate locations to provide required information.

1.04 QUALITY ASSURANCE

- A. Sign Painter: Professional experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

2.00 PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: May be new or used, wood or metal, in sound condition and structurally adequate to work and suitable for specified finish.
- B. Sign Surface: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.
 - 1. Thickness: As required by standards to span framing members to provide even, smooth surface without waves or buckles.
- C. Rough Hardware: Galvanized.
- D. Paint: Exterior quality.
 - 1. Use Bulletin colors for graphics.
 - 2. Colors for structure, framing, sign surfaces, and graphics: as selected by Engineer.

3.00 EXECUTION

3.01 INFORMATIONAL SIGNS

- A. Paint exposed surfaces with one coat of primer and one coat of exterior paint.

- B. Paint graphics in styles, sizes, and colors selected.
- C. Install at a height for optimum visibility on ground-mounted poles or attached to temporary structural surfaces.

3.02 MAINTENANCE

- A. Maintain signs and supports in a neat, clean condition; repair damage to structure, framing, or sign.
- B. Relocate information signs as required by progress of the work.

3.03 REMOVAL

- A. Remove sign, framing, supports, and foundations at completion of project.

END OF SECTION

01 60 00 PRODUCT REQUIREMENTS

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Material and equipment incorporated into the Work
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type, and quality specified or as specifically approved in writing by the Engineer.
 - 3. Manufactured and Fabricated Products
 - a. Design, fabricate, and assemble in accord with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages to be interchangeable.
 - c. Two or more items of the same kind shall be identical and by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
 - 4. Do not use material or equipment for any purpose other than that for which it is designated or specified.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01 11 10: Summary of Work.
- C. Section 01 33 00: Submittal Procedures.
- D. Section 01 74 00: Cleaning and Waste Management.

1.03 REUSE OF EXISTING MATERIAL

- A. Except as specifically indicated or specified, materials and equipment removed from the existing structure, if any, shall not be used in the completed Work.
- B. For material and equipment specifically indicated or specified to be reused in the Work:
 - 1. Use special care in removal, handling, storage, and reinstallation to assure proper function in the completed Work.
 - 2. Arrange for transportation, storage, and handling of products that require off-site storage, restoration, or renovation. Pay all costs for such work.

1.04 MANUFACTURER'S INSTRUCTIONS

- A. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to Engineer.
 - 1. Maintain one set of complete instructions at the job site during installation and until completion.
- B. Handle, install, connect, clean, condition, and adjust products in strict accord with such instructions and in conformity with specified requirements.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Engineer for further instructions.

2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.05 TRANSPORTATION AND HANDLING

- A. Arrange Product deliveries in accord with construction schedules, and coordinate to avoid conflict with work and conditions at the site.
 1. Deliver Products in undamaged condition, in manufacturer's original containers or packaging with identifying labels intact and legible. Note: A Material Safety Data Sheet (MSDS) is required for chemical products. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals and that Products are properly protected and undamaged.
- B. Provide equipment and personnel to handle Products by methods that prevent soiling or damage to Products or packaging.

1.06 STORAGE AND PROTECTION

- A. Store Products in accord with manufacturer's instructions with seals and labels intact and legible. Note: A Material Safety Data Sheet (MSDS) is required for chemical products.
 1. Store products subject to damage by the elements in weather- tight enclosures.
 2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
- B. Exterior Storage
 1. Store fabricated products above the ground or on blocking or skids to prevent soiling or staining. Cover products that are subject to deterioration with impervious sheet coverings and provide adequate ventilation to avoid condensation.
 2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored Products to assure that Products are maintained under specified conditions and free from damage and deterioration.
- D. Protection After Installation:
 1. Provide substantial coverings as necessary to protect installed Products from damage from traffic and subsequent construction operations. Remove when no longer needed.

1.07 SUBSTITUTIONS AND PRODUCT OPTIONS

- A. Products List
 1. Within 30 days after Contract Date, submit to Engineer a complete list of major Products proposed to be used with the name of the manufacturer and the installing Subcontractor.
- B. Contractor's Options
 1. For Products specified only by reference standard, select any Product meeting that standard.
 2. For Products specified by naming several Products or manufacturers, select any one of the products or manufacturers named that complies with the specifications.
 3. For Products specified by naming one or more Products or manufacturers or "or equal," Contractor must submit a request for substitutions for any Product or manufacturer not specifically named.

4. For Products specified by naming only one Product and manufacturer, there is no option.
- C. Substitutions
1. For a period of 30 days after Contract Date, Engineer will consider written requests from Contractor for substitution of Products.
 2. Submit a separate request for each Product, supported with complete data and with drawings and samples as appropriate, including:
 - a. Comparison of qualities of the proposed substitution with that specified.
 - b. Changes required in other elements of the Work because of the substitution.
 - c. Effect on the construction schedule.
 - d. Cost data comparing the proposed substitution with the Product specified.
 - e. Any required license fees or royalties.
 - f. Availability of maintenance service and source of replacement materials.
 3. Engineer shall be the judge of the acceptability of the proposed substitution.
- D. Contractor's Representation
1. The request for a substitution constitutes a representation that Contractor
 - a. Has investigated the proposed Product and determined that it is equal to or superior in all respects to that specified.
 - b. Will provide the same warranties or bonds for the substitution as for the Product specified.
 - c. Will coordinate the installation of an accepted substitution into the Work and make such other changes as may be required to make the Work.
 - d. Waives all claims for additional costs, under his responsibility, that may subsequently become apparent.
- E. Engineer will review requests for substitutions with reasonable promptness and notify Contractor, in writing, of the decision to accept or reject the requested substitution.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall be responsible for all cutting, fitting, and patching, including attendant excavation and backfill, required to complete the Work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the Work to provide for installation and ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace Work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed Work as specified for testing.
 - 6. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.

1.02 RELATED DOCUMENTS

- A. Section 01 11 00: Summary of Work

1.03 SUBMITTALS

- A. Submit a written request to Engineer well in advance of executing any cutting or alteration that affects:
 - 1. Work of the Owner or any separate contractor.
 - 2. Structural value or integrity of any element of the Project.
 - 3. Integrity or effectiveness of weather exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance, or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
 - 1. Identification of the Project.
 - 2. Description of affected Work.
 - 3. Necessity for cutting, alteration, or excavation.
 - 4. Effect on Work of Owner or any separate Contractor, or on structural or weatherproof integrity of Project.
 - 5. Description of proposed Work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 6. Alternatives to cutting and patching.
 - 7. Cost proposal, when applicable.
 - 8. Written permission of any separate contractor whose work will be affected.
- C. Should conditions of Work or the schedule indicate a change of products from original installation, Contractor shall submit request for substitution.
- D. Submit written notice to Engineer designating the date and the time the work will be uncovered.

2.00 PRODUCTS

2.01 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

3.00 EXECUTION

3.01 INSPECTIONS

- A. Inspect existing conditions of Project, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products or performance of Work.
- C. Report unsatisfactory or questionable conditions to Engineer in writing; do not proceed with work until Engineer has provided further instructions.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage.
- C. Provide protection from elements for that portion of the Project that may be exposed by cutting and patching work, and maintain excavations free from water.

3.03 PERFORMANCE

- A. Execute cutting and demolition by methods that will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods that will prevent settlement or damage to other work.
- C. Employ original Installer or Fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture resistant elements.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- E. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.
- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through the surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.
- H. For continuous surfaces, refinish to nearest intersection.
- I. For an assembly, refinish entire unit.

END OF SECTION

01 74 00 CLEANING AND WASTE MANAGEMENT

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Execute cleaning during progress of the Work and at completion of the Work as required by General Conditions.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01 57 00: Temporary Controls.
- C. Each Specification Section: Cleaning for specific Products or Work.

1.03 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

1.04 QUALITY CONTROL

- A. Use experienced workmen or professional cleaners for final cleaning.

2.00 PRODUCTS

2.01 MATERIALS

- A. Furnish the labor and products needed for cleaning and finishing as recommended by the Manufacturer of the surface material being cleaned.
- B. Use cleaning products only on the surfaces recommended by the Cleaning Product Manufacturer.
- C. Use only those cleaning products which will not create hazards to health or property and which will not damage surfaces.

3.00 EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute periodic cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide on-site containers for the collection of waste materials, debris, and rubbish.
- C. Remove waste materials, debris, and rubbish from the site periodically and dispose of it at legal disposal areas away from the site.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.

3.03 FINAL CLEANING

- A. Thoroughly clean the entire site and make ready for occupancy.
 - 1. Remove construction debris, boxes, and trash from the site.
 - 2. Remove construction storage sheds and field offices.
 - 3. Restore grade to match surrounding condition and remove excess dirt.
 - 4. Sweep all drives and parking lots clean of dirt and debris. Use water truck or hose down paved site to like new appearance.
- B. Clean floors and inspect for damage.
 - 1. Remove oil, grease, paint drippings, and other contaminants from floors, then mop repeatedly until thoroughly clean. Replace damaged flooring.
- C. Clean wall surfaces to remove dirt or scuff marks. Remove excess adhesive along top edges of wall base.
- D. Spot paint nicks and other damage. If spot-painting does not blend into the existing color and texture of the surrounding surface, repaint wall from inside corner to inside corner. Touch up damaged surfaces on factory finished equipment using special paint furnished by the Manufacturer.
- E. Clean plumbing fixtures, valves, and trim. Remove labels and adhesive from fixtures. Remove floor drains and clean baskets or buckets.
- F. Remove dirt, oil, grease, dust, and other contaminants from floors, equipment and apparatus in mechanical and electrical rooms with vacuum.
- G. Inspect exterior painted surfaces. Spot paint any damaged surfaces.
- H. Clean permanent filters and replace disposable filters on heating, ventilating, and air conditioning systems. Clean ducts, blowers, and coils if units were operated without filters during construction.
- I. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.
- J. Clean and polish all electrical equipment and exposed conduits. Remove paint overspray. Provide a blemish free appearance on all exposed equipment and conduits.
- K. Prior to final completion or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas to verify that the entire Work is clean.

END OF SECTION

01 77 00 CLOSEOUT PROCEDURES

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Construction Contract.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract. Fiscal provisions, legal submittals, and additional administrative Requirements and documents in Division 00.
- B. Section 01 74 00: Cleaning and Waste Management.
- C. Section 01 78 39: Projects Record Documents.
- D. The respective sections of specifications: Closeout Submittals Required of Trades.

1.03 SUBSTANTIAL COMPLETION

- A. When Contractor considers the Work substantially complete, he shall submit to Engineer
 - 1. A written notice that the Work, or designated portion therefore, is substantially complete.
 - 2. A list of items to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, Engineer will make an inspection to determine the status of completion.
- C. Should Engineer determine that the Work is not substantially complete
 - 1. Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
 - 2. Contractor shall remedy the deficiencies in the Work and send a second written notice of substantial completion to the Engineer.
 - 3. Engineer will reinspect the Work.
- D. When the Engineer finds that the Work is substantially complete he will
 - 1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with a tentative list of items to be completed before final payment.
 - 2. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.04 FINAL INSPECTION

- A. When Contractor considers the work complete, he shall submit written certification that
 - 1. Contract Documents have been reviewed.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - 5. Work is completed and ready for final inspection.
- B. Engineer will make an inspection to verify the status of completion with reasonable promptness after receipt of such certification.
- C. Should Engineer consider that the Work is incomplete or defective

1. Engineer will promptly notify the Contractor in writing listing the incomplete or defective work.
 2. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Engineer that the Work is complete.
 3. Engineer will reinspect the Work.
- D. When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer shall request the Contractor to make closeout submittals.

1.05 REINSPECTION FEES

- A. Should Engineer perform reinspection due to failure of the Work to comply with the claims of status of completion made by the Contractor
1. Owner will compensate Engineer for such additional service.
 2. Owner will deduct the amount of such compensation from the final payment to the Contractor

1.06 CLOSEOUT SUBMITTALS TO THE ENGINEER

- A. Record drawings per Section 01 78 39: Project Record Documents.
- B. Keys and keying schedule.
- C. Warranties and bonds.
- D. Evidence of payment or release of liens as required by the General Conditions.
- E. Consent of Surety to Final Payment.
- F. Equipment installation reports on equipment.
- G. Shop drawings, record data, Operation and Maintenance Manuals, and other submittals as required by the Contract Documents.
- H. Specified spare parts and special tools.
- I. Certificates of occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the work and access to services and utilities.
- J. Evidence of final, continuing insurance, and bond coverage as required by the Contract Documents.

1.07 FINAL PAYMENT REQUEST

- A. Submit a preliminary final payment request. This request is to include adjustments to the Contract Amount for:
1. Approved Change Orders.
 2. Allowances not previously adjusted by Change Order.
 3. Unit Prices.
 4. Deductions for defective work that has been accepted by the Owner.
 5. Penalties and bonuses.
 6. Deductions for liquidated damages.
 7. Deductions for re-inspection payments per Paragraph 1.05.
 8. Other adjustments.
- B. Engineer shall prepare a final Change Order, reflecting the approved adjustments to the contract amount which have not been covered by previously approved Change Orders.
- C. Submit the final application for payment per the General Conditions, including the final Change Order.

1.08 TRANSFER OF UTILITIES

- A. Transfer utilities to the owner when the Certificate of Substantial Completion has been issued, final cleaning has been completed per Section 01 74 00, and the work has been occupied by the Owner.
- B. Submit final meter readings for utilities and similar data as of the date the Owner occupied the work.

1.09 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

- A. Provide warranties, bonds, and service agreements required by Section 01 33 00 or by the individual sections of the specifications.
- B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.
- C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.
 - 1. Each document is to be signed by the respective manufacturer, supplier, and subcontractor.
 - 2. Each document is to include:
 - a. The product or work item description.
 - b. The firm, with the name of the principal, address, and telephone number.
 - c. Scope of warranty, bond, or services agreement.
 - d. Date, duration, and expiration date for each warranty, bond, and service agreement.
 - e. Procedures to be followed in the event of a failure.
 - f. Specific instances that might invalidate the warrant or bond.
- D. Submit two (2) copies of each document to the Engineer for review and transmittal to the Owner.
 - 1. Submit duplicate sets.
 - 2. Documents are to be submitted on 8-1/2" x 11" paper, punched for a standard three-ring binder.
 - 3. Submit each set in a commercial quality three-ring binder with a durable and cleanable plastic cover. The title "Warranties, Bonds, and Services Agreements", the project name and the name of the Contractor are to be typed and affixed to the cover.
- E. Submit warranties, bonds, and services agreements:
 - 1. At the time of final completion and before final payment.
 - 2. Within 10 days after inspection and acceptance for equipment or components placed in service during the progress of construction.

1.10 CLAIMS AND DISPUTES

- A. Claims and disputes must be resolved prior to recommendations of final payment acceptance and final payment by the Contractor will indicate that any outstanding claims or disputed issues have been resolved to the fullest satisfaction of the Contractor.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Summary includes: detailed information for the preparation, submission, and Engineer's review of Operations and Maintenance (O&M) Data, as required by individual Specification sections.
- B. Related sections:
 - 1. Section 01 77 00 – Closeout Procedures.

1.2 DEFINITIONS

- A. Preliminary Data: Initial and subsequent submissions for Engineer's review.
- B. Final Data: Engineer-accepted data, submitted as specified herein.
- C. Maintenance Operation: As used on Maintenance Summary Form is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.

1.3 SEQUENCING AND SCHEDULING

- A. Equipment and System Data:
 - 1. Preliminary Data:
 - a. Do not submit until Shop Drawing for equipment or system has been reviewed and approved by Engineer.
 - b. Submit prior to shipment date.
 - 2. Final Data:
 - a. Submit Instructional Manual Formatted data not less than 30 days prior to equipment or system field functional testing.
- B. Materials and Finishes Data:
 - 1. Preliminary Data: Submit at least 15 days prior to request for final inspection.
 - 2. Final Data: Submit within 10 days after final inspection.

1.4 DATA FORMAT

- A. Prepare preliminary data in the form of an instructional manual. Prepare final data in the form of an instructional manual and in electronic media format.
- B. Instructional Manual Format:
 - 1. Binder: Commercial quality, permanent, three-ring or three-post binders with durable plastic cover.
 - 2. Size: 8-1/2" x 11" minimum.
 - 3. Cover: Identify manual with typed or printed title "OPERATION AND MAINTENANCE DATA" and list:

- a. Project title.
 - b. Designate applicable system, equipment, material, or finish.
 - c. Identity of separate structure as applicable.
 - d. Identity of general subject matter covered in manual.
 - e. Identity of equipment number and Specification section.
 - 4. Title Page:
 - a. Contractor name, address, and telephone number.
 - b. Subcontractor, Supplier, installer, or maintenance contractor's name, address, and telephone number, as appropriate.
 - 1). Identify area of responsibility of each.
 - 2). Provide name and telephone number of local source of supply for parts and replacement.
 - 5. Table of Contents:
 - a. Neatly typewritten and arranged in systematic order with consecutive page numbers.
 - b. Identify each product by product name and other identifying numbers or symbols as set forth in Contract Documents.
 - 6. Paper: 20-pound minimum, white for typed pages.
 - 7. Text: Manufacturer's printed data, or neatly typewritten.
 - 8. Three-hole punched data for binding and composition; arrange printing so that punched holes do not obliterate data.
 - 9. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
- C. Electronic Media Format:
- 1. Portable Document Format (PDF):
 - a. After all preliminary data has been found to be acceptable to Engineer, submit Operation and Maintenance data in PDF format on CD.
 - b. Files to be exact duplicates of Engineer-accepted preliminary data. Arrange by specification number and name.
 - c. Files to be fully functional and viewable in most recent version of Adobe Acrobat.

1.5 SUBMITTALS

- A. Procedures of Submittal
 - 1. Contractor shall:
 - a. Submit all preliminary submittals electronically.
 - b. Submit all required final hard copies and required electronic copies as specified herein.
- B. Informational:
 - 1. Data Outline: Submit one electronic copy of a detailed outline of proposed organization and contents of Final Data prior to preparation of Preliminary Data.
 - 2. Preliminary Data:
 - a. Submit one electronic copy for Engineer's review.
 - b. If data meets conditions of the Contract:

- 1). One electronic copy will be returned to Contractor.
- 1). One electronic copy will be forwarded to Resident Project Representative.
- 2). One electronic copy will be retained in Engineer's file.
- c. If data does not meet conditions of the Contract:
 - 3). One electronic copy will be returned to Contractor with Engineer's comments (on separate document) for revision.
 - 4). Engineer's comments will be retained in Engineer's file.
 - 5). One electronic copy will be retained in Engineer's file.
 - 6). Re-submit one electronic copy revised in accordance with Engineer's comments.
3. Final Data: Submit two hard copies and one electronic copy in each format specified herein.

1.6 DATA FOR EQUIPMENT AND SYSTEMS

- A. Content for Each Unit (or Common Units) and System:
 1. Product Data:
 - a. Include only those sheets that are pertinent to specific product.
 - b. Clearly annotate each sheet to:
 - 1). Identify specific product or part installed.
 - 2). Identify data applicable to installation.
 - 3). Delete references to inapplicable information.
 - c. Function, normal operating characteristics, and limiting conditions.
 - d. Performance curves, engineering data, nameplate data, and tests.
 - e. Complete nomenclature and commercial number of replaceable parts.
 - f. Original Manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
 - g. Spare parts ordering instructions.
 - h. Where applicable, identify installed spares and other provisions for future work (e.g., reserved panel space, unused components, wiring, and terminals).
 2. As-installed, color-coded piping diagrams.
 3. Charts of valve tag numbers, with the location and function of each valve.
 4. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:
 - a. Format:
 - 1). Provide reinforced, punched, binder tab; bind in with text.
 - 2). Reduced to 8-1/2" x 11", or 11" x 17" folded to 8-1/2" x 11".
 - 3). Where reduction is impractical, fold and place in 8-1/2" x 11" envelopes bound in text.
 - 4). Identify Specification section and product on Drawings and envelopes.
 - b. Relations of component parts of equipment and systems.
 - c. Control and flow diagrams.
 - d. Coordinate drawings with Project record documents to assure correct illustration of completed installation.
 5. Instructions and Procedures: Within text, as required to supplement product data.
 - a. Format:

- 1). Organize in consistent format under separate heading for each different procedure.
- 2). Provide logical sequence of instructions for each procedure.
- 3). Provide information sheet for Owner's personnel, including:
 - a). Proper procedures in event of failure.
 - b). Instances that might affect validity of guarantee or Bond.
- b. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
- c. Operating Procedures:
 - 1). Startup, break-in, routine, and normal operating instructions.
 - 2). Test procedures and results of factory tests where required.
 - 3). Regulation, control, stopping, and emergency instructions.
 - 4). Description of operation sequence by control Manufacturer.
 - 5). Shutdown instructions for both short and extended duration.
 - 6). Summer and winter operating instructions, as applicable.
 - 7). Safety precautions.
 - 8). Special operating instructions.
- d. Maintenance and Overhaul Procedures:
 - 1). Routine maintenance.
 - 2). Guide to troubleshooting.
 - 3). Disassembly, removal, repair, reinstallation, and re-assembly.
6. Guarantee, Bond, and Service Agreement: In accordance with Section 01 77 00, CLOSEOUT PROCEDURES.

B. Content for Each Electric or Electronic Item or System:

1. Description of Unit and Component Parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data, nameplate data, and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 - d. Interconnection wiring diagrams, including control and lighting systems.
2. Circuit Directories of Panelboards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
3. List of electrical relay settings, and control and alarm contact settings.
4. Electrical interconnection wiring diagram, including control and lighting systems.
5. As-installed control diagrams by control Manufacturer.
6. Operating Procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Safety precautions.
 - d. Special operating instructions.
7. Maintenance Procedures:
 - a. Routine maintenance.
 - b. Guide to troubleshooting.
 - c. Adjustment and checking.
 - d. List of relay settings, control and alarm contact settings.
8. Manufacturer's printed operating and maintenance instructions.

9. List of original Manufacturer's spare parts, Manufacturer's current prices, and recommended quantities to be maintained in storage.

C. Maintenance Summary:

1. Compile individual Maintenance Summary for each applicable equipment item, respective unit or system, and for components or sub-units.
2. Format: Use only 8-1/2" x 11" size paper.
3. Include detailed lubrication instructions and diagrams showing points to be greased or oiled; recommend type, grade, and temperature range of lubricants and frequency of lubrication.
4. Recommended Spare Parts:
 - a. Data to be consistent with Manufacturer's Bill of Materials/Parts List furnished in O&M manuals.
 - b. "Unit" is the unit of measure for ordering the part.
 - c. "Quantity" is the number of units recommended.
 - d. "Unit Cost" is the current purchase price.

1.7 DATA FOR MATERIALS AND FINISHES

A. Content for Architectural Products, Applied Materials, and Finishes:

1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
2. Instructions for Care and Maintenance:
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods that are detrimental to product.
 - c. Recommended schedule for cleaning and maintenance.
3. Content for Moisture Protection and Weather Exposed Products:
4. Manufacturer's data, giving full information on products:
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
5. Instructions for inspection, maintenance, and repair.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

1.00 GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site for the Owner one record copy of
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.
 - 5. Engineer Field Orders or written instructions.
 - 6. Approved Shop Drawings, Product Data, and Samples.
 - 7. Field Test records.
 - 8. Construction photographs.
 - 9. Reference Standards as Necessary

1.02 RELATED REQUIREMENTS

- A. Section 01 33 00: Submittal Procedures.
- B. Section 01 32 33: Photographic Documentation

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with CSI/CSC format.
- C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by Engineer.

1.04 MARKING DEVICES

- A. Provide felt-tip marking pens for recording information in the color code designated by Engineer.
- B. Mark additional work or information in erasable pencil.
- C. Use red for new or revised indication.
- D. Use purple for work deleted or not installed (lines to be removed).
- E. Highlight in yellow the items constructed per the plans.

1.05 RECORDING

- A. Label each document "PRODUCT RECORD" in neat, large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.
- C. Mark drawings to record actual construction, including the following:
 - 1. Depths of various elements of the foundation in relation to finished first floor datum or the top of walls.
 - 2. Horizontal and vertical locations of underground utilities and appurtenances constructed and existing utilities encountered during construction.

3. Location of internal utilities and appurtenances concealed in the construction. Make reference to permanent structure on the surface. Include the following equipment:
 4. Piping
 5. Ductwork
 6. Equipment and control devices requiring periodic maintenance or repair
 7. Valves, unions, traps, and tanks
 8. Services entrance
 9. Feeders
 10. Outlets changes of dimension and detail
 11. Changes made by Field Order and Change Order
 12. Details not on the original Contract Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to RFI's.
- D. Mark specifications and addenda to identify products provided.
- E. Record manufacturer name, trade name, catalog number, and each supplier (with address and phone number) of each product and item of equipment actually installed.
- F. Record changes made by Field Order and Change Order.

1.06 SUBMITTAL

- A. Submit record documents to Engineer for review and acceptance 30 days prior to final completion of the project.
1. Provide one set of marked up drawings.
 2. Provide one set of specifications.
- B. Accompany submittal with transmittal letter in duplicate containing:
1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Title and number of each Record Document.
 5. Signature of Contractor or his authorized representative.
 6. Partial Payment Requests will not be recommended for payment if record documents are doing to be incomplete or not in order. Final payments will not be recommended without record documents.

2.00 PRODUCTS (NOT USED)

3.00 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 79 00 – DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes description and requirements of the required demonstration and training for the project:
 - 1. Providing and delivering informational submittals.
 - 2. Submitting required qualifications of Manufacturer's Representative.
 - 3. Preparing, maintaining, providing and delivering Manufacturer's Certificate of Compliance and Manufacturer's Certificate of Proper Installation.
 - 4. Furnishing required Training.
 - 5. Furnishing required Equipment Testing, Unit Process and Facility Performance Demonstration.
- B. Related Sections
 - 1. Section 01 78 23 – Operation and Maintenance Data.

1.2 DEFINITIONS

- A. Person-Day: One person for 8 hours within regular Contractor working hours.
- B. Facility: Entire Project, or an agreed-upon portion including all unit processes.
- C. Functional Test: Test or tests in presence of Engineer and Owner to demonstrate that installed equipment meets Manufacturer's installation, calibration, and adjustment requirements and other requirements as specified.
- D. Performance Test: Test or tests performed after any required functional test in presence of Engineer and Owner to demonstrate and confirm individual equipment meets performance requirements specified in individual sections.
- E. Unit Process: As used in this Section, a unit process is a portion of the facility that performs a specific process function, such as, but not limited to:
 - 1. Primary Clarifier and control panel
- F. Facility Performance Demonstration:
 - 1. A demonstration, conducted by Contractor, with assistance of Owner, to demonstrate and document the performance of the entire operating facility, manually and automatically (if required), based on criteria developed in conjunction with Owner and as accepted by Engineer.
 - 2. Such demonstration is for the purposes of:
 - a. Verifying to Owner entire facility performs as a whole, and
 - b. Documenting performance characteristics of completed facility for Owner's records. Neither the demonstration nor the evaluation is intended in any way to make performance of a unit process or entire facility the responsibility of Contractor, unless such performance is otherwise specified.

1.3 SUBMITTALS

A. Informational Submittals:

1. Training Schedule: Submit not less than 21 days prior to start of equipment installation and revise as necessary for acceptance.
2. Lesson Plan: Submit proposed lesson plan not less than 21 days prior to scheduled training and revise as necessary for acceptance.
3. Training Session Tapes: Furnish Owner with two complete sets of DVDs fully indexed and cataloged with printed label stating session and date taped.
4. Facility Startup and Performance Demonstration Plan.
5. Functional and performance test results.
6. Completed Unit Process Startup Form for each unit process.
7. Completed Facility Performance Demonstration/Certification Form.

1.4 QUALIFICATION OF MANUFACTURER'S REPRESENTATIVE

- A. Authorized representative of the Manufacturer, factory trained, and experienced in the technical applications, installation, operation, and maintenance of respective equipment, subsystem, or system, with full authority by the equipment Manufacturer to issue the certifications required of the Manufacturer. Additional qualifications may be specified elsewhere.
- B. Representative subject to acceptance by Owner and Engineer. No substitute representatives will be allowed unless prior written approval by such has been given.

1.5 FACILITY STARTUP AND PERFORMANCE DEMONSTRATION PLAN

- A. Develop a written plan, in conjunction with Owner's operations personnel; to include the following:
 1. Step-by-step instructions for startup of each unit process and the complete facility.
 2. Unit Process Startup Form (sample attached), to minimally include the following:
 - a. Description of the unit process, including equipment numbers/nomenclature of each item of equipment and all included devices.
 - b. Detailed procedure for startup of the unit process, including valves to be opened/closed, order of equipment startup, etc.
 - c. Startup requirements for each unit process, including water, power, chemicals, etc.
 - d. Space for evaluation comments.
 3. Facility Performance Demonstration/Certification Form (sample attached), to minimally include the following:
 - a. Description of unit processes included in the facility startup.
 - b. Sequence of unit process startup to achieve facility startup.
 - c. Description of computerized operations, if any, included in the facility.
 - d. Contractor certification facility is capable of performing its intended function(s), including fully automatic operation.
 - e. Signature spaces for Contractor and Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL

- A. Furnish Manufacturers' services when required by an individual specification section, to meet the requirements of this Section.
- B. Where time is necessary in excess of that stated in the Specifications for Manufacturer's services, or when a minimum time is not specified, the time required to perform the specified services shall be considered incidental.
- C. Schedule Manufacturer's services to avoid conflict with other onsite testing or other Manufacturer's onsite services.
- D. Determine, before scheduling services, that all conditions necessary to allow successful testing have been met.
- E. Only those days of service approved by Engineer will be credited to fulfill the specified minimum services.
- F. When specified in individual specification sections, Manufacturer's onsite services shall include:
 - 1. Assistance during product (system, subsystem, or component) installation to include observation, guidance, instruction of Contractor's assembly, erection, installation or application procedures.
 - 2. Inspection, checking, and adjustment as required for product (system, subsystem, or component) to function as warranted by Manufacturer and necessary to furnish Manufacturer's Certificate of Proper Installation.
 - 3. Providing, on a daily basis, copies of all Manufacturer's representatives' field notes and data to Engineer.
 - 4. Revisiting the Site as required to correct problems and until installation and operation are acceptable to Engineer.
 - 5. Resolution of assembly or installation problems attributable to or associated with, respective Manufacturer's products and systems.
 - 6. Assistance during functional and performance testing, and facility startup and evaluation.
 - 7. Training of Owner's personnel in the operation and maintenance of respective product as required.
 - 8. Additional requirements may be specified elsewhere.
- G. Facility Startup Meetings: Notify Owner at least 14 days prior to startup and conduct a facility startup meeting on site. Discuss test schedule, test methods, materials, chemicals and liquids required, facilities operations interface, and Owner involvement.
- H. Contractor's Testing and Startup Representative:

1. Designate and furnish one or more personnel to coordinate and expedite testing and facility startup.
 2. Representative(s) shall be present during startup meetings and shall be available at all times during testing and startup.
- I. Provide temporary valves, gauges, piping, test equipment and other materials and equipment required for testing and startup.
 - J. Provide Subcontractor and equipment Manufacturer's with adequate staff to prevent delays. Schedule ongoing work so as not to interfere with or delay testing and startup.
 - K. Owner will:
 1. Provide water, power, chemicals, and other items as required for startup, unless otherwise indicated.
 2. Operate process units and facility with support of Contractor.
 3. Provide labor and materials as required for laboratory analyses.

3.2 MANUFACTURER'S CERTIFICATE OF COMPLIANCE

- A. When specified in individual Specification section, submit prior to shipment of product or material.
- B. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.
- C. Signed by product Manufacturer certifying that product or material specified conforms to or exceeds specified. Attach supporting reference data, affidavits, and certifications as appropriate.
- D. May reflect recent or previous test results on material or product, if acceptable to Engineer.

3.3 MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

- A. When so specified, a Manufacturer's Certificate of Proper Installation form, a copy of which is attached to this Section, shall be completed and signed by the equipment Manufacturer's representative.
- B. Such form shall certify that the signing party is a duly authorized representative of the Manufacturer, is empowered by the Manufacturer to inspect, approve, and operate their equipment and is authorized to make recommendations required to assure that the equipment is complete and operational.

3.4 TRAINING

- A. General:
 1. Furnish Manufacturer's representatives for detailed classroom and hands-on training to Owner's personnel on operation and maintenance of specified product (system, subsystem, component) and as may be required in applicable Specifications.

2. Furnish trained, articulate personnel to coordinate and expedite training, to be present during training coordination meetings with Owner, and familiar with operation and maintenance manual information specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
 3. Manufacturer's representative shall be familiar with facility operation and maintenance requirements as well as with specified equipment.
 4. Furnish complete training materials, to include operation and maintenance data, to be retained by each trainee.
- B. Training Schedule:
1. List specified equipment and systems that require training services and show:
 - a. Respective Manufacturer.
 - b. Estimated dates for installation completion.
 - c. Estimated training dates.
 2. Allow for multiple sessions when several shifts are involved.
 3. Adjust schedule to ensure training of appropriate personnel as deemed necessary by Owner, and to allow full participation by Manufacturer's representatives. Adjust schedule for interruptions in operability of equipment.
 4. Coordinate with Section 01 32 16, CONSTRUCTION PROGRESS SCHEDULE.
- C. Lesson Plan: When Manufacturer or vendor training of Owner personnel is specified, prepare for each required course, containing the following minimum information:
1. Title and objectives.
 2. Recommended types of attendees (e.g., managers, engineers, operators, maintenance).
 3. Course description and outline of course content.
 4. Format (e.g., lecture, self-study, demonstration, hands-on).
 5. Instruction materials and equipment requirements.
 6. Resumes of instructors providing the training.
- D. Pre-startup Training:
1. Coordinate training sessions with Owner's operating personnel and Manufacturer's representatives, and with submission of operation and maintenance manuals in accordance with Section 01 78 23, OPERATIONS AND MAINTENANCE DATA.
 2. Complete at least 14 days prior to beginning of facility startup.
- E. Post-startup Training: If required in Specifications furnish and coordinate training of Owner's operating personnel by respective Manufacturer's representatives.
- F. Taping of Training Sessions:
1. Furnish audio and color video taping of all instruction sessions, including Manufacturer's representatives, hands-on equipment instruction and classroom sessions.
 2. Video training DVDs shall be produced by a qualified, professional video specialist approved by Owner.
 3. Use DVD format, suitable for playback on standard equipment available commercially in the United States.

3.5 EQUIPMENT TESTING

A. Preparation:

1. Complete installation before testing.
2. Furnish qualified Manufacturer's representatives, when required by individual Specification sections.
3. Obtain and submit from equipment Manufacturer's representative Manufacturer's Certificate of Proper Installation Form when required by individual Specification sections.
4. Equipment Test Report Form: Provide written test report for each item of equipment to be tested, to include the minimum information:
 - a. Owner/Project Name.
 - b. Equipment or item tested.
 - c. Date and time of test.
 - d. Type of test performed (Functional or Performance).
 - e. Test method.
 - f. Test conditions.
 - g. Test results.
 - h. Signature spaces for Contractor and Engineer as witness.
5. Cleaning and Checking: Prior to beginning functional testing:
 - a. Calibrate testing equipment in accordance with Manufacturer's instructions.
 - b. Inspect and clean equipment, devices, connected piping, and structures to ensure they are free of foreign material.
 - c. Lubricate equipment in accordance with Manufacturer's instructions.
 - d. Turn rotating equipment by hand when possible to confirm that equipment is not bound.
 - e. Open and close valves by hand and operate other devices to check for binding, interference, or improper functioning.
 - f. Check power supply to electric-powered equipment for correct voltage.
 - g. Adjust clearances and torque.
 - h. Test piping for leaks.
6. Ready-to-test determination will be by Engineer-based at least on the following:
 - a. Acceptable Operation and Maintenance Data.
 - b. Notification by Contractor of equipment readiness for testing.
 - c. Receipt of Manufacturer's Certificate of Proper Installation, if so specified.
 - d. Adequate completion of work adjacent to, or interfacing with, equipment to be tested.
 - e. Availability and acceptability of Manufacturer's representative, when specified, to assist in testing of respective equipment.
 - f. Satisfactory fulfillment of other specified Manufacturer's responsibilities.
 - g. Equipment and electrical tagging complete.
 - h. Delivery of all spare parts and special tools.

B. Functional Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Owner and Engineer in writing at least 10 days prior to scheduled date of testing.
3. Prepare Equipment Test Report summarizing test method and results.

4. When in Engineer's opinion, equipment meets functional requirements specified such equipment will be accepted for purposes of advancing to performance testing phase, if so required by individual Specification sections. Such acceptance will be evidenced by Engineer/Owner's signature as witness on Equipment Test Report.

C. Performance Testing:

1. Conduct as specified in individual Specification sections.
2. Notify Engineer and Owner in writing at least 10 days prior to scheduled date of test.
3. Performance testing shall not commence until equipment has been accepted by Engineer as having satisfied functional test requirements specified.
4. Type of fluid, gas, or solid for testing shall be as specified.
5. Unless otherwise indicated, furnish labor, materials, and supplies for conducting the test and taking samples and performance measurements.
6. Prepare Equipment Test Report summarizing test method and results.
7. When, in Engineer's opinion, equipment meets performance requirements specified, such equipment will be accepted as to conforming to Contract requirements. Such acceptance will be evidenced by Engineer's signature on Equipment Test Report.

3.6 STARTUP OF UNIT PROCESSES

- A. Prior to unit process startup, equipment within unit process shall be accepted by Engineer as having met functional and performance testing requirements specified.
- B. Startup sequencing of unit processes shall be as chosen by Contractor to meet schedule requirements.
- C. Make adjustments, repairs, and corrections necessary to complete unit process startup.
- D. Startup shall be considered complete when, in opinion of Engineer, unit process as operated in manner intended for 5 continuous days without significant interruption. This period is in addition to functional or performance test periods specified elsewhere.
- E. Significant Interruption: May include any of the following events:
 1. Failure of Contractor to provide and maintain qualified onsite startup personnel as scheduled.
 2. Failure to meet specified functional operation for more than 2 consecutive hours.
 3. Failure of any critical equipment or unit process that is not satisfactorily corrected within 5 hours after failure.
 4. Failure of any non-critical equipment or unit process that is not satisfactorily corrected within 8 hours after failure.
 5. As determined by Engineer.
- F. A significant interruption will require startup then in progress to be stopped. After corrections are made; start up test period and start from beginning again.

3.7 FACILITY PERFORMANCE DEMONSTRATION

- A. When, in the opinion of Engineer, startup of all unit processes has been achieved, sequence each unit process to the point that facility is operational.
- B. Demonstrate proper operation of required interfaces within and between individual unit processes.
- C. After facility is operating, complete performance testing of equipment and systems not previously tested.
- D. Document, as defined in Facility Startup and Performance Demonstration Plan, the performance of the facility.
- E. Certify, on the Facility Performance Demonstration/Certification Form, that facility is capable of performing its intended function(s), including fully automatic operation.

3.8 SUPPLEMENTS

- A. Supplements listed below, following “End of Section”, are a part of this Specification:
 - 1. Manufacturer’s Certificate of Proper Installation Form.
 - 2. Unit Process Startup Form.
 - 3. Facility Performance Demonstration/Certification Form.

END OF SECTION

MANUFACTURER'S CERTIFICATE OF PROPER INSTALLATION

OWNER: _____ EQUIP. SERIAL NO: _____
EQUIP. TAG NO: _____ EQUIP. SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above referenced equipment/system has been:

(Check Applicable)

☐	Installed in accordance with Manufacturer's recommendations.
☐	
☐	Inspected, checked, and adjusted.
☐	
☐	Serviced with proper initial lubricants.
☐	
☐	Electrical and mechanical connections meet quality and safety standards.
☐	
☐	All applicable safety equipment has been properly installed.
☐	
☐	Functional tests.
☐	
☐	System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments:

I, the undersigned Manufacturer's Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate its equipment, and (iii) authorized to make recommendations required to assure that the equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____.

Manufacturer: _____

By Manufacturer's Authorized Representative: _____

(Authorized Signature)

UNIT PROCESS STARTUP FORM

OWNER: _____ PROJECT: _____

Unit Process Description: (Include description and equipment number of all equipment and devices):

Startup Procedure: (Describe procedure for sequential startup and evaluation, including valves to be opened/closed, order of equipment startup, etc.):

Startup Requirements (Water, power, chemicals, etc.):

Evaluation Comments:

FACILITY PERFORMANCE DEMONSTRATION/CERTIFICATION FORM

OWNER: _____ PROJECT: _____

Unit Process Description: (List unit processes involved in facility startup):

Unit Processes Startup Sequence: (Describe sequence for startup, including computerized operations if any):

Contractor Certification that Facility is capable of performing its intended function(s), including fully automatic operation:

Contractor: _____ Date: _____, 20 ____

Engineer: _____ Date: _____, 20 ____

DIVISION 2
EXISTING CONDITIONS

SECTION 02 41 00 - DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Portions of buildings and other areas, materials selective demolition, and partial demolition work are as shown on Drawings and specified herein.
 - 2. Materials to be removed for construction and reinstalled for reuse or continued operation are as shown on the drawings and specified herein.

1.2 SUBMITTALS

- A. Shop Drawings: Plans showing all materials to be removed and/or reinstalled for reuse on continued operation including interim storage plans for each item.
- B. Quality Control Submittals:
 - 1. Schedule of demolition, as part of and consistent with the progress schedule specified in Section 01 32 16, CONSTRUCTION PROGRESS SCHEDULE.
 - 2. Methods of demolition and equipment proposed to demolish each structure.
 - 3. Copies of any authorizations and permits required to perform Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Utilities:
 - 1. Notify Owner and appropriate utilities 72 hours prior to turning off affected services before starting demolition or alterations.
 - 2. Remove utility lines exposed by demolition excavation.
- B. Removal and Storage of Equipment for Reuse:
 - 1. Do not remove equipment and materials without approval of Engineer.
 - 2. Properly store and maintain equipment and materials in same condition as when removed.
 - 3. Engineer will determine condition of equipment and materials prior to removal.

3.2 DEMOLITION

- A. Drawings define minimum portion of equipment to be removed and structures to be modified. Unless otherwise shown, rough cuts or breaks may be made exceeding limits of demolition shown.
- B. Provide all demolition, removal, temporary storage, and reinstallation of materials as required for implementation of the work.

- C. Remove all materials associated with existing equipment that is to be removed or relocated.
- D. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.

3.3 DISPOSAL

- A. Dispose of debris and other non-salvaged materials offsite in licensed landfills.

3.4 SALVAGE

- A. Equipment and materials not reused or reinstalled, including all metals and piping within the limits of demolition, unless otherwise specified or requested by the Owner, shall be disposed of.

END OF SECTION

DIVISION 3
CONCRETE

SECTION 03 01 00 - CONCRETE SURFACE REPAIR SYSTEMS

PART 1 - GENERAL

1.1 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO): T277, Standard Method of Test for Rapid Determination of the Chloride Permeability of Concrete.
 2. ASTM International (ASTM):
 - a. C 109, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
 - b. C 157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
 - c. C 293, Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading)
 - d. C 309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - e. C 348, Standard Test Method for Flexural Strength of Hydraulic Cement Mortars.
 - f. C 469, Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
 - g. C 496, Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
 - h. C 531, Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes
 - i. C 666, Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
 - j. C 672, Standard Test Method for Scaling Resistance for Concrete Surfaces Exposed to Deicing Chemicals.
 - k. C 882, Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with Concrete by Slant Shear.
 - l. C 928, Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repair.
 - m. C 1012, Standard Test Method for Length Change of Hydraulic Cement Mortars Exposed to a Sulfate Solution.
 - n. C 1202, Standard Test Method for Electrical Induction of Concrete's Ability to Resist Chloride Ion Penetration.
 - o. E 699, Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee.

1.2 SUBMITTALS

- A. Information Submittals:
1. Mortar System:

- a. Manufacturer's installation bulletin.
 - b. Manufacturer's product data sheets
- 2. Certificates:
 - a. Certificate of Compliance that proposed product systems meet or exceed specified performance criteria.
- 3. Statements of Qualification:
 - a. Contractor's installers.
 - b. Mortar system Manufacturer's representative.

1.3 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.
 - 2. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
 - 3. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.

PART 2 - PRODUCTS

2.1 POLYMER-MODIFIED REPAIR MORTAR

- A. Mortar: Two component, polymer-modified, cementitious based, chloride resistant, non-sag mortar, gray in color, corrosion inhibiting, working time of 20 minutes minimum, surface renovation mortar conforming to the following properties:
- B. Performance Criteria:
 - 1. Bond strength in accordance with ASTM C 882 (modified) Test Method at 28 days: Minimum 1,750 psi.
 - 2. Modules of Elasticity: ASTM C531, minimum 2.0 by 10⁶ psi.
 - 3. Compressive Strength:
 - a. ASTM C 109 at 1 day: minimum 2,500 psi.
 - b. ASTM C 109 at 28 days: minimum 6,000 psi.
 - 4. Flexural Properties, ASTM C 293 at 28 days: minimum 1,200 psi.
 - 5. Permeability, AASHTO T 277: 800 coulombs maximum.
 - 6. Splitting Tensile Strength: ASTM C 496 at 7 days, minimum 500 psi.
 - 7. Drying Shrinkage, ASTM C 596 at 28 days: 0.05% max.
 - 8. Freeze Thaw Resistance, ASTM C 666, at 300 cycles: 95% RDF.
- C. Manufacturers and Products:
 - 1. Sika Corporation, Lyndhurst, New Jersey, SikaTop 123 Plus.
 - 2. Or approved equal.

2.2 BONDING AGENT

- A. Epoxy resin/portland cement adhesive:
 - 1. Component "A" shall be an epoxy resin/water emulsion containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2. Component "B" shall be primarily a water solution of a polyamine.
 - 3. Component "C" shall be a blend of selected portland cements and sands.
 - 4. The material shall not contain asbestos.
- B. Performance Criteria:
 - 1. Properties of the mixed epoxy resin/portland cement adhesive:
 - a. Pot life: 75 to 105 minutes.
 - b. Contact time: 12 hours (min) @ 79 degrees Fahrenheit.
 - c. Color: gray.
 - 2. Properties of the cured epoxy resin/portland cement adhesive:
 - a. Compressive strength in accordance with ASTM C 109:
 - 1). 3 day: 4,500 pounds per square-inch minimum.
 - 2). 7 days: 6,500 pounds per square-inch minimum.
 - 3). 28 days: 8,500 pounds per square-inch minimum.
 - 3. Splitting tensile strength in accordance with ASTM C 496:
 - a. 28 days: 600 pounds per square-inch minimum.
 - 4. Flexural strength:
 - a. 1,100 pounds per square-inch minimum in accordance with ASTM C 348.
 - 5. Bond strength in accordance with ASTM C 882 modified at 14 days:
 - a. 0 hours open time: 2,800 pounds per square-inch minimum.
 - b. 24 hours open time: 2,600 pounds per square-inch minimum.
 - 6. The epoxy resin/portland cement adhesive shall not produce a vapor barrier.
 - 7. Material must be proven to prevent corrosion of reinforcing steel when tested under the procedures as set forth by the FHWA Program Report Number FHWA/RD86/193. Proof shall be in the form of an independent testing laboratory corrosion report showing prevention of corrosion of the reinforcing steel.
- C. Manufacturers and Products:
 - 1. Sika Corporation, Lyndhurst, New Jersey, Sika Armatec 110.
 - 2. Or approved equal.

2.3 WATER

- A. Clean and free from oil, acid, alkali, organic matter, or other deleterious substances, meeting federal drinking water standards.

2.4 ACCESSORIES

- A. Finishing Aid Manufacturer and Product: Sika Corporation, Lyndhurst, New Jersey, Sika Film Evaporation Retardant..

PART 3 - EXECUTION

3.1 GENERAL

- A. Adhere to all limitations and cautions for the epoxy resin/portland cement adhesive in the manufacturer's current printed literature.

3.2 PREPARATION

- A. Collect and dispose of water from removal operations in manner and location acceptable to Owner.
- B. Do not use power-driven jackhammers and chipping hammers, unless water blasting is prohibited due to potential damage to installed equipment.
- C. Remove concrete minimum of 1" clearance around rebar for application and bonding of new mortar to entire periphery of exposed rebar if the following surface conditions exist:
 - 1. 50% or more of periphery around rebar is exposed during removal of concrete.
 - 2. 25% or more of periphery around rebar is exposed during removal of concrete and corrosion has eventuated to the extent that loss of section has occurred.
 - 3. Bond between existing concrete and reinforcement has deteriorated.
- D. Steel: Clean exposed reinforcing bars of rust and concrete, and coat with two 20mils layers (40 mils total) of epoxy resin bonding agent. Allow proper drying time between coats as recommended by the manufacturer
- E. Cementitious substrates: Roughen all surfaces to a ICRI 310.2 surface profile of CSP-5 or rougher using one of the following methods:
 - 1. Abrasive blasting.
 - 2. Steel shotblasting.
 - 3. High/ultra high-pressure water jetting.
- F. Clean surface areas to be filled with new mortar of laitance and contamination by high pressure water blasting not more than 24 hours before applying bonding agent, Saturated Surface Dry (SSD) existing concrete at time of application of mortar.

3.3 APPLICATION

- A. Mix mortar in mortar-concrete mixer per manufactures recommendations.
 - 1. Do not re-temper material.
- B. Apply epoxy bonding agent per manufactures recommendations.
 - 1. Minimum thickness: 20 mils
- C. Place mortar into prepared area from one side to the other.
- D. Work material firmly into the side and bottom of patch to assure a good bond. Level repair mortar and screed to elevation of existing concrete.

- E. Finish to same texture as existing concrete around patch.

3.4 CURING

- A. Cure per ACI recommendations for portland cement concrete. Moist cure with wet burlap and polyethylene, a fine mist of water or a water-based compatible curing compound. Moist curing should commence immediately after finishing and continue for a minimum of 48 hours.
- B. Protect newly applied material from rain, sun, and wind until compressive strength is 70% of the 28-day compressive strength. To prevent from freezing cover with insulating material. Setting time is dependent on temperature and humidity.

3.5 CLEANING

- A. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

END OF SECTION

SECTION 03 60 01 – BASIN BOTTOM GROUT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Grouting basin bottom slabs.

1.2 REFERENCES

- A. International Concrete Repair Institute (ICRI):
 - 1. 310.2 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

1.3 DEFINITIONS

- A. When grouting basin bottom slabs:
 - 1. Grout that has not bonded: Is defined as grout that, after placing and setting, has hollow sound when tapped with 4-foot long, nominal, 2-inch by 4-inch piece of lumber.
- B. Quality control submittals:
 - 1. Manufacturer's instructions:
 - a. For equipment to be used in grouting basin bottom slabs:
 - 1) Submit grout placement instructions from manufacturer of equipment designated to operate in basin.
 - 2) Include in such instructions statements on limitations and precautions to be observed when using equipment for grout placement.
- C. Jitterbug: an expanded metal or grate tamper designed for finishing concrete surfaces with a rough surface profile.

1.4 QUALITY ASSURANCE

- A. Pre-installation conference for grouting basin bottom slabs: Schedule meeting with ENGINEER not less than 48 hours before planned grouting operations to discuss method of placement of grout.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C150 type II or combination of Type I with fly ash.
 - 2. Fly Ash: ASTM C618, Class C or F fly ash shall not exceed 15 percent of the cementitious materials, unless written approval is given by the Engineer.

B. Normal-Weight Aggregates: Provide aggregates from a single source with documented service record data of at least 10 years satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
2. Fine aggregate:
 - a. Provide fine aggregate for concrete or mortar consisting of clean, natural sand or of sand prepared from crushed stone or crushed gravel.
 - b. Do not provide aggregate having deleterious substances in excess of following percentages by weight of contaminating substances.
 - c. In no case shall total exceed percent listed.

<u>Item</u>	<u>Test Method</u>	<u>Percent</u>
Removed by decantation (dirt, silt, etc.)	ASTM C117	3
Shale or Chert	ASTM C123	1
	ASTM C295*	1
Clay Lumps	ASTM C142	1
* Test Method C123 is used to identify particles in the sample lighter than 2.40 Specific Gravity. Test Method C295 is used to identify which of the lightweight particles are shale or chert. If the results of Test Method C123 are less than 1 percent, Test Method C295 is not required.		

- d. Except as otherwise specified, grade fine aggregate from coarse to fine in accordance with ASTM C33.

C. Water: ASTM C94 and potable (not recycled water).

2.2 MIXES

- A. Grout mixture:
1. One part portland cement and 4-1/2 parts sand, by weight.
 2. Water content:
 - a. Sufficient to allow workability for spreading grout with screeds attached to arms of equipment mechanism.
 - b. Not excessive, to prevent formation of surface water, laitance, segregation, and to allow grout to stay in place after screeding.
 3. Do not use admixtures.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface preparation:
1. Basin bottom slab surface preparation:
 - a. Concrete slab surfaces shall have rough texture, suitable for bonding grout.

- b. Roughen top of slab surface to a ICRI 310.2 surface profile of CSP-5 or rougher using one of the following methods:
 - 1) Abrasive blasting.
 - 2) Steel shotblasting.
 - 3) High/ultra high-pressure water jetting.
- c. Clean entire slab surface as required to remove dirt, oil, curing compound, laitance, dust, and other matter that may prevent proper grout bonding.
- d. Saturate concrete slabs with water for minimum of 3 days just before placing grout. At time grout is placed, concrete shall be saturated and surface-dry (SSD) with no standing water during application.
- e. Apply (scrub in) a bond coat slurry of portland cement and water paste to the saturated-surface-dry prepared substrate before application of the grout. Do not apply more of the bond coat than can be covered with grout before the bond coat dries. Do not re-temper this bond coat.

B. Equipment preparation:

- 1. Preparation of equipment for grouting basin bottom slabs:
 - a. Setting the screeds:
 - 1) Bolt nominal 2-inch by 4-inch section of lumber blades on arms of equipment mechanism.
 - 2) Locate leading edge of lumber approximately 2 inches in front of blade and cut it parallel to centerline of arm.
 - 3) Securely nail nominal 2-inch by 6-inch screed board to ends of 2 by 4 lumber, in manner such that screed runs parallel to centerline of arm.
 - 4) Nail bent sheet metal to lower edge of screed board.
 - 5) Ensure that bottom of screed board is 1-1/2 inches below steel blades on arms of equipment mechanism.

3.2 APPLICATION

A. Grouting basin bottom slabs:

- 1. Placement, general:
 - a. Place grout in accordance with equipment manufacturer's instructions and in accordance with limitations and precautions given in such instructions.
 - b. Bring promptly to attention of the ENGINEER, conflicts between manufacturer's instructions and this Section.
- 2. Placing grout:
 - a. Use grouting equipment to apply grout for basin bottom slabs.
 - b. Perform grouting continuously without interruptions until basin slab is covered.
 - c. Place ring of grout approximately 3 feet wide on outer edge of slab and gradually widened towards center following spiral pattern until basin bottom slab is covered.
 - d. Unacceptable placing procedure: Following procedures will not be accepted:
 - 1) Grouting by circular sectors or "pie" sections.
 - 2) Grouting from center outward.

- e. Use finishing workers to control area immediately in front of screed boards in manner so that:
 - 1) Grout is installed to specified thickness.
 - 2) No low areas occur.
 - 3) No excessive amount of grout accumulates.
 - 4) Grout surface has uniform wood trowel finish without ridges, gouges, or other defect.
- f. Coordinate grout placement rate and number of finishing workers with travel speed of arms of equipment mechanism.
- g. Last grout area to be grouted in center may be finished by worker operating from 1 of the arms.
- 3. Following grout placement:
 - a. After completion of slab grouting, allow mechanism to run continuously until there is no more danger that grout sloughing may occur.
 - b. Prevent dry clumps of grout or rocks from being caught under screed board and gouging finish surface of grout.
- 4. Corrections:
 - a. Before grout has set:
 - 1) Where sloughing has occurred, remove grout from sloughed areas and place grout in low areas.
 - 2) Repair gouges in grouted surface.
- 5. Curing:
 - a. After grout has set, water cure grout for 14 days.
 - b. Keep grout surface continuously wet for duration of curing period.
- B. Tolerances:
 - 1. For grouting basin bottom slabs:
 - a. Tolerance in elevation of finished grout surface: Plus or minus 1/8 inch.
 - 1) Specified tolerance is more exacting than customary industry standards for slab finish.
 - 2) Tolerance is required for proper operation of equipment.
 - b. Thickness of grout layer:
 - 1) Not less than 1 inch at any point.
 - 2) Provide average thickness of grout as indicated on the Drawings.

3.3 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Verify grout elevation tolerance on basin bottom slabs as follows:
 - a. After grout has set, operate grouting equipment with blades set to clear grout surface.
 - b. Under these conditions, blades shall not clear grout surface by more than 1/4 inch at any point:
 - 1) Excess clearance: Correct as specified in article titled "Adjusting" in this Section.

3.4 ADJUSTING

A. Grouting basin bottom slabs:

1. After grout has set:
 - a. Where clearance between blades and grouted surface exceeds tolerance specified in this Section, grind high points in grout surface using terrazzo machine until specified tolerance is met.
 - b. Grout that has not bonded to concrete slab is not acceptable. Remove and replace such grout.

END OF SECTION

DIVISION 5
METALS

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Steel framing and supports for mechanical and electrical equipment.
 - 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 3. Loose bearing and leveling plates.
 - 4. Steel welded plates and angles for casting into concrete not specified in other Sections.
 - 5. Miscellaneous steel trim including steel angle corner guards and steel edgings.
 - 6. Metal floor plate and supports.
 - 7. Abrasive metal nosing, treads, and thresholds.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Loose steel lintels.
 - 2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Sections include the following:
 - 1. Section 05 52 13, PIPE AND TUBE RAILINGS.
 - 2. Section 09 90 00, PAINTING AND PROTECTIVE COATINGS

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- B. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 °F, ambient; 180 °F, material surfaces.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Metal nosing and treads.
 - 2. Paint products.
 - 3. Grout.
 - 4. Fall Protection (ladder).
 - 5. Metal Floor Plate and support.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. Provide templates for anchors and bolts specified for installation under other Sections.
3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Verification: For each type and finish of extruded nosing and tread.

D. Mill Certificates: Signed by Manufacturers of stainless-steel sheet certifying that products furnished comply with requirements.

E. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate installation of steel weld plates and angles for casting into concrete that are specified in this Section but required for work of another Section. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 - 2. Available Manufacturers: Subject to compliance with requirements, Manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- E. Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- F. Cast Iron: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

2.4 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.
- B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.
- C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632, Alloy 6061-T6.
- D. Aluminum Castings: ASTM B 26, Alloy 443.0-F.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type, 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5,

at exterior walls. Provide stainless-steel fasteners for fastening aluminum. Select fasteners for type, grade, and class required.

- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A, with hex nuts, ASTM A 563; and, where indicated, flat washers.
 - 1. Finish: Plain or Hot Dip Zinc-coated ASTM A153 Class C, as indicated.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts and, where indicated, flat washers; ASTM F 593, AISI Type 316, Condition CW for bolts and ASTM F 594 for AISI Type 316, Condition CW nuts.
 - 1. All threads on stainless steel rods/bolts shall be protected with antiseize lubricant suitable for submerged stainless bolts and complying with Federal Specification MIL-A-907E.
- D. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- E. Machine Screws: ASME B 18.6.3.
- F. Lag Bolts: ASME B 18.2.1.
- G. Wood Screws: Flat head, ASME B18.6.1.
- H. Plain Washers: Round, ASME B 18.22.1.
- I. Lock Washers: Helical, spring type, ASME B 18.21.1.
- J. Cast-in-Place Anchors in Concrete: Anchors capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Threaded or wedge type; galvanized ferrous castings either: ASTM A 47 malleable iron or ASTM A 27, cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153.
- K. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material for Anchors in Exterior Locations: ASTM F 593, AISI Type 316, Condition CW for bolts and ASTM F 594 for AISI Type 316, Condition CW nuts.
 - 3. Expansion anchors shall not be substituted for adhesive anchors.
- L. Adhesive Anchors:
 - 1. Threaded Rod:
 - a. ASTM F 593 stainless steel threaded rod, diameter as shown on Drawings.

- b. Length as required to provide minimum depth of embedment.
 - c. Clean and free of grease, oil, or other deleterious material.
 - d. For hollow-unit masonry, provide galvanized or stainless steel wire cloth screen tube to fit threaded rod.
- 2. Adhesive:
 - a. Two-component, insensitive to moisture, designed to be used in adverse freeze/thaw environments, with gray color after mixing.
 - b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.
 - c. Nonsag, with selected viscosity based on installation temperature and overhead application where applicable.
 - d. HILTI HIT HY-150 or approved equal.
- 3. Packaging:
 - a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.
 - b. Cartridge Marking: Include manufacturer's name, product name, material type, batch serial number, and adhesive expiration date.
- 4. Manufacturers and Products:
 - a. Hilti, Inc., Tulsa, OK; HIT Doweling Anchor System, HIT HY 150 (HIT HY 20 for hollow masonry).
 - b. Approved Equal.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 9.
- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.
 - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.), or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
 - 1. Use primer with a VOC content of 420 g/L (3.5 lb/gal.), or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 2. Available Products:
 - a. Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18119.
 - b. Carboline Company; Carbozinc 621.
 - c. ICI Devoe Coatings; Catha-Coat 313.
 - d. International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer.
 - e. PPG Architectural Finishes, Inc.; Aquapon Zinc-Rich Primer 97-670.

- f. Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer.
 - g. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in steel, complying with SSPC-Paint 20.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- G. Non-shrink, Nonmetallic Grout: Factory-packaged, non-staining, non-corrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by Manufacturer for interior and exterior applications and complying with Section 03 60 00 GROUT.
- H. Concrete Materials and Properties: Comply with requirements in Section 03 30 00, CAST-IN-PLACE CONCRETE for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.

2.7 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32", unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal comers to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld comers and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure, and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8" x 1-1/2", with a minimum 6" embedment and 2" hook, not less than 8" from ends and corners of units and 24" o.c., unless otherwise indicated.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Design and provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 - 1. Fabricate units from slotted channel framing where indicated.
 - 2. Furnish inserts if units are installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.9 LOOSE STEEL LINTEL

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8", unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose steel lintels located in exterior walls with zinc-rich primer.

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates after fabrication.
- C. Prime plates with zinc-rich primer.

2.11 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

2.12 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
 - 1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime interior miscellaneous steel trim, with zinc-rich primer.

2.13 METAL LADDERS

- A. General:
 - 1. Comply with the more stringent requirements of OSHA and ANSI A14.3, unless indicated otherwise.
 - 2. Space side rails 16" clear apart, unless otherwise indicated.
 - 3. Support each ladder at top and bottom and not more than 60" o.c, with welded or bolted brackets, made from same metal as ladder.
 - 4. All ladders including ladders less than 20 feet in height shall be equipped with an integral fall protection system.
- B. Design Live Loads:
 - 1. Side rail loads: Ladder rails shall be designed to withstand a minimum of two (2) 300 pound loads plus 30 percent impact concentrated between any two consecutive attachments.
 - 2. Rung loads: Ladder rungs shall be designed to withstand a minimum live load of 300 pounds plus 30 percent impact.
- C. Ladder Deflection:
 - 1. Limit rung deflection to span divided by 360.
- D. Extension (Pop-up). Every ladder that does not have an exterior hand hold shall be equipped with a pop-up extension designed by the ladder manufacturer.
 - 1. Pop-up extension shall be of the same material and finish as the ladder with telescoping tubular section that locks automatically when fully extended.
 - 2. Upward and downward movement shall be controlled by stainless steel spring balancing mechanisms.

3. Units shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's recommendations.

2.14 ALUMINUM PLANK

- A. Acceptable Manufacturers include, but are not limited to the following:
 1. Ohio Gratings Inc.
 2. McNichols Co.
 3. Amico, a Gibraltar Industries Co.
 4. Harsco Industrial IKG.
 5. Or Approved equal.
- B. Materials: Plank and banding are Aluminum type 6061-T6, ASTM B221.
 1. Description:
 - a. Unpunched, Aluminum Heavy Duty Plank Grating: Six inch wide extruded aluminum plank with support bars spaced 1.2" on center, fabricated with banding into panels of standard width to fill areas shown on the drawings.
 - 1) Top Surface: Slip resistant
 - 2) Finish: Mill finished
 - 3) Plank Type: Unpunched
 - 4) Plank Depth: based on loading requirements and clear span.

2.15 METAL FLOOR PLATE

- A. Also referenced as "Checkered" or "Check" Plate, with raised lugs on one side and smooth surface on other side.
- B. Fabricate from roller-aluminum-alloy 6061-T6, ASTM B 632 plate of thickness indicated below. Raised lug pattern shall be on top and start at 45° angle to edge of plate or tread.
- C. Design and provide stainless steel or aluminum angle and/or aluminum beam supports, as indicated or required and not indicated.
- D. Include stainless steel or aluminum angle stiffeners and fixed and removable sections, as indicated or required.
- E. Provide flush stainless steel bar drop handles for lifting removable sections one at each end of each section.
- F. Floor plate, including all support members, reinforcement ribs, stiffeners, edge members, supports and all structural requirements shall be designed by a Professional Engineer licensed in the State of the Work and provided by the manufacturer/fabricator of the floor plate.
- G. Design of the floor plate, including all supports, connections and integral members shall be for the actual dead load plus a live load consisting of:
 1. The uniform live load of the adjacent floor, or

2. A uniform live load of 200 lbf/sq. ft., whichever load produces the greater effects. Design shall use the loading and pattern loading for multiple spans which produces the greatest loading, stresses and deflection with the floor plate system.
- H. The maximum fiber stress shall not exceed that which is allowed by the Aluminum Association.
- I. The maximum total load deflection shall be limited to the span divided by 180 (L/180), not to exceed 0.25 inch between supporting members.
- J. Contractor shall submit sealed shop drawings complete with details and calculations to the Engineer for review prior to fabrication. Submittal data will be complete with detail and calculations to determine all components of the floor plate system, including plate, reinforcing ribs, supports, rib pattern, connections and others as necessary.
- K. All ends and openings shall be banded.
- L. Provide 1/4 inch neoprene gaskets for all sealed or odor control floor plate coverings as/where indicated.
- M. The weight of a floor plate section shall not exceed 80 pounds.
- N. Aluminum surfaces in contact with concrete, grout or dissimilar metals will be protected with a coat of bituminous paint, Mylar isolators or other protective system, as approved by the Engineer.
- O. Available Manufacturers
 1. Thompson Fabricating, LLC; Tarrant, AL.
 2. Or approved equal.

2.16 ABRASIVE METAL NOSINGS AND TREADS

- A. Cast-Metal Units: Cast aluminum, with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.
 1. Manufacturers:
 - a. American Safety Tread Co., Inc.
 - b. Baleo Inc.
 - c. Barry Pattern & Foundry Co., Inc.
 - d. Granite State Casting Co.
 - e. Safe-T-Metal Co.
 - f. Wooster Products Inc.
 2. Nosing: Cross-hatched units, 4" wide with 1/4" lip, for casting into concrete steps.
 3. Nosing: Cross-hatched units, 1-1/2" x 1-1/2", for casting into concrete curbs.
 4. Treads: Cross-hatched units, full depth of tread with 3/4" x 3/4" nosing, for application over bent plate treads or existing stairs.

- B. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.
1. Available Manufacturers:
 - a. ACL Industries, Inc.
 - b. American Safety Tread Co., Inc.
 - c. Amstep Products.
 - d. Armstrong Products, Inc.
 - e. Baleo Inc.
 - f. Granite State Casting Co.
 - g. Wooster Products Inc.
 2. Provide ribbed units, with abrasive filler strips projecting 1/16" above aluminum extrusion.
 3. Provide solid-abrasive-type units without ribs.
 4. Nosing: Square-back units, 3" wide, for casting into concrete steps.
 5. Nosing: Beveled-back units, 3" wide with 1-3/8" lip, for surface mounting on existing stairs.
 6. Nosing: Two-piece units, 3" wide, with sub channel for casting into concrete steps.
 7. Treads: Beveled-back units, full depth of tread with 1-3/8" lip, for application over existing stairs.
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with Manufacturer.
- D. Drill for mechanical anchors and countersink. Locate not more than 4" from ends and not more than 12" o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by Manufacturer.
1. Provide 2 rows of holes for units more than 5" wide, with 2 holes aligned at ends and intermediate holes staggered.
- E. Apply bituminous paint, Mylar isolators or other protective system as approved by the Engineer to concealed bottoms, sides, and edges of cast-metal units set into concrete

2.17 FINISHES, GENERAL

- A. Comply with NAAMM "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.

2.18 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
1. ASTM A 123 for galvanizing steel and iron products.
 2. ASTM A 153 for galvanizing steel and iron hardware.

- B. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B) and Items Indicated to Receive Zinc-Rich primer: SP 6/NACE No.3, "Commercial Blast Cleaning."
 - 2. Interiors (SSPC Zone 1A): SSPC-SP 3, "Power Tool Cleaning."
- C. Shop Priming: Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.19 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- C. Bright, Directional Satin Finish: No.4.
- D. Dull Satin Finish: No.6.
- E. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.20 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Class 1, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class 1, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including Manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.

3.3 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use non-shrink grout, nonmetallic, in concealed locations where not exposed to moisture; use non shrink, nonmetallic grout in exposed locations, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.4 INSTALLING METAL BOLLARDS

- A. Anchor bollards in concrete as indicated.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3" above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.5 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosing on tread widths.
- B. For nosing embedded in concrete steps or curbs, align nosing flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Section 07 92 00, JOINT SEALANTS to provide a watertight installation.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0 mil dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 9 painting Sections.
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION

SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Aluminum Railings.
- B. Related Sections:
 - 1. Section 05 50 00, METAL FABRICATIONS.
 - 2. Section 09 90 00, PAINTING AND PROTECTIVE COATINGS.

1.2 PERFORMANCE REQUIREMENTS

- A. General: In engineering railings to withstand structural loads indicated, design of railing materials shall be based on the following:
 - 1. Aluminum Railing: Design in accordance with Aluminum Design Manual, latest edition.
 - 2. Allowable Deflections: $L/180$ max
- B. Structural Performance: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails:
 - a. Uniform load of 50 lbf/ ft. applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 3. Infill of Guards:
 - a. Concentrated load of 200 lbf (0.89 kN) applied horizontally on an area of 1 ft².
 - b. Uniform load of 25 lbf / ft² applied horizontally.
 - c. Infill load and other loads need not be assumed to act concurrently.
- C. Thermal Movements: Provide exterior railings that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base the engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 °F, ambient; 180 °F, material surfaces.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.3 SUBMITTALS

- A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
 2. Grout, anchoring cement, and paint products.
- B. Shop Drawings:
1. Include plans, elevations, sections, details, and attachments to other work. Also, provide locations and details for any post stiffeners, as required by design.
 2. Include structural analysis and design calculations signed and sealed by a qualified professional engineer licensed in the state of the work.
- C. Samples for Owner's Selection: For products involving selection of color, texture, or design.
- D. Samples for Verification: For each type of exposed finish required.
1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 2. Fittings and brackets.
 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of finishing and connecting members at intersections.
- E. Mill Certificates: Signed by manufacturer certifying that products furnished comply with requirements.
- F. Welding certificates.
- G. Qualification Data: For testing agency.
- H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing through one source from a single Manufacturer.
- B. Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
 2. AWS D1.2, "Structural Welding Code--Aluminum."
 3. AWS D1.6, "Structural Welding Code--Stainless Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with railings by field measurements before fabrication and indicate measurements on Shop Drawings.
1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating railings without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION AND SCHEDULING

- A. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Metals:
 1. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
 2. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.
- B. Finishes:
 1. Comply with NAAMM "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 2. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
 3. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
 4. Provide exposed fasteners with finish matching appearance, including color and texture, of railings or posts.

2.2 MATERIALS AND FINISHES

- A. Aluminum
 1. General: Provide alloy and temper as recommended by manufacturer to meet the type of use and finish indicated, and with not less than the strength and durability properties designated below.
 2. Extruded Structural Pipe and Round Tubing: ASTM B 429, Alloy 6063-T6.
 3. Drawn Seamless Tubing: ASTM B 210, Alloy 6063-T832.
 4. Plate and Sheet: ASTM B 209, Alloy 6061-T6.
 5. Die and Hand Forgings: ASTM B 247, Alloy 6061-T6.
 6. Castings: ASTM B 26, Alloy A356.0-T6.
 7. Finish, as follows:

- a. Handrail Pipe and Posts: Anodized finish shall be AA-M32-C22-A41 and shall meet the requirements of AAMA 607.1
- b. Cast Fittings and Toeboards: Anodized finish shall be AA-M10-C22-A41 and shall meet the requirements of AAMA 607.1
- c. Pretreat aluminum by cleaning and removing marks before anodizing.

2.3 RAIL AND POSTS

- A. Nominal 1-1/2" diameter.
- B. Rails: 1.900" outside diameter by 0.145" wall thickness. Schedule 40.
- C. Posts: 1.900" outside diameter by 0.200" wall thickness. Schedule 80.

2.4 FITTINGS

- A. General
 - 1. Refer to drawings for fitting, joint, and base details.
 - 2. Materials and finishes for all fittings, joints, and bases shall match the railing material. Alloy or material grade shall meet or exceed the alloy or material grade specified.

2.5 FASTENERS

- A. General: Provide the following:
 - 1. In accordance with Section 05 50 00, METAL FABRICATIONS
 - 2. Aluminum/Stainless Steel Railings: Type 304 or 316 stainless-steel fasteners.
- B. Locknuts, Washers, and Screws:
 - 1. Elastic Locknuts, Steel Flat Washers, RHMS Rounded Head Machine Screws; Type A 304 or A 316 stainless steel.
 - 2. Flat Washers: Molded Nylon
- C. Concrete Anchors: As specified in 05 50 00 Metal Fabrications.

2.6 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32" unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Non-welded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is Manufacturer's standard splicing method.
- H. Close exposed ends of railing members with prefabricated end fittings.
- I. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4" or less.
- J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- K. For removable railing posts, fabricate slip-fit sockets from stainless-steel tube or pipe whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 - 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.
- L. Toeboards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated. Dimension between bottom of toeboard and walking surface not to exceed 1/4-inch.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints and in accordance with Manufacturers written instructions.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 2. Set posts plumb within a tolerance of 1/16" in 3'.
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4" in 12'.
- C. Corrosion Protection: Prevent galvanic action and other forms of corrosion caused from direct contact with concrete and dissimilar metals by coating metal surfaces in accordance with manufacturers' recommendations and Division 9.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.
- F. Mount handrails only on completed walls. Do not support handrails temporarily by means not satisfying structural performance requirements.

3.3 RAILING CONNECTIONS

- A. Set rails horizontal or parallel to slope of steps. Install posts and rails in the same plane. Remove projects or irregularities and provide smooth surface for sliding hand continuously along top rail. Use offset rail for use on stairs and platforms if post is attached to web of stringers or structural platform supports.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement, maximum interval of 54 feet on center and at structural joints. Provide slip-joint internal sleeve extending 2" beyond joint on either side, fasten internal sleeve securely to 1 side, and locate joint within 6" of post.

3.4 ANCHORING POSTS

- A. Form or core-drill holes not less than 5" deep and 3/4" larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material per Manufacturer's written instructions.
- B. Leave anchorage joint exposed; wipe off surplus anchoring material; and leave 1/8" buildup, sloped away from post.
- C. Where indicated, anchor posts with fittings engineered for anchoring posts to concrete.
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
1. For aluminum pipe railings, attach posts using fittings designed and engineered for this purpose.

- E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.
- F. Anchor bolts shall be stainless steel.

3.5 ANCHORING RAILING ENDS

- A. Anchor railing ends to concrete and masonry with round flanges connected to railing ends and anchored to wall construction with anchors and bolts.

3.6 ATTACHING HANDRAILS TO WALLS

- A. Attach handrails to wall with wall brackets. Provide brackets with 1-1/2" clearance from inside face of handrail and finished wall surface.
 - 1. Use type of bracket with predrilled hole for exposed bolt anchorage.
- B. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
- C. Secure wall brackets to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
 - 2. For hollow masonry anchorage, use toggle bolts.

3.7 ADJUSTING AND CLEANING

- A. Clean railing by washing thoroughly with clean water and soap and rinsing with clean water.

3.8 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing Manufacturer. Remove protective coverings at time of Substantial Completion.
- B. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

END OF SECTION

DIVISION 9
FINISHES

SECTION 09 90 00 - PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Exposed, buried, and submerged metal, exposed PVC and CPVC, exposed FRP, and aluminum and dissimilar metals, to be protective painted, whether specifically mentioned or not, except as specified otherwise. Prime coat structural steel surfaces, as specified herein. Exterior concrete surfaces will not be protective painted except as specified herein. Interior concrete surfaces will be protective painted as specified herein.

1.2 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American National Standards Institute (ANSI):
 - a. Standard Colors for Color Identification and Coding.
 - b. A13.1, Scheme for the Identification of Piping Systems.
 - 2. American Water Works Association (AWWA):
 - a. C203, Coal-Tar Protective Coatings and Linings for Steel Water Pipelines-Enamel and Tape-Hot-Applied.
 - b. C210, Liquid Epoxy Coating System for the Interior and Exterior of Steel Water Pipelines.
 - c. C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.
 - 3. NSF International (NSF): 61 Drinking Water System Components-Health Effects.
 - 4. National Association of Corrosion Engineers (NACE): Manual for Painter Safety.
 - 5. Occupational Safety and Health Act (OSHA).
 - 6. Steel Structures Painting Council (SSPC):
 - a. QP1, Standard Procedure for Evaluating Qualifications of Painting Contractors.
 - b. QP2, Standard Procedure for Evaluating the Qualifications of Painting Contractors to Remove Hazardous Paint.
 - c. SP 1, Surface Preparation Specification No. 1, Solvent Cleaning.
 - d. SP 2, Hand Tool Cleaning.
 - e. SP 3, Power Tool Cleaning.
 - f. SP 5, White Metal Blast Cleaning.
 - g. SP 6, Commercial Blast Cleaning.
 - h. SP 7, Brush-Off Blast Cleaning.
 - i. SP 8, Pickling.
 - j. SP 10, Near-White Blast Cleaning.
 - k. SP 11-T, Power Tool Cleaning to Bare Metal.
 - l. Guide No. 3, PA, Guide to Safety in Painting Applications.
 - m. SP 13, Surface Preparation of Concrete.

1.3 DEFINITIONS

- A. Terms used in this section:
 - 1. Coverage: Total minimum dry film thickness in mils, or square feet per gallon.
 - 2. FRP: Fiberglass Reinforced Plastic.

3. HCl: Hydrochloric Acid.
4. MDFT: Minimum Dry Film Thickness.
5. MDFTPC: Minimum Dry Film Thickness per Coat.
6. Mil: Thousandth of an inch.
7. Military Specification-Paint.
8. PSDS: Paint System Data Sheet.
9. SFPG: Square Feet per Gallon.
10. SFPGPC: Square Feet per Gallon per Coat.
11. SP: Surface Preparation.

1.4 SUBMITTALS

A. Shop Drawings:

1. Data Sheets:
 - a. For each paint system, furnish a Paint System Data Sheet (PSDS), the Manufacturer's Technical Data Sheets, and paint colors available (where applicable) for each product used in the paint system. The PSDS form is appended to the end of this section.
 - b. Submit required information on a system-by-system basis.
 - c. Furnish copies of paint system submittals to the coating applicator.
 - d. Indiscriminate submittal of Manufacturer's literature only is not acceptable.
 - e. Schedule of proposed coating materials.
 - f. Schedule of surfaces to be coated with each coating material.

B. Samples:

1. Reference Panel:
 - a. Prior to start of surface preparation, furnish a 4" by 4" steel panel for each grade of sandblast specified herein, prepared to specified requirements.
 - b. Provide panel representative of the steel used; prevent deterioration of surface quality.
 - c. Upon approval of Engineer, panel to be reference source for inspection.
 - d. Unless otherwise specified, before painting work is started, prepare minimum 8" by 10" samples with type of paint and application specified on similar substrate to which paint is to be applied.
 - e. Furnish additional samples as required until colors, finishes, and textures are approved.
 - f. Approved samples to be the quality standard for final finishes.

C. Quality Control Submittals:

1. Applicator's Qualification: List of references substantiating experience.
2. Factory Applied Coatings: Manufacturer's certification stating factory applied coating system meets or exceeds requirements specified.
3. If the Manufacturer of finish coating differs from that of shop primer, provide both Manufacturers' written confirmation that materials are compatible.
4. Manufacturer's written instructions and special details for applying each type of paint.
5. Manufacturers' Certification of Proper Installation.

D. Contract Closeout Submittals: Special guarantee.

- E. Provide documentation that paint or coatings used on surfaces in contact with water being treated is NSF 61 approved for use in a potable water system.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Applicator: Minimum 5 years' experience in application of specified products.
- B. Regulatory Requirements:
 - 1. Meet federal, state, and local requirements limiting the emission of volatile organic compounds.
 - 2. Perform surface preparation and painting in accordance with recommendations of the following:
 - a. Paint Manufacturer's instructions.
 - b. SSPC-PA Guide No. 3, Guide to Safety in Paint Applications.
 - c. Federal, state, and local agencies having jurisdiction.
- C. Mockup:
 - 1. Before proceeding with work under this section, finish one complete space or item of each color scheme required showing selected colors, finish texture, materials, quality of work, and special details.
 - 2. After approval, sample spaces or items shall serve as a standard for similar work throughout the Project.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Store products in a protected area that is heated or cooled to maintain temperatures within the range recommended by paint Manufacturer.
- B. Shipping:
 - 1. Where pre-coated items are to be shipped to the site, protect coating from damage. Batten coated items to prevent abrasion.
 - 2. Use nonmetallic or padded slings and straps in handling.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply paint in temperatures outside of Manufacturer's recommended maximum or minimum allowable, or in dust, smoke-laden atmosphere, damp or humid weather.
- B. Do not perform abrasive blast cleaning whenever relative humidity exceeds 85%, or whenever surface temperature is less than 5° F above dew point of ambient air.

1.8 SPECIAL GUARANTEE

- A. Furnish Manufacturer's extended guarantee or warranty, with OWNER named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the OWNER, removal and replacement of work specified in this Specification section found *defective* during a period of 1 year after the date of Substantial Completion.

- B. Contractor and paint Manufacturer shall jointly and severally furnish guarantee.

PART 2 - PRODUCTS

2.1 PAINT AND COATINGS MANUFACTURERS

- A. Nationally recognized Manufacturers of paints and protective coatings who are regularly engaged in the production of such materials for essentially identical service conditions.
- B. Manufacturers:
1. Tnemec Coatings
 2. Sherwin Williams
 3. Quadex, Inc.
 4. Devoe Coatings, an Akzo Nobel Corporate brand.
 5. Carboline Coatings Company
 6. Or Approved Equal.

2.2 ABRASIVE MATERIALS

- A. Select abrasive type and size to produce surface profile that meets coating Manufacturer's recommendations for specific primer and coating system to be applied.

2.3 PAINT MATERIALS

- A. General:
1. Manufacturer's highest quality products suitable for intended service.
 2. Compatibility: Only compatible materials from a single Manufacturer shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats.
 3. Thinners, Cleaners, Driers, and other additives: As recommended by Manufacturer of coating material.

- B. Products:

Product	Definition
Tar Stop	Coating designed to prevent bleeding of black asphaltic varnish through finish paint; Shellac is a suitable alternate; not applicable for white and pastel colors
Anticorrosive Polyamide Epoxy Primer	Polyamide, anticorrosive, converted epoxy primer containing rust-inhibitive pigments
Coal-Tar Epoxy	Amine or phenolic epoxy type: 70% volume solids minimum, suitable for immersion service
Organic Zinc Rich Primer	Converted epoxy, epoxy/phenolic or urethane type, minimum 10 pounds metallic zinc content per gallon
Rust Inhibitive Primer	Single Package steel primers with anticorrosive pigment loading
Wash Primer	Vinyl butyral acid
Epoxy Nonskid (Aggregated)	Polyamide or amine converted epoxies aggregated; aggregate may be packaged separately
Epoxy Filler/Surfacer	100% solids epoxy trowel grade filler and nonshrinking surfacer,

Product	Definition
	suitable for application to concrete and masonry. Approved for potable water contact and conforming to NSF 61, where required
High Build Epoxy	Polyamide or polyamidoamine epoxy, minimum 69% volume solids, capability of 4 to 8 MDFT per coat

1. High temperature coating 150 to 350 degrees Fahrenheit: As manufactured by one of the following:
 - a. Carboline: Thermaline 4900.
 - b. Dampney: Thermalox 245 Silicione – Zinc Dust
 - c. PPG Amercoat: Amerlock 2/400 GFK.
 - d. Tnemec Aeroion Series 971 Fluid Applied Insulation Coating

2.4 MIXING

- A. Multiple-Component Coatings:
 1. Prepare using the contents of the container for each component as packaged by paint Manufacturer.
 2. No partial batches will be permitted.
 3. Do not use multiple-component coatings that have been mixed beyond their pot life.
 4. Furnish small quantity kits for touchup painting and for painting other small areas.
 5. Mix only components specified and furnished by paint Manufacturer.
 6. Do not intermix additional components for reasons of color or otherwise, even within the same generic type of coating.
- B. Colors: Formulate paints with colorants free of lead, lead compounds, or other materials that might be affected by presence of hydrogen sulfide or other gas likely to be present at the site.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Surface Preparation Verifications:
 1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of paint Manufacturer whose product is to be applied. The more stringent requirements shall apply.
 2. Provide Engineer minimum 7 days advance notice to start of shop or field surface preparation work and coating application work.
 3. Perform such work only in presence of Engineer, unless Engineer grants prior approval to perform such work in Engineer's absence.
- B. Schedule inspection with Engineer in advance for cleaned surfaces and all coats prior to succeeding coat.

3.2 PREPARATION

- A. Shop Blast Cleaning:
 1. Notify Engineer at least 7 days prior to start of shop blast cleaning to allow for inspection of the work during surface preparation and shop application of paints.

2. Structural steel, metal doors and frames, metal louvers, and similar items, as reviewed by Engineer, may be shop prepared and primed.
- B. Field Abrasive Blasting: Perform blasting for items and equipment where specified and as required to restore damaged surfaces previously shop or field blasted and primed.
- C. Protection of Items not to be painted:
1. Remove, mask, or otherwise protect hardware, lighting fixtures, switch plates, aluminum surfaces, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not intended to be painted.
 2. Provide drop cloths to prevent paint materials from falling on or marring adjacent surfaces.
 3. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process.
 4. Mask openings in motors to prevent paint and other materials from entering the motors.

3.3 PREPARATION OF SURFACES

- A. Metal Surfaces:
1. Where indicated, meet requirements of the following SSPC Specifications:
 - a. Solvent Cleaning: SP 1.
 - b. Hand Tool Cleaning: SP 2.
 - c. Power Tool Cleaning: SP 3.
 - d. White Metal Blast Cleaning: SP 5.
 - e. Commercial Blast Cleaning: SP 6.
 - f. Brush-Off Blast Cleaning: SP 7.
 - g. Pickling: SP 8.
 - h. Near-White Blast Cleaning: SP 10.
 - i. Power Tool Cleaning to Bare Metal: SP 11.
 - j. Surface Preparation of Concrete: SP 13.
 2. The words “solvent cleaning”, “hand tool cleaning”, “wire brushing” and “blast cleaning”, or similar words of equal intent in these Specifications, or in paint manufacturer’s specifications, refer to the applicable SSPC Specifications.
 3. Where OSHA or EPA regulations preclude standard abrasive blast cleaning, wet or vacu-blast methods may be required. Coating Manufacturers’ recommendations for wet blast additives and first coat application shall apply. If not otherwise required, contractor shall provide abrasive blast cleaning by means of sand blasting or high pressure water.
 4. DeLavaud Process Ductile Iron Pipe:
 - a. Use SSPC SP grades as guide only.
 - b. For high performance (epoxy) coatings, follow recommendations of pipe and coating Manufacturers.
 - c. The surface preparation and application of the primer and finish coats shall be performed by the pipe Manufacturer
 - d. For conventional (alkyd) coatings, clean asphalt varnish supplied on pipe and apply one full coat of a tar stop before two full coats of the color coats specified.
 5. Hand tool clean areas that cannot be cleaned by power tool cleaning.

6. Round or chamfer sharp edges and grind smooth burrs, jagged edges, and surface defects.
 7. Welds and Adjacent Areas:
 - a. Prepare such that there is:
 - 1) No undercutting or reverse ridges on weld bead.
 - 2) No weld spatter on or adjacent to weld or any other area to be painted.
 - 3) No sharp peaks or ridges along weld bead.
 - b. Grind embedded pieces of electrode or wire flush with adjacent surface of weld bead.
 8. Pre-blast Cleaning Requirements:
 - a. Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning.
 - b. Cleaning Methods: Steam, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.
 - c. Clean small isolated areas as above or solvent clean with suitable solvents and clean cloths.
 9. Blast Cleaning Requirements:
 - a. Type of Equipment and Speed of Travel: Design to obtain specified degree of cleanliness. Minimum surface preparation is as specified herein and takes precedence over coating Manufacturer's recommendations.
 - b. Select type and size of abrasive to produce a surface profile that meets coating Manufacturer's recommendations for particular primer to be used.
 - c. Use only dry blast cleaning methods, unless otherwise directed in writing by Engineer.
 - d. Do not reuse abrasive material, except for designed recyclable systems. Must meet applicable federal, state, and local air pollution and environmental control regulations for blast cleaning, confined space entry (if required), and disposition of spent aggregate and debris.
 10. Post-Blast Cleaning and Other Cleaning Requirements:
 - a. Clean surfaces of dust and residual particles from cleaning operations by dry (no oil or water vapor) air blast cleaning or other method prior to painting. Vacuum clean enclosed areas and other areas where dust settling is a problem and wipe with a tack cloth.
 - b. Paint surfaces the same day they are blasted. Re-blast surfaces that have started to rust before they are painted.
- B. Galvanized Surfaces:
1. Remove soil, cement spatter, and other surface dirt with appropriate hand or power tools.
 2. Remove oil and grease by wiping or scrubbing the surface with a suitable solvent, rags and brushes. Use clean solvent and clean rags for the final wiping to avoid contaminating the surface.
 3. Obtain coating Manufacturer's recommendations for additional preparation that may be required.
- C. Concrete Surfaces:
1. Do not begin until 30 days after concrete has been placed.

2. Remove grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods.
3. Clean to remove loose concrete and provide a surface for binding according to SP-13 Surface Preparation of Concrete. Surface may not be cleaned by acid etching or open flame methods unless approved in writing by Engineer. Contractor must provide evidence that method will produce desired profile without causing damage to concrete member.
 - a. Mechanical Surface Preparation Methods: (according to section 4 of SP-13)
 - 1) Dry abrasive blasting (sand blasting)
 - 2) Wet abrasive blasting
 - 3) Vacuum-assisted abrasive blasting
 - b. Vacuum cleaning, air blast cleaning, and/or water cleaning as described by ASTM D4258 shall be used after the completion of one or more of the mechanical surface preparation methods listed above.
 - c. Final surface preparation shall be as required by coatings manufacturer to insure proper adhesion of the coatings, as needed.
4. Contractor is responsible for coordinating and insuring that manufacturer's protective coatings are compatible with mortar repair or cement lining prior to submitting coatings.
5. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.

D. Plastic Surfaces:

1. Hand sand plastic surfaces to be coated with a medium grit sandpaper to provide tooth for the coating system.
2. Large areas may be power sanded or brush-off blasted, provided sufficient controls are employed so surface is roughened without removing excess material.

3.4 SURFACE CLEANING METHODS

A. Brush-off Blast Cleaning:

1. Equipment, procedure, and degree of cleaning shall meet requirements of SSPC-SP 7, Brush-off Blast Cleaning.
2. Abrasive: Either wet or dry blasting sand, grit, or nut shell.
3. Select various surface preparation parameters such as size and hardness of abrasive, nozzle size, air pressure, and nozzle distance from surface such that surface is cleaned without pitting, chipping, or other damage.
4. Verify parameter selection by blast cleaning a trial area that will not be exposed to view.
5. Engineer will approve acceptable trial blast cleaned area and will use area as a representative sample of surface preparation.
6. Repair or replace surfaces damaged by blast cleaning.

B. Acid Etching:

1. After pre-cleaning, spread the following solution by brush or plastic sprinkling can: 1 part commercial Muriatic acid reduced by 2 parts water by volume. Adding acid to water in these proportions gives an approximate 10% solution of HCl.
2. Application:

- a. Application Rate: Approximately 2 gallons per 100 square feet.
 - b. Work acid solution into surface by hard-bristled brushes or brooms until complete wetting and coverage is obtained.
 - c. Acid will react vigorously for a few minutes, during which time brushing is continued.
 - d. After bubbling subsides (10 minutes), hose down the remaining slurry with high pressure clean water.
 - e. Rinse immediately to avoid formation on the surface of salts that are difficult to remove.
 - f. Thoroughly rinse to remove any residual acid surface condition which can impair adhesion.
3. Ensure surface is completely dry before application of coating.
 4. Apply acid etching, to obtain a "grit sandpaper" surface profile. If not, repeat treatment.

C. Solvent Cleaning:

1. Consists of removal of foreign matter such as oil, grease, soil, drawing and cutting compounds, and any other surface contaminants by using solvents, emulsions, cleaning compounds, steam cleaning, or similar materials and methods which involve a solvent or cleaning action.
2. Meets requirements of SSPC-SP 1.

3.5 APPLICATION

A. General:

1. Extent of Coating (Immersion): Coatings shall be applied to all internal vessel and pipe surfaces, nozzle bores, flange gasket sealing surfaces, carbon steel internals, and stainless steel internals, unless otherwise specified.
2. For coatings subject to immersion, obtain full cure for completed system. Consult coatings Manufacturer's written instructions for these requirements. Do not immerse coating for any purpose until completion of curing cycle.
3. Apply coatings in accordance with these Specifications and the paint Manufacturers' printed recommendations and special details. The more stringent requirements shall apply. Allow sufficient time between coats to assure thorough drying of previously applied paint.
4. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
5. Sand wood and metal lightly between coats to achieve required finish.
6. Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
7. Fusion Bonded Coatings Method Application: Electrostatic, fluidized bed, or flocking.
8. Coat units or surfaces to be bolted together or joined closely to structures or to one another prior to assembly or installation.
9. Where more than one coat of a material is applied within a given system, alternate color to provide a visual reference that the required number of coats have been applied.

B. Galvanized Metal:

1. Concealed galvanized surfaces (behind building panels or walls) do not required painting unless specifically indicated herein.

2. Prepare surface and apply wash primer or coating Manufacturer's recommended coating. This primer will replace the required paint system's indicated primer.
 3. Apply coating system appropriate for the exposure (intermediate/finish coats).
- C. Shop Primed and Factory Finished Surfaces:
1. Schedule inspection with Engineer before shop priming or top-coating factory finished items delivered to site.
 2. Prepare surfaces and spot prime using specified primer.
 3. Apply mist coat of primer, 1-mil dry film thickness.
 4. After welding, prepare and prime holdback areas as required for paint system. Apply primer in accordance with Manufacturer's instructions.
- D. Manufacturer Applied Paint Systems:
1. Repair abraded areas on factory finished items as recommended by Manufacturer.
 2. Carefully blend repaired areas into original finish.
 3. Fusion Bonded Coatings: Provide appropriate liquid repair kits for field use.
- E. Film Thickness:
1. Number of Coats: Minimum required without regard to coating thickness. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in Manufacturers' products, and atmospheric conditions.
 2. Maximum film build per coat shall not exceed coating Manufacturer's recommendations.
 3. Film Thickness Measurements and Electrical Inspection of Coated Surfaces:
 - a. Perform with properly calibrated instruments.
 - b. Recoat and repair as necessary for compliance with the Specifications.
 - c. All coats are subject to inspection by Engineer and coating manufacturer's representative.
 4. Visually inspect concrete, nonferrous metal, plastic, and wood surfaces to ensure proper and complete coverage has been attained.
 5. Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.
 6. Thickness Testing:
 - a. After repaired and recoated areas have dried sufficiently, final tests will be conducted by the Engineer.
 - b. Measure coating thickness specified in mils with a magnetic type dry film thickness gauge.
 - c. Test finish coat, except zinc primer, galvanizing, and elastomeric coatings in excess of 25 mils dry, for holidays and discontinuities with an electrical holiday detector.
 - d. Holiday detect coatings in excess of 25 mils dry with high voltage units recommended by the coating manufacturer.
 - e. Check each coat for correct millage. Do not make measurement before a minimum of 8 hours after application of coating.
- F. Porous Surfaces, Such As Concrete, Masonry:

1. Filler/Surfacer: Use coating Manufacturer's recommended product to fill air holes, bug holes, and other surface defects.
 2. Prime Coat: May be thinned to provide maximum penetration and adhesion.
 - a. Type and Amount of Thinning: Determined by paint manufacturer and dependent on surface density and type of coating.
 3. Finish Coat: Use coatings Manufacturer's recommended product.
- G. Damaged Coatings, Pinholes, and Holidays:
1. Feather edges and repair in accordance with recommendations of paint Manufacturer.
 2. Apply finish coats, including touchup and damage-repair coats in a manner which will present a uniform texture and color-matched appearance.
- H. Unsatisfactory Application:
1. If item has an improper finish color, or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified color and coverage. Obtain specific surface preparation information from coating manufacturer.
 2. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.
 3. Evidence of runs, bridges, shiners, laps, or other imperfections is cause for rejection.
 4. Repair defects in accordance with written recommendations of coating Manufacturer.
 5. Leave staging and lighting up until Engineer has inspected surface or coating. Replace staging removed prior to approval by Engineer. Provide additional staging and lighting as requested by Engineer.

3.6 FIELD QUALITY CONTROL

- A. Testing Gauges:
1. Provide a magnetic type dry film thickness gauge to test coating thickness specified in mils, as manufactured by Nordson Corp., Anaheim, CA, Mikrotest.
 2. Provide an electrical holiday detector, low voltage, wet sponge type to test finish coat, except zinc primer, high-build elastomeric coatings, and galvanizing, for holidays and discontinuities as manufactured by Tinker and Rasor, San Gabriel, CA, Model M-1.
 3. Provide a high voltage holiday detector for elastomeric coatings in excess of 25 mils dry film thickness. Unit to be as recommended by the coating Manufacturer.

3.7 MANUFACTURER'S SERVICES

- A. Provide Manufacturer's representative at site in accordance with Section 01 79 00, DEMONSTRATION AND TRAINING, for installation assistance, inspection, and certification of installation.

3.8 CLEANUP

- A. Place cloths and waste that might constitute a fire hazard in closed metal containers or destroy at the end of each day.

- B. Upon completion of the Work, remove staging, scaffolding, and containers from the site or destroy in a legal manner.
- C. Completely remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

3.9 PROTECTIVE COATINGS SYSTEMS

- A. All finish coating colors to be submitted for Owner/Engineer selection and/or approval, as applicable.

- B. System No. 1: Submerged Metal - General

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Polyamide, Anticorrosive Epoxy Primer	1 coat, 6 MDFT
	Polyamide High Build Epoxy	1 coat, 6 MDFT

- C. System No. 2: Submerged Metal - Domestic Sewage

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 5)	Prime in accordance with manufacturer's recommendations	5 MDFT minimum
	Coal Tar Epoxy	2 coats minimum, 20 MDFT

- D. System No. 3: Exposed Metal - Highly Corrosive:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Polyamide, Anticorrosive Epoxy Primer	1 coat, 5 MDFT
	Polyamide High Build Epoxy	2 coats minimum, 15 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

- E. System No. 4: Exposed Metal - General:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Polyamide, Anticorrosive Epoxy Primer	1 coat, 5 MDFT
	Polyamide High Build Epoxy	1 coat, 5 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

- F. System No. 4A: Exposed Metal - High Temperature (150 to 350 degrees Fahrenheit):

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	High Temperature Coating	Per coating manufacturer's instructions

G. System No. 5: Buried Metal - General:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast or Centrifugal Wheel Blast (SP 10)	Standard Hot Coal-Tar Enamel -OR- Coal-Tar Epoxy -OR- Tape Coat System	AWWA C203 AWWA C210 AWWA C214
	For Acidic Soil, Brackish Water High Bacteria: Hot Coal-Tar, Double Felt	AWWA C203, App. A, Sec. A1.5
	For Highly Abrasive Soil, Brackish Water: Hot Coal-Tar, Fibrous Glass -OR- Tape Coat System	AWWA C203, App. A, Sec. A1.5 AWWA C214 with Double Outer Wrap

H. System No. 10: Galvanized Metal Conditioning:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1) followed by Hand Tool (SP 2) or Power Tool (SP 3)	Wash Primer or Coating Manufacturer's Recommendation	1 coat, 2 MDFT
		Remaining coats as required for exposure

I. System No. 11: Galvanized Metal Repair:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1) followed by Hand Tool (SP 2), Power Tool (SP 3), or Brush-off Blast (SP 7)	Organic Zinc Rich Primer	1 coat, 3 MDFT Remaining coats as required for exposure

J. System No. 12: Skid-Resistant-Aluminum and FRP:

Surface Prep.	Paint Material	Min. Coats, Cover
Brush-off Blast (SP 7) or Plastic Surface Preparation	Epoxy Primer	1 coat, 2 MDFT minimum Remaining coats as re- quired for exposure
	Epoxy Nonskid (Aggregated)	2 coats minimum, 18 MDFT

K. System No. 14: Exposed PVC:

Surface Prep.	Paint Material	Min. Coats, Cover
Scarify	Polyamide High Build Epoxy	1 coat, 3 MDFT
	Poly Urethane Enamel	1 coat, 3 MDFT

L. System No. 15: Aluminum and Dissimilar Metal Insulation:

Surface Prep.	Paint Material	Min. Coats. Cover
Solvent Clean (SP 1)	Wash Primer	1 coat, 1 MDFT
	Polyamide High Build Epoxy	1 coat, 10 MDFT

M. System No. 16: Existing Concrete/CMU - Repair:

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Mortar Repair or Ce- ment Lining or Epoxy Filler	As required to form a smooth surface profile or as shown on drawings
	Polyamide High Build Epoxy	2 coats minimum, 125 MDFT

- N. System No. 17: New Concrete/CMU - Exterior (as required by application schedule):

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Surface Repair Mortar or Epoxy Filler	As required to form a smooth surface profile or as shown on drawings
	Polyamide High Build Epoxy	1 coat, 10 MDFT
	Polyurethane Enamel	1 coat, 3 MDFT

- O. System No. 18: New Concrete/CMU - Interior or Immersion Mildly Corrosive:

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Surface Repair Mortar or Epoxy Filler	As required to form a smooth surface profile or as shown on drawings
	Cycloaliphatic Amine High Build Epoxy	2 coats minimum, 20 MDFT

- P. System No. 19: New Concrete/CMU - Immersion Highly Corrosive:

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Surface Repair Mortar or Epoxy Filler	As required to form a smooth surface profile or as shown on drawings
	Modified Polyamine High Build Epoxy	3 coats minimum, 125 MDFT

- Q. System No. 20: New Concrete/CMU - Below Grade (as required by application schedule):

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Surface Repair Mortar or Epoxy Filler	As required to form a smooth surface profile or as shown on drawings
	Polyamide High Build Coal Tar Epoxy	15 MDFT minimum

3.10 CHEMICAL RESISTANT COATING

A. Chemical Resistant Coating:

Surface Prep.	Paint Material	Min. Coats. Cover
SP 13	Primer and one trowel-applied coat of novolac epoxy resin with silica fillers.	Finished system thickness 250 mils minimum.

3.11 APPLICATION SCHEDULE

- A. Unless otherwise shown or specified, paint surfaces in accordance with the following application schedule. In the event of discrepancies or omissions, request clarification from Engineer before starting work in question.
- B. System No. 1: Submerged Metal - General
1. Metal surfaces new and existing below a plane 1 foot above maximum liquid surface, metal surfaces above maximum liquid surface that are part of immersed equipment, concrete embedded surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles, and structural steel.
 2. Pumps, motors, equipment items, and accessories identified in the technical specifications to be coated with this system.
 3. Exterior of submerged piping and valves other than stainless steel or PVC piping.
 4. Submerged pipe supports and hangers.
 5. Submerged stem guides.
- C. System No. 2: Submerged Metal - Domestic Sewage: Use on the following items or areas:
1. Metal surfaces new and existing below a plane 1 foot above maximum liquid surface, metal surfaces above maximum liquid surface that are a part of immersed equipment, concrete embedded surfaces of metallic items, such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles, and structural steel.
 2. Pumps, motors, equipment items, and accessories identified in the technical specifications to be coated with this system.
 3. All submerged metal surfaces are to be coated, including those sections that will be concealed after installation of equipment.
- D. System No. 3: Exposed Metal - Highly Corrosive: Use on the following items or areas:
1. All exposed structural steel, metal building structure, bolted connections, and other exposed metal structures as indicated on the drawings.
 2. Pumps, motors, equipment items, and accessories identified in the technical specifications to be coated with this system.
 3. Pipe, valves, pipe hangers, supports and saddles, conduit, cable tray hangers, and supports.
 4. Valve and gate operator and stands.
 5. Mechanical equipment supports, drive units, and accessories.
- E. System No. 4: Exposed Metal - Mildly Corrosive: Use on the following items or areas:

1. Exposed metal surfaces, new and existing located inside or outside of structures and exposed to weather or in a highly humid atmosphere, such as vaults, and other similar areas.
 2. Interior exposed structural steel, metal building structure, bolted connection and other exposed metal structures of electrical rooms.
 3. Pumps, motors, equipment items, and accessories identified in the technical specifications to be coated with this system.
 4. Pipe, valves, pipe hangers, supports and saddles, conduit, cable tray hangers, and supports.
 5. Valve and gate operator and stands.
 6. Mechanical equipment supports, drive units, and accessories.
 7. Insulated piping, Polyurethane topcoat not required.
- F. System No. 4A: Exposed Metal - High Temperature (150 to 350 degrees Fahrenheit): Use on the following areas or items:
1. Metal surfaces subject to temperatures ranging from 150 to 350 degrees Fahrenheit.
 2. Pumps, motors, equipment items, and accessories identified in the technical specifications to be coated with this system.
- G. System No. 5: Buried Metal - General: Use on the following items or areas:
1. Buried, below-grade portions of steel items, except buried stainless steel or ductile iron pipe.
- H. System No. 10: Galvanized Metal Conditioning: Use on the following items or areas:
1. Galvanized surfaces requiring painting.
 2. After application of System 10, apply finish coats as required for exposure.
- I. System No. 11: Galvanized Metal Repair: Use on the following items or areas:
1. New or existing galvanized surfaces that are abraded, chipped, or otherwise damaged.
- J. System No. 12: Skid-Resistant-Aluminum and FRP: Use on the following items or areas:
1. Checker plate at exterior and interior wet locations.
 2. Aluminum plank at all exterior and interior accessible walking surfaces.
- K. System No. 14: Exposed PVC: Use on the following items or areas:
1. All exterior exposed-to-view PVC and CPVC surfaces, and FRP surfaces.
- L. System No. 15: Aluminum and Dissimilar Metal Insulation: Use on the following items or areas:
1. Aluminum surfaces embedded or in contact with concrete, masonry, and other metals.
 2. Stainless steel surfaces embedded in concrete.
 3. Dissimilar metals for electrical insulation.
 4. All other miscellaneous aluminum framing members and pipe supports.
- M. System No. 16: Existing Concrete/CMU - Repair:
1. All surfaces as indicated on the drawings.
 2. Interior surfaces of all liquid containing structures where concrete or CMU are indicated to be repaired or rehabbed, unless noted otherwise.

3. Exterior exposed surfaces noted to be repaired as required for architectural painting.
 4. As required to repair/patch areas damaged or altered during construction.
- N. System No. 17: New Concrete/CMU - Exterior (as indicated below only):
1. All surfaces as indicated on the drawings.
- O. System No. 18: New Concrete/CMU - Interior or Immersion Mildly Corrosive:
1. All surfaces as indicated on the drawings.
- P. System No. 19: New Concrete/CMU - Immersion Highly Corrosive:
1. All surfaces as indicated on the drawings.
- Q. System No. 20: New Concrete/CMU - Below Grade (as indicated below only):
1. All surfaces as indicated on the drawings.
- R. Surfaces Not Requiring Protective Painting: Unless otherwise stated or shown, the following areas or items will not require protective painting or coating:
1. Reinforcing steel.
 2. Nonferrous and corrosion-resistant ferrous alloys such as copper, bronze, Monel, aluminum, chromium plate, atmospherically exposed weathering steel, and stainless steel, except where:
 - a. Required for electrical insulation between dissimilar metals.
 - b. Aluminum and stainless steel are embedded in concrete or masonry, or aluminum is in contact with concrete or masonry.
 - c. Color coding of equipment and piping is required.
 3. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic (FRP) except as required for exposed-to-view PVC and CPVC, as required for FRP without integral UV resistant gel coat, and as required for architectural painting or color coding.
 4. Pre-finished electrical items such as motor control centers, switchboards, switchgear, panelboards, transformers, disconnect switches (if pre-finished in OSHA yellow); except color coding of equipment is required.
 5. Non-submerged electrical conduits attached to unpainted concrete surfaces.
 6. Cathodic protection anodes.

3.12 COLORS

- A. General: Provide manufacturer's full range of color charts to Owner/Owner's Representative for selection and/or approval. Provide colors as indicated in, Door and Hardware Schedule, Interior Finish Schedule, Exterior Finish Schedule, as shown on the drawings, as selected by Owner, and as designated herein.
- B. Pipe Identification Painting:
1. Color code non submerged metal piping except electrical conduit. Paint fittings and valves the same color as pipe, except equipment isolation valves.
 2. Piping Color Coding: In accordance with Piping Schedule.
 3. On exposed stainless steel piping, apply color 24" in length along pipe axis at connections to equipment, valves, or branch fittings, at wall boundaries, and at intervals along piping not greater than 9' on center.

4. Pipe Supports: Mild steel, painted No. 70 light gray as specified in ANSI 359-A, as manufactured by Tnemec Co., No. BJ45.
- C. Proprietary identification of colors is for identification only. Selected Manufacturer may supply matches.
- D. Equipment Colors:
1. Equipment includes the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits.
 2. Paint equipment and piping one color as selected.
 3. Paint non submerged portions of equipment the same color as the piping it serves, except as itemized below:
 - a. Dangerous Parts of Equipment and Machinery: OSHA Orange.
 - b. Fire Protection Equipment and Apparatus: OSHA Red.
 - c. Radiation Hazards: OSHA Purple.
 - d. Physical hazards in normal operating area and energy lockout devices, including, but not limited to, electrical disconnects for equipment and equipment isolation valves in air and liquid lines under pressure: OSHA Yellow.
 4. Fiberglass reinforced plastic (FRP) equipment with an integral colored gel coat does not require painting, provided the color is as selected.

END OF SECTION

09 90 00.1 PAINT SYSTEM DATA SHEET

Complete and attach Manufacturer's Technical Data Sheet to this PSDS for each coating system.

Paint System Number (from Spec):		
Paint System Title (from Spec):		
Coating Supplier:		
Representative:		
Surface Preparation:		
Paint Material (Generic)	Product Name/Number (Proprietary)	Min. Coats, Coverage

DIVISION 26
ELECTRICAL

SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

- A. This Section specifies the basic requirements for electrical installations and includes requirements common to more than one section of Division 26. It expands and supplements the requirements specified in the General and Supplementary Conditions.
- B. This project consists of construction of the new building structures, associated facilities, and all related electrical systems as defined in the plans and in these specifications.
- C. The work includes the installation, connection and testing of new electrical equipment, including grounding systems, control systems, conduit and wiring, and all appurtenances to construct and demonstrate proper operation of the completed electrical systems.
- D. The Contractor shall be responsible for the coordination of power, communication, and controls for the project.
- E. The electrical plans do not give exact locations, etc., and do not show all the offsets, control lines, pilot lines, and other installation details. Each contractor shall carefully lay out the work at the sites to conform to the job conditions, to conform to details of installation supplied by the manufacturers of the equipment to be installed, and thereby to provide complete operating systems.
- F. The electrical plans show diagrammatically the locations of the various electrical outlets and apparatus and the general method of circuiting and controlling. Exact locations of these outlets and apparatus shall be determined by reference to the general plans and to all detail drawings, etc., by measurements at the buildings, and in cooperation with other crafts, and in all cases shall be subject to the approval of the Owner and Engineer. The Engineer reserves the right to make any reasonable change in location of any outlet or apparatus before installation, without additional cost to the Owner.
- G. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structure of the buildings, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each bidder shall be responsible for the proper fitting of the material and apparatus into the buildings.
- H. Should the particular equipment which any bidder proposes to install require other space conditions than those indicated on the Drawings, the Bidder shall arrange for such space with the Engineer before submitting the bid. Should changes become necessary on account of failure to comply with this clause, the Contractor shall make such changes at the Contractor's expense.
- I. Where wire sizes, conduit and other items of construction are shown or required for a complete installation, but are not adequately identified as to size or material requirements,

the materials furnished shall be in accordance with "Code" requirements as though shown in detail on the Drawings.

- J. All equipment shall be leveled and made plumb. Metal junction boxes, equipment enclosures and metal raceways mounted on water or earth-bearing walls shall be separated from walls not less than 1/4 inch by corrosion-resistant spacers. All electrical conduits and items of equipment shall be run or set parallel to walls, floors and other items of construction.

1.2 STANDARDS

- A. The Contractor shall perform work specified in Division 26 in accordance with standards listed below. Where these specifications are more stringent, the most stringent standard shall take precedence. In case of conflict, obtain a decision from the Engineer.
 - 1. Applicable National Fire Protection Association (NFPA) codes, including but not limited to:
 - a. NFPA 70 – National Electrical Code.
 - b. NFPA 70E – Standard for Electrical Safety in the Workplace.
 - c. NFPA 72 - National Fire Alarm Code.
 - d. NFPA 101 – Life Safety Code.
 - e. NFPA 820 – Standard for Fire Protection in Wastewater Treatment and Collection Facilities.
 - f. Internet Website: <http://www.nfpa.org>
 - 2. Applicable Code of Federal Regulations (CFR) codes, including but not limited to:
 - a. 29 CFR 1910 – Occupational Safety and Health Standards (OSHA).
 - b. 29 CFR 1926 – Safety and Health Regulations for Construction.
 - c. Internet Website: <http://www.gpo.gov/fdsys>
 - 3. ANSI/IEEE C2 – National Electrical Safety Code.
 - 4. Applicable Federal, State and Local Fire codes.
 - 5. Applicable Federal, State and Local Energy Codes.
 - 6. Applicable Federal, State and Local Building Codes.
 - 7. Applicable City Electrical Code.
 - 8. Applicable City Ordinances pertaining to electrical work.
 - 9. Applicable Federal, State and Local – Environmental, Health and Safety Laws and Regulations.
- B. Contractor shall utilize the most current editions of standards, which are current at time of bid and as recognized by the Authority Having Jurisdiction for the respective standard.

1.3 SUBMITTALS

- A. Submittals shall comply with the General and Special Provisions and with the General and Supplementary Conditions. The following paragraphs supplement these requirements:
- B. Submittals shall consist of manufacturing information, schematics, wiring diagrams, ladder logic diagrams, instrument loop diagrams, outline drawings, clearances and related information. Shop Drawings shall be so marked as to indicate the EXACT items offered.

- C. Submittals shall bear Contractor's certification that the item complies in all respects with the item originally specified. It is the Contractor's responsibility to procure the proper sizes, quantities, rearrangements, structural modifications or other modifications in order for the substituted item to comply with the established requirements.
- D. Group materials submitted by their Specification numbers, but do not submit the entire electrical within one submittal. Provide a table of contents to indicate the included equipment types.
- E. The Contractor shall submit complete descriptions, illustrations, specification data, etc., of all materials, fittings, devices, fixtures, special systems, etc., as required by the individual sections of this Division.
- F. Submittal of shop drawings, product data and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the Engineer will not be processed.
- G. Shop Drawings: In addition to the above, submit in reproducible form made by a process approved by the Engineer, shop drawings for major materials where called for and when requested by the Engineer.
 - 1. Lockout/Tagout Program.
 - 2. Switchboard, motor control centers, panelboards, surge arresters, and safety switches.
 - 3. Motor starters and contactors including custom wiring diagrams for all motors.
 - 4. Lighting fixtures and lamps including light pole foundation requirements.
 - 5. Wire, cable and conduit.
 - 6. Dry type transformers including weight and dimensions.
 - 7. Wiring devices and plates.
 - 8. Site lighting control components including contactors and lighting control center.
 - 9. Dimensioned layout of electrical room drawn to scale, with equipment location shown therein. Clearances shall be in accordance with NEC and local codes.
 - 10. Dimensioned layout of all below grade conduit installations.
 - 11. Grounding system and layout.
 - 12. Emergency power system.
 - 13. Lightning protection system layout.
 - 14. Traffic control system layout and schematics.
 - 15. Seismic protection materials and methods for all electrical equipment.
 - 16. Mounting brackets, supports and assembly for walkway mounted equipment including instruments, lighting and control panels

1.4 QUALITY ASSURANCE

- A. Any electrical equipment provided under this Division shall be turned over to the Owner in operating condition. Instruction on further operation and maintenance shall be included in the operating and maintenance instructions.

1.5 PRODUCT LISTING

- A. Prepare listing of major electrical equipment and materials for the project.
- B. Provide all information requested.
- C. Submit this listing as a part of the submittal requirements.
- D. When two or more items of same material or equipment are required they shall be of the same manufacturer when available. Product manufacturer uniformity does not apply to raw materials, bulk materials, wire, conduit, fittings, sheet metal, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment kits, and similar items used in Work, except as otherwise indicated.
- E. Provide products that are compatible within systems and other connected items.

1.6 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power operated equipment, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.

1.7 WORK SUPERVISION

- A. The Contractor shall designate in writing the qualified electrical supervisor who shall provide supervision to all electrical work on this project. The minimum qualifications for the electrical supervisor shall be a master electrician as defined by the statutes of the state of the work being performed. The supervisor or his appointed alternate possessing at least a master electrician license shall be on site whenever electrical work is being performed. The qualifications of the electrical supervisor shall be subject to approval of the Owner and the Engineer.
- B. All master and journeyman electricians shall be licensed in accordance with the statutes of the state of the work being performed. No unlicensed electrical workers shall perform work on this project. Apprentice electricians in a ratio of not more than one apprentice per journeyman electrician will be allowed if the apprentices are licensed and actively participating in an apprenticeship program recognized and approved by the statutes of the state of the work being performed.

1.8 LOCKOUT / TAGOUT PROGRAM

- A. The Contractor shall provide a complete copy of electrical energy source Lockout/Tagout Program to the Owner, with copy to the Engineer. The document shall clearly identify the on-site master electricians and their contact information, including office and mobile telephone numbers.

- B. The Lockout/Tagout Program shall comply with Part 1910 - Occupational Safety and Health Standards (OSHA) Subpart S – Electrical, and meet the requirements of 29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout), including requirements listed in 1910.331 through 1910.335.
- C. Implementation of the Lockout/Tagout Program and all other related safety requirements are the sole responsibility of the Contractor.

1.9 SAFETY PROGRAM

- A. The Contractor shall implement an electrical safety program that complies with NFPA 70E and 29 CFR 1926.
- B. Implementation of the Electrical Safety Program, determining and providing proper Personal Protective Equipment (PPE), training and enforcing personnel to wear the prescribed PPE, conducting work area safety inspections (including correcting deficiencies), and all other related safety requirements are the sole responsibility of the Contractor.

1.10 EQUIPMENT CONNECTIONS

- A. General: Provide connections for all equipment installed or modified by this contract, regardless of who furnished the equipment.
- B. Provide all disconnect switches required by Code whether or not shown on the plans.
- C. Contractor shall connect Owner-furnished equipment when specified.

1.11 GENERAL CONDITIONS

- A. The work under this heading is subject to the General and Supplementary Conditions, special conditions for mechanical and electrical work, and the Contractor or subcontractor will be responsible for and be governed by all requirements thereunder as though specifically repeated herein.

1.12 COORDINATION

- A. The Contractor shall coordinate arrangement, mounting and support of all electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at a required slope.
 - 4. So connecting raceways, cables and wireways will be clear of obstructions and of the working and access space of other equipment.
- B. The Contractor shall coordinate electrical equipment to be mounted on vendor supplied walkways with supplier.

1.13 SPECIAL NOTE

- A. The mechanical, structural and process plans and specifications, including the general conditions and all supplements issued thereto, information to bidders, and other pertinent documents issued by the Engineer, are a part of these specifications and the accompanying electrical plans, and shall be complied with in every respect. All the above is included herewith, and shall be examined by all bidders. Failure to comply shall not relieve the Contractor of responsibility or be used as a basis for additional compensation due to omission of mechanical, process and structural details from the electrical drawings.

1.14 CONTINUATION OF SERVICES

- A. The Contractor shall install any temporary lines and connections required to maintain electric services and safely remove and dispose of them when complete. The Contractor shall supply emergency power whenever any existing electrical service is without power for a period of more than three (3) hours due to his work. In general, the existing facility shall remain operational during construction.
- B. Planned outages shall be coordinated two weeks in advance with duration and time of start approved by the Owner. Changeover work which may be required after normal hours or weekends shall not constitute the basis for additional cost to the Owner. When an outage begins, the Contractor shall proceed directly to completion of the work without unscheduled interruptions or delays due to lack of manpower, equipment or tools.
- C. The Contractor shall refer to the sequence of construction and shall provide temporary connections as may be required to complete each phase of construction as may be required. The Contractor shall submit proposed electrical service plans for each phase of construction to the Owner and Engineer for consideration.
- D. The Contractor shall be responsible for field locating, protecting, and rerouting of any existing electrical or communication conduits and cables during construction as may be needed for workable installation. The use of temporary connections during construction will be allowed as needed, but all final services shall be properly installed prior to the completion of the project.
- E. The Contractor shall be responsible for immediately repairing any existing electrical or communication conduits that may be damaged during construction. Any items that are damaged by the Contractor will be brought to the attention of the Owner and Engineer and work shall commence immediately to repair the damaged items. The Contractor shall provide continuous support services with no interruptions until the repair is completed. All repairs completed in this fashion will be considered temporary and provisions for a permanent replacement will be required. All wiring damaged during construction will be required to be removed and replaced from point of origin to the destination point.

1.15 LAYOUT

- A. The Contractor shall coordinate and establish all benchmarks and control lines. The Contractor shall lay out all work. The lay out shall be reviewed by the Engineer and Owner prior to starting any work.

1.16 RELATED WORK SPECIFIED ELSEWHERE

- A. Mechanical Equipment: The Contractor shall rough-in for and make final electrical connections to all motor, panels, fixtures, and equipment furnished under other sections of the specifications, providing all material and equipment required for such final connections, except hereinbefore described. This includes, but is not limited to, control panels and other miscellaneous equipment.
- B. The Contractor shall refer to other sections of these specifications for all information relating to the requirements of all electrical connections to the equipment and shall furnish and install electrical items required for a complete installation, ready for operation.
- C. Roughing-in shall be accomplished from approved shop drawings.
- D. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- E. Refer to equipment specifications in other Divisions for rough-in requirements.

1.17 LOCAL CONDITIONS

- A. Inspection of Sites: The bidder shall inspect the site, thoroughly acquaint himself with conditions to be met and work to be accomplished. Failure to comply with this shall not constitute grounds for any additional payments.

1.18 RECORD DOCUMENTS

- A. Refer to the General and Supplementary Conditions for requirements. The following paragraphs supplement the requirements of the General and Supplementary Conditions:
 - 1. Mark Drawings to indicate revisions to conduit size and location both exterior and interior; actual equipment locations, dimensioned for column lines; concealed equipment, dimensioned to column lines; distribution and branch electrical circuitry; fuse and circuit breaker size and arrangements; support and hanger details; Change Orders; concealed control system devices.
 - 2. The Contractor shall locate all underground and concealed work, identifying all equipment, conduit, circuit numbers, motors, feeders, breakers, switches, and starters. The Contractor will certify accuracy by endorsement. Record drawings shall be correct in every detail, such that the Owner can properly operate, maintain, and repair exposed and concealed work.
 - 3. The Contractor shall store the Record drawings on the site. Drawings shall not be rolled. Make corrections, additions, etc., with pencil, with date and authorization of change.

4. Mark specifications to indicate approved substitutions; Change Orders; actual equipment and materials used.

1.19 OPERATION AND MAINTENANCE DATA

- A. Refer to the General and Supplementary Conditions for procedures and requirements for preparation and submittal of maintenance manuals.
- B. In addition to the information required by the General and Supplementary Conditions, include the following information:
 1. Installation manual: Description of function, installation and calibration manuals, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 2. Operations manual: Manufacturer's printed operating instructions and procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; summer and winter operating instructions; and all programming and equipment settings.
 3. Maintenance manual: Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 4. Service manual: Servicing instructions and lubrication charts and schedules, including the names and telephone numbers of personnel to contact for both routine periodic and warranty service for equipment and materials provided under this Division.
 5. Final approved equipment shop drawings, clearly labeled.
 6. Final test reports, clearly labeled, including motor certification tests.
 7. Final certified calibration sheets for all equipment and instruments.
- C. After approval of the O & M Manuals, the Contractor shall provide one (1) electronic copy of all documentation in Adobe PDF file format using a storage media device of the Owner and Engineer's choosing, along with 2 hard copies.

1.20 GUARANTEE

- A. The Contractor shall guarantee the work and materials for a period of one (1) year from the date of completion. If there are failures due to faulty material or workmanship, the Contractor shall correct the failure at no cost to the Owner.
- B. Refer to the General and Supplementary Conditions for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.
 1. Compile and assemble the warranties specified in Division 26, into a separate set of vinyl covered, three ring binders, tabulated and indexed for easy reference.
- C. Provide complete warranty information for each item to include product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

- D. Upon completion of the installation, the Contractor shall adjust the systems to the satisfaction of the Engineer.
- E. This guarantee shall include the capacity and integrated performance of the component parts of the various systems in accordance with the intent of the specifications. The Contractor shall conduct complete tests required by the Engineer to demonstrate the ability of the various systems.

1.21 CLEANING

- A. Refer to the General and Supplementary Conditions for general requirements for final cleaning.
- B. Clean all light fixtures, lamps and lenses prior to final acceptance. Replace all inoperative lamps.
- C. The electrical system shall be thoroughly cleaned inside and outside, of all enclosures to remove all debris, dust, concrete splatter, plaster paint and lint.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All materials and equipment used in carrying out these specifications shall be new and have UL listing, or listing by other recognized testing laboratory when such listings are available. Specifications and drawings indicate name, type, or catalog numbers of materials and equipment to be used as standards.

PART 3 - EXECUTION

3.1 SALVAGE

- A. All salvage and equipment removed by the work shall remain the property of the Owner unless directed otherwise by the Owner. Material removed from the project shall be stored on the project site where and as directed. Debris shall be removed from the job site and disposed of by the Contractor.

3.2 DELIVERY, STORAGE, AND HANDLING

- A. Deliver equipment to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
- B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- C. Equipment and materials shall be stored in accordance with the manufacturer's recommendations and instructions.

- D. All equipment, including but not limited to equipment containing coils and/or electronics, shall be stored in a clean, dry, ventilated and heated building. The storage area shall be free from condensation or other injurious environmental conditions. Freedom from condensation shall be essential and shall be accomplished by the use of auxiliary heaters as required to raise the temperature to 5-degree C above the ambient temperature. The equipment shall be protected from excessive dust.
- E. In addition, certain electronic equipment that requires cooling based upon its specific storage temperature range shall be stored in an air-conditioned building.
- F. All motors shall be stored in a clean, dry, ventilated and heated building. The storage area shall be free from condensation or other injurious environmental conditions. Freedom from condensation shall be essential and shall be accomplished by the use of auxiliary heaters as required to raise the temperature to 5 degree C above the ambient temperature. The motors shall be protected from excessive dust.
- G. Cables and wiring shall be kept in a dry location out of the sun.
- H. Outdoor storage, even when protected by a tarpaulin, is unacceptable.
- I. Equipment may be rejected if the storage criteria are not followed.

3.3 INSTALLATION

- A. Coordinate electrical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for electrical installations.
- D. The Contractor shall keep ends of conduits, including those extending through roofs, equipment and fixtures covered or closed with caps or plugs to prevent foreign material from entering during construction.
- E. Coordinate the installation of required supporting devices and sleeves to be set in concrete and other structural components as they are constructed.
- F. Sequence, coordinate, and integrate installations of electrical materials and equipment for maintaining the required operation of the facility. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.
- H. Where mounting heights are not detailed or dimensioned, install electrical services and overhead equipment to provide the maximum headroom possible.

- I. Install electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- J. Coordinate the installation of electrical materials and equipment above ceilings with suspension system, mechanical equipment and systems, and structural components.
- K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
- L. Coordinate installation of electrical equipment on vendor supplied walkways with supplier.

3.4 MATERIALS AND WORKMANSHIP

- A. All materials shall be new, and shall be of the latest standard design of a manufacturer regularly engaged in the manufacture of that type of equipment. Materials shall be in good condition and shall be free from dents, scratches or other damage incurred in shipment or installation.
- B. All equipment shall comply with the National Electrical Code, Underwriters Laboratories or other appropriate agency.
- C. Installation shall be made in a neat and workmanlike manner, and all materials shall be installed in accordance with the recommendations of the various manufacturers. The installation shall be subject to the approval of the Owner and Engineer.
- D. Incidental materials required to complete the installation as intended by these Specifications shall be of the type and quality in keeping with specified equipment.

3.5 COORDINATION

- A. Carefully examine specification and drawings to be thoroughly familiar with items which require electrical connections and coordination. (Electrical drawings are diagrammatic and shall not be scaled for exact sizes.)
- B. Notify other tradesmen of any deviations or special conditions necessary for the installation of work. Interference between work of various contractors shall be resolved prior to installation. Work installed not in compliance with specifications and drawings and without properly checking and coordinating as specified above shall, if necessary, be removed and properly reinstalled without additional cost to the Owner. Engineer to be mediating authority in all disputes arising on project.
- C. Equipment shall be installed in accordance with manufacturer's recommendation. Where conflicts occur between contract documents and these recommendations, a ruling shall be requested of the Engineer for decision before proceeding with such work.

3.6 CUTTING AND PATCHING

- A. Repair or replace routine damage caused by cutting in performance of work under this Division.
- B. Correct unnecessary damage caused due to installation of electrical work, brought about through carelessness or lack of coordination.
- C. Holes cut through floor slabs to be sleeved or core drilled with drill designed for this purpose. All openings, sleeves, and holes in slabs to be properly sealed, fire proofed and water proofed.
- D. Repairs to be performed with materials which match existing materials and to be installed in accordance with appropriate sections of these specifications.
- E. All cutting and patching work shall be coordinated in advance with the Engineer and Owner prior to any work.

3.7 TRENCHING, EXCAVATION, BACKFILLING, AND REPAIRS

- A. Provide trenching, excavation, and backfilling necessary for performance of work under this Division.

3.8 FOUNDATIONS AND PADS

- A. Foundations and pads required for equipment shall be provided as indicated. Proper size and location of foundations, pads and anchor bolts shall be determined under this Division.
- B. Provide anchors and bases for electrical equipment to withstand lateral forces and accommodate displacements.

3.9 NOISE AND VIBRATION CONTROL

- A. The electrical system as installed shall be free of objectionable noise or vibration. The Contractor shall isolate motors, starters, transformers, equipment, ballasts, etc., as directed or required as to ensure acceptable noise level free from objectionable vibration in all systems.

3.10 TESTS

- A. On completion of work, installation shall be completely operational and entirely free from ground, short circuits, and open circuits. Perform a thorough operational test in presence of the Owner and Engineer. Furnish all labor, materials and instruments for above tests.
- B. Furnish the Engineer, as part of closing file, a copy of such tests including identification of each circuit and readings recorded. Test information to be furnished to the Engineer includes ampere readings of all panels and major circuit breakers, isolation resistance reading of motors and transformers.

- C. Prior to final observation and acceptance test, all electrical systems and equipment, including but not limited to the following, shall be in satisfactory operating condition:
1. Electrical power and distribution system.
 2. Lighting systems.
 3. Transformers.
 4. Electric motors for all equipment.
 5. Telecommunication system.
 6. Emergency power system.
 7. Special electrical systems and CCTV.
- D. After installation of the electrical system and before operating equipment, functional checking shall be conducted in accordance with the manufacturer's recommendations, with the contract drawings, and as follows:
1. Functional checking shall include inspection, testing and repair, replacement or adjustments as necessary to ensure compliance with the requirements of the specifications. Tests and inspections shall be recorded on appropriate yellow lined contract and shop drawings, standard test forms and checklists to indicate that wiring and controls are in place in accordance with requirements and to form the basis of record drawings.
 2. The functional test procedures shall be signed and dated by the Contractor and presented to the Owner's construction observation personnel prior to operating any equipment.
 - a. Visual Inspection – The electrical system shall be examined as outlined below:
 - 1) Parts or components missing
 - 2) Improper assembly
 - 3) Parts or components not functioning properly
 - 4) Finish not as specified
 - 5) Materials not as specified
 - 6) Connections not tight
 - 7) Mounting and supports loose or unsatisfactory
 - 8) Nameplates missing or inaccurate
 - b. Grounding System Tests
 - 1) Measure the resistance of the counterpoise grounding system by the rate-of-fall of potential method. Record all measurements on an approved standard test form made specifically for the purpose. The resistance of the grounding system to ground shall not exceed NFPA 70 requirements.
 - c. Continuity Tests
 - 1) Each wire and each wire in each cable rated 300 volts and below shall be tested for continuity. Record wire number and pass or fail on checklist for each wire.
 - d. Dielectric Tests
 - 1) Each power conductor rated 600 volts and above shall be tested (meggered) for dielectric strength to ground.
 - 2) Prior to testing, all components that could be damaged should be disconnected. After testing, the circuit shall still register a resistance value of

not less than 1 megohm at 600 volts, dc. This test shall apply between all insulated circuits and external metal parts. Record equipment name, phase or wire number and all observed values for each wire.

- 3) Subsequent to wire and cable hook-ups, energize circuits and demonstrate proper functioning of all circuits. Record equipment or circuit number and pass or fail on function test checklist for each circuit.
- 4) The Contractor shall develop non-conforming material reports for each failure. Repair and report failures all failures to Owner and Engineer.
- 5) The Contractor shall replace defective parts, correct malfunctioning units, make all repairs and retest to demonstrate compliance. The Contractor shall document all actions taken on appropriate non-conforming material report.

3.11 INSPECTION FEES AND PERMITS

- A. Obtain and pay for all necessary permits and inspection fees required for electrical installation.

3.12 IDENTIFICATION OF EQUIPMENT

- A. Properly identify all electrical equipment, including but not limited to the following:
 1. Switchgear, switchboards, motor control centers, and control panels.
 2. Main distribution panel and individual devices within it.
 3. Panelboards and individual devices within it.
 4. Safety switches and disconnects.
 5. Contactors and lighting control center, including all branch circuits.
 6. Individually mounted circuit breakers.
 7. Relays.
 8. Transformers.
 9. Generators and automatic transfer switches.
 10. Any other type of enclosure that includes electrical equipment.

3.13 TEMPORARY LIGHTS AND POWER

- A. Provide a temporary electrical lighting and power distribution system of adequate size to support construction activities. This includes but is not limited to temporary light fixtures, power outlets, welding receptacles, etc. Include adequate feeder sizes to prevent excessive voltage drop. Temporary work to be installed in a neat and safe manner in accordance with the National Electrical Code, Article 590, and as required by OSHA or applicable local safety codes.
- B. The Contractor will pay for power consumption.
- C. Coordinate prior to installation to determine whether single phase or three-phase temporary service is desired.

END OF SECTION

SECTION 26 05 15 - ELECTRIC MOTORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes materials, installation and testing of induction motors and applies to motors which are generally provided as part of equipment specified in other sections. The Contractor shall provide motors, accessories and appurtenances complete and operable in accordance with the individual driven equipment specifications.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Complete motor data shall be submitted, including:
 - 1. Machine name and specification number of driven machine.
 - 2. Motor manufacturer.
 - 3. Motor type or model and dimensional drawing, including weight.
 - 4. Horsepower nominal.
 - 5. Guaranteed minimum full load efficiency. Also, nominal efficiencies at 1/2 and 3/4 load.
 - 6. Full load speed.
 - 7. Full load current at rated horsepower for application voltage.
 - 8. Service factor, minimum 1.15.
 - 9. Voltage, phase and frequency rating.
 - 10. Winding insulation class.
 - 11. Temperature rise class.
 - 12. Frame size.
 - 13. Enclosure.
 - 14. NEMA design.
 - 15. Thermal protection or over temperature protection.
 - 16. Wiring diagram for devices such as temperature switches, space heaters and motor leak detection as applicable.
 - 17. Bearing data, including recommendation of lubricants.
 - 18. Inverter duty motor for all motors connected to variable frequency drive controllers. Include minimum speed at which motors may be operated.
 - 19. Power factor at 1/2, 3/4 and full load.
 - 20. Complete nameplate data, rating and characteristics.
 - 21. Mounting arrangement, size and location of conduit entries, including lugs.
 - 22. Factory test results for each motor.

1.3 QUALITY ASSURANCE

- A. Provide routine (short commercial) test data complying with NEMA MG 1-12.51 and MG 1-23.46.

- B. Test thermally protected motors in accordance with NEMA MG 1 winding temperature and trip current tests.
- C. Comply with NEMA MG 1.
- D. Motors for applications in hazardous locations shall bear the UL label listing its use in accordance with the NEC.

1.4 COORDINATION

- A. Furnish reviewed shop drawings from motor controller manufacturer for coordination and sizing of the controller.
- B. Coordinate supplied motor connection box with conduits sizes indicated in the drawings.
- C. Coordinate motor leads and lugs with wire sizes indicated in the drawings.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Unless otherwise specified or specifically required by the manufacturer of the equipment to be driven, all motors shall be single speed, squirrel cage, a-c induction type motors. Electric motors shall be NEMA Design B constant speed squirrel cage induction motors having normal starting torque with low starting current except for motors controlled by variable speed operation and other special motors. In no case shall starting torque or breakdown torque be less than the value specified in ANSI/NEMA MG 1. In all cases, motors shall be suitable for the indicated starting method.
- B. Stator winding shall be copper.
- C. The maximum motor loading of each motor shall not exceed its nameplate horsepower rating (exclusive of service factor) under any operating condition.
- D. Motors shall be sized to start and accelerate the design loading and operate the full range of driven equipment without exceeding any of the specified design requirements. Motors that fail to meet these requirements shall be replaced at no additional cost to the Owner.
- E. All three phase motors shall be provided with Class F insulation, rated to operate at a maximum ambient temperature of 40 degrees C and at the altitudes where the motors will be installed and operated without exceeding Class B temperature rise limits stated in ANSI/NEMA MG1-12, 42. Single phase motors shall have Class F insulation with temperature rise not to exceed the insulation class. Motors to be operated with variable frequency drives shall be provided with insulation systems to withstand 1600 volt spikes, with dV/dt as defined in NEMA MG 1-31.
- F. All motors shall have a minimum service factor of 1.15.

- G. Motors for use in hazardous locations shall have enclosures suitable for the classification of the location. Such motors shall be UL listed and stamped.
- H. Motors larger than 50 HP located outdoors or in non-conditioned areas shall have 120-volt AC space heaters and temperature sensors.
- I. For motors controlled by variable frequency drives, the critical vibration speed of the motor/load combination shall either not fall within the operating range of the drive or such frequencies shall be blocked with the drive critical speed avoidance circuit. All motors connected to variable frequency drives shall be inverter duty rated.
- J. Unless otherwise specified, motors shall have no-load sound power levels not to exceed the values specified in NEMA MG 1-12.53.3.
- K. Premium Efficiency Motors:
 - 1. Motors with a nameplate rating of 1 horsepower and larger shall be premium efficiency type motors as determined by the testing set forth in ANSI/IEEE 112 – Standard Test Procedure for Polyphase Induction Motors and Generators, Method B. Motors shall be stamped with the efficiency on the nameplate with the caption “NEMA Nominal Efficiency.”
 - 2. Efficiency index, nominal efficiency and minimum efficiency shall be defined in accordance with ANSI/NEMA MG1-12.59 – Efficiency Levels of Energy Efficient Polyphase Squirrel-Cage Induction Motors. All three values are required to be indicated in the submittal.

2.2 MOTOR BEARINGS

- A. All motors greater than 2 horsepower shall have bearings designed for 17,500 hours (belted) or 100,000 hours (coupled) L-10 life.
- B. Motors less than 2 horsepower shall be provided with sealed, permanently lubricated ball bearings.
- C. Horizontal motors over 2 horsepower shall be shielded open-type bearing installed with labyrinth sealed end bells with pipe plugs. Bearings shall be regreasable and have provisions for purging old grease.
- D. Vertical motors over 2 horsepower shall be provided with relubricatable ball, spherical, roller or plate type thrust bearings. Lubrication shall be per manufacturer’s recommendation for smooth operation and long life of the bearing. Drains shall be provided to prevent over lubrication.

2.3 MOTOR THERMAL PROTECTION

- A. All single phase motors shall have integral thermal overload protection or shall be current limited.

- B. Winding thermostats shall be provided in accordance with NEMA MG-1. Thermostats shall be snap action, bi-metallic, temperature actuated type switches and shall be provided with a normally closed contact. Thermostats shall be precalibrated by the manufacturer and shall be series connected.

2.4 ACCESSORIES

- A. All vertical motors and horizontal motors 3 horsepower and larger shall have split-type conduit boxes with a gasketed moisture seal between the conduit box and motor frame. Motors less than 3 horsepower shall have the manufacturer's standard conduit boxes. Motors other than open drip-proof shall be gasketed.
- B. All motors weighing 250 pounds or greater shall have suitable lifting eyes for installation and removal.
- C. Motor grounding lugs shall be provided and shall be suitable for terminating ground wires.
- D. All motors shall be fitted with permanent stainless steel nameplates indelibly stamped or engraved with NEMA Standard motor data.
- E. Refer to equipment specifications for special requirements such as space heaters or motor winding thermal protection.

PART 3 - EXECUTION

3.1 STORAGE

- A. Protect motors from exposure to elements for which they are not designed. Install and energize temporary electrical service to motors with electrical heaters.
- B. Store motors in an air-conditioned, ventilated or protected environment similar to or better than the destination environment.

3.2 INSTALLATION

- A. Motor installation shall be performed in accordance with the motor manufacturer's written recommendations and the written requirements of the manufacturer of the driven equipment.
- B. Connections, switches, controls, disconnects and other items shall be provided in accordance with the plans and specifications for each motor.
- C. The Contractor shall coordinate conduit sizes indicated in the drawings with the supplied motor connection box. The Contractor shall be responsible for providing larger connection boxes as may be required.

3.3 FIELD TESTING

- A. Perform insulation resistance tests in accordance with NEMA MG-1. Test voltage shall be 1000 VAC plus twice the rated voltage of motor.
- B. Inspect the physical and mechanical conditions of each motor installation including any deviations from the nameplate, drawings, specifications and manufacturer's written guidelines. Verify expected rated voltage, phase and frequency for each motor installation. Confirm the presence of and correct application of lubrications for each motor along with proper securing and torque settings for bolted installations of each motor.
- C. Check for proper phase and ground connections for each motor are connected. For multi-voltage motors, verify that motors are connected properly for the supplied voltage.
- D. Verify that space heaters, where provided, are functional.
- E. Test the motor for proper rotation prior to connection to the driven equipment. Measure and record running current and evaluate the current relative to the load conditions and nameplate full-load amps.
- F. Simulate operating conditions for each motor to demonstrate proper operation of interlocks and control features.
- G. Record operating current in each phase for each motor ½ horsepower and larger. Motors exceeding motor nameplates values shall be repaired or replaced.
- H. For motors 50 horsepower and larger or when a discernible abnormal vibration is detectible, a vibration test shall be completed. Vibration shall not exceed 0.25 in./sec. For horizontal motors, the N-S and E-W vibrations shall be measured at the top and bottom of the front and rear bearing housing. For vertical motors, the N-S and E-W vibrations shall be measured at the upper and lower bearing housing.
- I. All testing shall be witnessed by the Engineer and Owner.
 - 1. Motor and Motor Protection Tests for motors – In addition to other testing start and stop each motor a minimum of 3 times and perform a run test for vibration, heat, and to document motor protection. The Contractor shall document the settings of the motor overcurrent protection, overload relay and similar data on the provided form – MOTOR TEST REPORT.
 - 2. The Contractor shall develop non-conforming material reports for each failure and repair or report failures.
 - 3. The Contractor shall replace defective parts, correct malfunctioning units, make all repairs and retest to demonstrate compliance. The Contractor shall document action taken on appropriate non-conforming material report.

3.4 MOTOR TEST REPORT

- A. The following form is provided for the motor certification specified herein. Master blank forms are available on request.

END OF SECTION

Kilgore Primary Clarifier Rehabilitation

MOTOR TEST REPORT

Each electric motor shall be tested for proper operation. Follow manufacturer's testing recommendations and procedures.

1. Name and Horsepower of Motor Tested: _____

2. Overcurrent Protection: _____

3. Overload Protection: _____

4. Visual Inspection Checklist:

- ☐ Momentarily Bump Motor Shaft for Proper Rotation
- ☐ Motor Frame Bolts
- ☐ Shaft Coupling
- ☐ Lubricants
- ☐ Other Comments:

5. Megger motor from wire in motor control center or control panel and record results:

$\phi A - \phi B$ _____ $\phi B - \phi C$ _____ $\phi C - \phi A$ _____

$\phi A - G$ _____ $\phi B - G$ _____ $\phi C - G$ _____

6. Record full load voltage and current:

V_{ab} _____ V_{an} _____ I_a _____

V_{bc} _____ V_{bn} _____ I_b _____

V_{ca} _____ V_{cn} _____ I_c _____

7. Motor Nameplate FLA: _____

Running Amps: _____

P.F. _____

8. Comments:

Signature Required: _____

Company: _____

Date: _____

SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.
 - 3. Sleeves and sleeve seals for cables.
- B. Related Sections include the following:
 - 1. Division 26 Sections

1.2 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene monomer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- A. Field quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association (NETA) or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
 - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.5 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70. No aluminum on project.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW and RHH-RHW-USE.

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Hubbell Power Systems, Inc.
 - 3. O-Z/Gedney; EGS Electrical Group LLC.
 - 4. 3M; Electrical Products Division.
 - 5. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper, stranded.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 - 1. Control circuits, motor branch circuits, and branch circuits to vibrating equipment shall be stranded for all conductor sizes.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type RHH-RHW-USE single conductors in raceway.
- B. Exposed Feeders: Type RHH-RHW-USE, single conductors in raceway.

- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type RHH-RHW-USE, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type RHH-RHW-USE single conductors in raceway.
- E. Feeders in Cable Tray: Type RHH-RHW-USE, single conductors in raceway for larger than 4/0 AWG; Otherwise Type TC tray cable.
- F. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW, single conductors in raceway.
- I. Variable Frequency Drive Branch Circuits: Shielded cable, size adjusted for published ampacity of cable.
- J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- K. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- D. Cable splicing, in general, will not be allowed. Where applicable, all wiring connections to be made using terminal block type connections. Wire nut use will be permitted only where allowed by the Owner and Engineer.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. Megger Test of individual conductors to ground after installation.
 - 2. Visual observation of conductor at accessible locations.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test the following for compliance with requirements.
 - a. All panel feeders.
 - b. All motor feeders.
 - c. All control wires for continuity.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
 - 1. Underground distribution grounding.
 - 2. Common ground bonding with lightning protection system.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
 - 1. Test wells.
 - 2. Ground rods.
 - 3. Ground rings.
 - 4. Grounding arrangements and connections for separately derived systems.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For grounding to include the following in emergency, operation and maintenance manuals.
 - 1. Instructions for periodic testing and inspection of grounding features at test wells ground rings grounding connections for separately derived systems based on ANSI/NETA MTS.
 - a. Test shall be to determine if ground resistance or impedance values remain within specified maximums and instructions shall recommend corrective action if they do not.
 - b. Include recommended testing intervals.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

- B. Bare copper Conductors:
 - 1. Solid Conductors: ASTM B3
 - 2. Stranded Conductors: ASTM B8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Conductor: No. 4 AWG, stranded conductor or per NFPA 70.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 4/0 AWG minimum.
 - 1. Bury at least 30 inches below grade.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Bolted connectors.

3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with ANSI/IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-

copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

- C. Grounding Connections to Manhole and Handhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- D. Water Heater, Heat-Tracing and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment and components.
- E. Metal Poles Supporting Outdoor Lighting fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact or damage.
- B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to

electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

- C. Ground rods: Drive rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
 - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
 - 1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
 - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
- F. Grounding and Bonding for Piping:
 - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit from building's main service equipment, or grounding bus, to main metal water service entrance to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.

- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each steel column and indicated item, extending around the perimeter of building.
 - 1. Install tinned-copper conductor not less than No. 4/0 AWG for ground ring and for taps to building steel.
 - 2. Bury ground ring not less than 24 inches from building foundation at a depth not less than 30 inches below finished grade.
- J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
 - 1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 - 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal at ground test wells. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 - 3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
 - 5. Substations and Pad-Mounted Equipment: 5 ohms.
 - 6. Manhole and Handhole Grounds: 10 ohms.
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 DEFINITIONS

- A. RMC: Rigid metal conduit.
- B. NECA: National Electrical Contractors Association.

1.3 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.

1.5 QUALITY ASSURANCE

- A. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 4. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101. NECA publications are available at www.NECAnet.org.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size and shape of conductor gripping pieces as required to suit individual conductors or cables supported.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes and bars.
- F. Mounting, Anchoring and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded 304 stainless steel stud, for use in hardened Portland cement concrete, steel or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois tool works, Inc.
 - 3) MKT Fastening, LLC
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened Portland cement concrete with tension, shear and pullout capacities appropriate for supported loads and building materials in which used.

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red head; a division of Illinois tool works, Inc.
 - 5) MKT Fastening, LLC.
3. Concrete Inserts: Stainless steel, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle bolts: All-steel springhead type.
7. Hanger Rods: Threaded 304 stainless steel.
8. Nuts: Match threaded rod or bolt; double nut vertical hanger rods.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES.

- A. Description: bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Outdoor locations: Supporting material shall be stainless steel or PVC-Coated galvanized steel or as described within the Drawings.
- C. Indoor locations: Supporting materials shall be galvanized in dry areas and stainless steel or PVC-Coated galvanized steel in damp areas, or as described within the Drawings.
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for RMC as required by NFPA 70. Minimum rod size shall be ¼ inch in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

- B. Raceway Support Methods: In addition to methods described in NECA 1, RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lbs.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
 - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 - 7. To Light Steel: Stainless steel sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit and place miscellaneous metal supports accurately in location, alignment and elevation to support and anchor electrical materials and equipment.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000 psi, 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base.
 - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions and directions furnished with items to be embedded.

2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

END OF SECTION

SECTION - 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 26 Section "PVC Coated Conduit."

1.2 DEFINITIONS

- A. LFMC: Liquidtight flexible metal conduit.
- B. LFNC: Liquidtight flexible nonmetallic conduit.
- C. GRS: Galvanized Rigid Steel Conduit.
- D. RNC: Rigid nonmetallic conduit.
- E. EMT: Electrical Metallic Tubing.

1.3 SUBMITTALS

- A. Product Data: for surface raceways, wireways and fittings, hinged-cover enclosures and cabinets.
- B. Custom enclosures and cabinets.
- C. Source quality-control test reports.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflec Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.

4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 5. Electri-Flex Co.
 6. Manhattan/CDT/Cole-Flex.
 7. Maverick Tube Corporation.
 8. O-Z Gedney; a unit of General Signal.
 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. PVC-Coated Steel Conduit: PVC-coated.
1. Comply with NEMA RN 1.
 2. Coating Thickness: 0.040 inch, minimum.
 3. Comply with ETL Verified PVC-001.
- D. EMT: ANSI C80.3 fittings for conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Conduit Fittings for Hazardous (Classified) Locations: comply with UL 886
 2. Coating for Fittings for PVC-Coated Conduit: Minimum Thickness 0.040 inch, with overlapping sleeves protecting threaded joints.
- E. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. AFC Cable Systems, Inc.
 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 3. Arnco Corporation
 4. CANTEX Inc.
 5. CertainTeed Corp.; Pipe & Plastics Group
 6. Condux International, Inc.
 7. ElecSYS, Inc.
 8. Electri-Flex co.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Manhattan/CDT/Cole-Flex.
 11. RACO; a Hubbell Company
 12. Thomas & Betts Corporation.
- B. RNC: NEMA TC2, Type EPC-40-PVC, unless otherwise indicated.
- C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell company.
 - 8. Scott Fetzer Co.; Adalet Division.
 - 9. Spring City Electrical Manufacturing Company.
 - 10. Stahlin Non-Metallic Enclosures.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The)
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. subsidiary.
- B. Sheet Metal Outlet and Device boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device boxes: NEMA FB 1, Type FD, with gasketed cover.
- D. Small Sheet Metal Pull and Junction boxes: NEMA OS 1.
- E. Cast-Metal Access, Pull and Junction boxes: NEMA FB 1.
- F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch for conditioned spaces only, unless otherwise indicated.
- G. Hinged-Cover Enclosures: NEMA 250, Type 4 Stainless steel, with continuous-hinge cover with latches for outdoor, process buildings, above and below grade structures and damp locations, unless otherwise indicated.

2.4 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A, 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052-or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with Engineer.

2.5 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Advance Products & systems, Inc.
 - 2. Calpico, Inc.
 - 3. Metraflex Co.
 - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
 - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
 - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
 - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed: PVC-Coated Rigid Steel
 - 2. Concealed: PVC-Coated Rigid Steel.
 - 3. Underground, Single Run: RNC, Schedule 40 in duct bank.
 - 4. Underground, Grouped: RNC, Schedule 40 in duct bank.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): PVC-Coated LFMC.
- B. Indoors:
 - 1. Exposed: PVC-Coated Rigid Steel or as noted in the Drawings.
 - 2. Concealed: Galvanized Rigid Steel or as noted in the Drawings.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid or Motor-Driven Equipment): PVC-Coated LFMC.
 - 4. Damp or Wet Locations: PVC-coated Rigid Steel or as noted in the Drawings.
 - 5. Above Drop-in Ceilings: EMT for lighting and receptacle branch circuits or as noted in the Drawings.
 - 6. Concealed in New Walls: EMT for lighting and receptacle branch circuits and switch legs or as noted in the Drawings.
- C. Minimum Raceway Size: $\frac{3}{4}$ -inch trade size; 1-inch trade size for below grade installation.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
 - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material.

- E. EMT: Use approved fittings.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of four 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1 inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Do not install conduits in such a manner as to compromise the structural integrity of walls, roofs, ceilings or floor. Where necessary, provide additional supporting members to support conduit runs. Below grade conduits 1 1/2" and larger shall be routed 24" below the concrete floor slabs.
 - 4. Comply with Chapter 6 of ACI 318.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Install raceway sealing fittings at suitable, approved and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 2. Where otherwise required by NFPA 70.
- L. Expansion-Joint Fittings: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg. F, and that has straight-run length that exceeds 25 feet.
1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces: connected with the Outdoors without Physical Separation: 125 deg F temperature change.
 - d. Attics: 135 deg F temperature change.
 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
 3. Install each expansion-joint fitting with position, mounting and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- M. Flexible conduit connections: Use maximum of 36 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement, and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- 3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS
- A. Coordinate sleeve selection and application Engineer.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Size pipe sleeves to provide ¼-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- G. Seal space outside of sleeves with grout for penetrations of concrete and masonry.

- H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint.
- I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with fire-stop materials.
- J. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.4 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

3.6 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 26 05 33.13 PVC COATED CONDUIT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes PVC-coated raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 26 Section "Raceway and Boxes for Electrical Systems".

1.2 SUBMITTALS

- A. Product Data: for surface raceways, wireways and fittings, hinged-cover enclosures and cabinets.
- B. Custom enclosures and cabinets.
- C. Source quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. All the conduit, fittings, and supporting products shall be provided by the same manufacturer to ensure that a five-year product warrantee is achieved.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
 - 1. Perma-Cote
 - 2. Plasti-Bond
 - 3. KorKap

2.2 MATERIALS

- A. PVC-coated, Galvanized Rigid Conduit (GRC) and fittings shall meet all the performance standards specified herein and such performance standards shall require verification by a nationally recognized testing agency including American Society for Testing and Materials (ASTM) and Underwriter Laboratories (UL).

- B. The PVC coated galvanized rigid conduit shall be UL Listed. The PVC coating shall have been investigated by UL as providing the primary corrosion protection for the rigid metal conduit. Ferrous fittings for general service locations shall be UL Listed with PVC as the primary corrosion protection. Hazardous location fittings, prior to plastic coating shall be UL listed. All conduits and fittings must be new, unused material. Applicable UL standards shall include: UL 6 Standard for Safety, Rigid Metal Conduit, UL514B Standard for Safety, Fittings for Conduit and Outlet Boxes.
- C. The PVC coated galvanized rigid conduit shall be Electrical Testing Laboratory (ETL) Verified to the Intertek ETL SEMKO High Temperature H₂O PVC Coating Adhesion Test Procedure for 200 hours. The PVC coated galvanized rigid conduit shall bear the ETL Verified PVC-001 label to signify compliance to the adhesion performance standard.
- D. The conduit shall be hot dip galvanized inside and out with hot galvanized threads.
- E. A PVC sleeve extending one pipe diameter or two inches, whichever is less, shall be formed at every female fitting opening except unions. The inside sleeve diameter shall be matched to the outside diameter of the conduit.
- F. The PVC coating on the outside of conduit couplings shall have a series of longitudinal ribs 40 mils in thickness to protect the coating from tool damage during installation.
- G. Form 8 Condulets, 1/2" through 2" diameters, shall have a v-seal tongue-in-groove gasket to effectively seal against the elements. The design shall be equipped with a positive placement feature to ease and assure proper installation. Certified results confirming seal performance at 15 psig (positive) and 25 in. of mercury (vacuum) for 72 hours shall be available. Form 8 Condulets shall be supplied with plastic encapsulated stainless steel cover screws.
- H. A urethane coating shall be uniformly and consistently applied to the interior of all conduit and fittings. This internal coating shall be a nominal 2 mil thickness. Conduit or fittings having areas with thin or no coating shall be unacceptable.
- I. The PVC exterior and urethane interior coatings applied to the conduit shall afford sufficient flexibility to permit field bending without cracking or flaking at temperatures above 30°F (-1°C).
- J. All male threads on conduit, elbows and nipples shall be protected by application of a urethane coating.
- K. All female threads on fittings or conduit couplings shall be protected by application of a urethane coating.
- L. Independent certified test results shall be available to confirm coating adhesion under the following conditions:
 - 1. Conduit and conduit exposure to 150°F (65°C) and 95% relative humidity with a minimum mean time to failure of 30 days (ASTM D1151).
 - 2. The interior coating bond shall be confirmed using the Standard Method of Adhesion by Tape Test (ASTM D3359).

3. No trace of the internal coating shall be visible on a white cloth following six wipes over the coating which has been wetted with acetone (ASTM D1308).
 4. The exterior coating bond shall be confirmed using the methods described in Section 3.8, NEMA RN1. After these tests the physical properties of the exterior coating shall exceed the minimum requirements specified in Table 3.1, NEMA RN1.
- M. Right angle beam clamps and U bolts shall be specially formed and sized to snugly fit the outside diameter of the coated conduit. All U bolts will be supplied with plastic encapsulated nuts that cover the exposed portions of the threads.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All clamping, cutting, threading, bending, and assembly instructions listed in the manufacturer's installation guide should be vigorously followed.
- B. Installation of the PVC Coated Conduit System shall be performed in accordance with the Manufacturer's Installation Manual. To assure correct installation, the installer shall be certified by Manufacturer to install coated conduit.
- C. Installer certification, before installation, is required.
- D. Clamps, bolts, angles, pipe straps, struts, rods, nuts and other supporting products for PVC-coated conduits shall be PVC-coated or stainless steel.
- E. The Contractor shall use equipment specifically designed for PVC-coated conduit when cutting, clamping, reaming, threading, bending, assembling or performing other installation procedures. PVC-coating shall be protected.
- F. Touch-up compound for PVC-coated conduit shall not be allowed. All conduits with damaged coatings shall be removed and replaced at no cost to owner.

END OF SECTION

SECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Identification for conductors and communication and control cable.
 - 2. Warning labels and signs.
 - 3. Instruction signs.
 - 4. Equipment identification labels.
 - 5. Miscellaneous identification products.

1.2 SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with NFPA 70E
- D. Comply with 29 CFR 1910.145.

1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.

PART 2 - PRODUCTS

2.1 CONDUCTOR AND COMMUNICATION – AND CONTROL-CABLE IDENTIFICATION MATERIALS.

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

- B. Marker Tapes: vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.2 WARNING LABEL AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145 and NFPA 70E.
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door or other access to equipment unless otherwise indicated.
- C. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend and size required for application. ¼ inch grommets in corners for mounting. Nominal size, 10 by 14 inches.
- D. Sample warning label and sign shall include, but are not limited to the following legends:
 - 1. Multiple Power source Warning: "DANGER – ELECTRICAL SHOCK HAZARD – EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION – AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
 - 3. WARNING – ARC FLASH AND SHOCK HAZARD –APPROPRIATE PPE REQUIRED.

2.3 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sized.
 - 1. Engraved legend with black letters on white face.
 - 2. Punched or drilled for mechanical fasteners.
 - 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark gray background. Minimum letter height shall be 3/8 inch.
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS.

- A. Cable ties: fungus-inert, self-extinguishing, 1-piece, self-locking, type 6/6 nylon cable ties.
 - 1. Minimum Width: 3/16 inch.
 - 2. Tensile Strength: 50 lb minimum.
 - 3. Temperature Range: Minus 40 to plus 185 degrees F.
 - 4. Color: Black, except where used for color-coding.

- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Outlet Boxes for Receptacles: Identify branch circuit by panel name and circuit number.
- B. Power-Circuit Conductor Identification: of secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.
- C. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
 - 1. Identify conductors, cables and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker type designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- E. Warning Labels for Indoor Cabinets, Boxes and Enclosures for Power and Lighting: comply with 29 CFR 1910.145 and apply metal-backed, butyrate warning signs. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover or other access.
 - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to the following:
 - a. Power transfer switches
 - b. Controls with external control power connections.
 - 2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.
- F. Instruction Signs:
 - 1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
 - 2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8 inch high letters for emergency instructions at equipment used for power transfer.

- G. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

- a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with ½-inch high letters on 1-1/2-inch high label; where 2 lines of text are required, use labels 2 inches high.
- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.

2. Equipment to Be Labeled:

- a. Panelboards, electrical cabinets and enclosures.
- b. Access doors and panels for concealed electrical items.
- c. Electrical switchgear and switchboards.
- d. Transformers.
- e. Motor-control centers.
- f. Disconnect switches.
- g. Enclosed circuit breakers.
- h. Motor starters.
- i. Push-bottom stations.
- j. Power transfer equipment.
- k. Contactors.
- l. Remote-controlled switches, dimmer modules and control devices.
- m. Power-generating units.
- n. Voice and data cable terminal equipment.
- o. Terminals, racks and patch panels for voice and data communications and for signal and control functions.

3.2 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach nonadhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder and branch-circuit conductors.

1. Color shall be factory applied or, for sized larger than No. 6 AWG if authorities having jurisdiction permit, field applied.
2. Colors for 480/277-V Circuits:
 - a. Phase A: Brown
 - b. Phase B: Orange
 - c. Phase C: Yellow
3. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

END OF SECTION

DIVISION 44
POLLUTION CONTROL EQUIPMENT

SECTION 44 42 23 – SPIRAL TYPE CLARIFIER MECHANISMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: the Work necessary to completely furnish and install the spiral type clarifier mechanisms, all related equipment, material, and appurtenances.
- B. Related Sections:
 - 1. Section 01 33 00 – Submittal Procedures.
 - 2. Section 01 60 00 – Product Requirements.
 - 3. Section 01 78 23 – Operation and Maintenance Data.
 - 4. Section 01 79 00 – Demonstration and Training.
 - 5. Division 05 – Metals.
 - 6. Division 26 – Electrical.

1.2 GENERAL

- A. Equipment Numbers: See Supplemental Data Sheet(s) at end of section.
- B. Like items of equipment provided hereinafter shall be the end products of one manufacturer to achieve standardization of appearance, operation, maintenance, spare parts and manufacturer's services.
- C. Unit Responsibility: The Work requires that the clarifier mechanism and associated appurtenances, including but not limited to, walkway, drive platform and handrail, scum beach, local control panel, and components, complete with all accessories and appurtenances be the end product of one responsible system manufacturer or responsible system supplier. Unless otherwise indicated, the Contractor shall obtain each system from the responsible supplier of the equipment, which supplier shall furnish all components and accessories of the system to enhance compatibility, ease of operation and maintenance, and as necessary to place the equipment in operation in conformance with the specified performance, features, and functions without altering or modifying the Contractor's responsibilities under the Contract Documents. The Contractor is responsible to the Owner for providing the equipment systems as specified herein.
- D. General Requirements: See Division 01, GENERAL REQUIREMENTS, which contains information and requirements that apply to the work specified herein and are mandatory for this project.
- E. The equipment specified herein is included in the Manufacturer/Subcontractor Form. Refer to the Bid Form and the Instructions to Bidders for additional requirements.

1.3 REFERENCES

- A. The following is a list of standards which may be referenced in this Section:

1. American Gear Manufacturers Association (AGMA): 908-B89, Geometry Factor for Determining the Pitting Resistance and Bending Strength of Spur, Helical, and Herringbone Gear Teeth.
2. American Institute of Steel Construction (AISC): Specifications for the Design, Fabrication, and Execution of Structural Steel for Buildings.
3. American National Standards Institute/American Bearing Manufacturers Association (ANSI/ABMA): 9 & 11, Load Ratings and Fatigue Life for Ball Bearings and Roller Bearings.
4. American National Standards Institute/American Gear Manufacturers Association (ANSI/AGMA):
 - a. 2000-A88, Gear Classification and Inspection Handbook Tolerances and Measuring Methods for Unassembled Spur and Helical Gears.
 - b. 2001-C95, Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth.
 - c. 2002-B88, Tooth Thickness Specification and Measurement.
 - d. 2003-B97, Rating the Pitting Resistance and Bending Strength of Generated Straight Bevel, Zerol Bevel, and Spiral Bevel Gear Teeth.
 - e. 2004-B89, Gear Materials and Heat Treatment Manual.
 - f. 2009-A98, Bevel Gear Classification, Tolerances and Measuring Methods.
 - g. 6001-D97, Design and Selection of Components for Enclosed Gear Drives.
 - h. 6010-F97, Standard for Spur, Helical, Herringbone and Bevel Enclosed Drives.
 - i. 6022-C93, Design Manual for Cylindrical Wormgearing.
 - j. 6034-B92, Practice for Enclosed Cylindrical Wormgear Speed Reducers and Gearmotors.
 - k. 9005-D94, Industrial Gear Lubrication.
5. American Society of Mechanical Engineers (ASME): B29.1M, Precision Power Transmission Roller Chains, Attachments, and Sprockets.
6. American Welding Society (AWS):
 - a. B2.1, Standard for Welding Procedure and Performance Qualification.
 - b. D1.1, Structural Welding Code – Steel.
 - c. QC 1, Standard for AWS Certification of Welding Inspectors.
7. ASTM International (ASTM):
 - a. A36/A36M, Standard Specification for Carbon Structural Steel.
 - b. A48, Standard Specification for Gray Iron Castings.
 - c. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - d. A148/A148M, Standard Specification for Steel Castings, High Strength, for Structural Purposes.
 - e. 6A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - f. A193/A193M, Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
 - g. A276, Standard Specification for Stainless Steel Bars and Shapes.
 - h. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

- i. A285/A285M, Standard Specification for Pressure Vessel Plates, Carbon Steel, Low- and Intermediate-Tensile Strength.
- j. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- k. A384, Standard Practice for Safeguarding Against Warpage and Distortion during Hot-Dip Galvanizing of Steel Assemblies.
- l. A385, Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).
- m. A536, Standard Specification for Ductile Iron Castings.
- n. A666, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
- o. D3034, Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- 8. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 - a. NEMA MG-1.

1.4 DEFINITIONS

- A. Alarm Torque: 90 percent of design running torque.
- B. Cutout Torque: 120 percent of design running torque.
- C. Design Running Torque:
 - 1. Torque used to select size, strength, and type of materials and components for mechanism and drive system.
 - 2. At which or below will provide continuous 24 hour per day mechanism operation for period of not less than 20 years at design torque condition and rotational speed without damage, permanent deformation or overload.
 - 3. Equal to 50 percent on overload device scale.
- D. Slenderness Ratio: Ratio of unbraced length to least radius of gyration.
- E. Submerged Metal: Metal below gear head drive and a plane 18 inches above weir elevation indicated.
- F. Ultimate Torque: 200 percent of design running torque and below which no portion of mechanism will be damaged if operated for only a short period of time (a few seconds) and equal to 100 percent on overload device scale.
- G. Certified Welding Inspector (CWI): As defined in AWS QC 1.

1.5 SUBMITTALS

- A. General: Administrative, shop drawings, samples, quality control and contract close-out submittals shall conform to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES.
- B. In addition to the requirements of Section 01 33 00, SUBMITTAL PROCEDURES, submit the following additional specific information:

1. Shop Drawings:
 - a. Equipment Assembly: Make, model, weight, and horsepower of each.
 - b. Manufacturer's Catalog: Product information, descriptive literature, dimensional layouts, specifications, standard and specialized equipment assembly cuts, and identification of materials of construction.
 - c. Detailed Drawings:
 - 1). Structural, Mechanical, and Electrical: Show equipment fabrications and interface with other items including dimensions, size, and locations of connections to other work, and weights of associated equipment.
 - 2). Structural and Mechanical: Details of walkway bridge, rotating rake arm trusswork.
 - d. Design Details:
 - 1). Running, Alarm, Cutout, and Ultimate Torque ratings of drive unit assembly.
 - 2). Ultimate Torque load capabilities of drive unit assembly, torque cage, rotating rake arm trusswork.
 - e. Hydraulic calculations and performance verification data.
 - f. Certification of Structural Calculations: Letter of certification for structural design of mechanism shall be signed and sealed by a registered professional engineer (Designer) in the state where the Project is located. Copies of detailed structural design calculations shall not be submitted for review. If submitted, calculations will be returned without review.
 - g. Structural Loads: Static, dynamic, and torque reaction loads to be transferred into structure at center column and access bridge support locations.
 - h. Details of torque sensing and load indication device.
 - i. Identification of outside utility requirements for each component such as air, water, and power.
 - j. Power and control wiring diagrams, including terminals and numbers.
 - k. Functional description of internal and external instrumentation and controls to be supplied including list of parameters monitored, controlled, or alarmed.
 - l. Painting/Coating System(s): Include manufacturer's descriptive technical catalogue literature and specifications.
 - m. Diameter of ball race.
 - n. Motor nameplate data per NEMA MG-1, motor manufacturer and any appurtenances.
 - o. Functional and Performance test description and results.
2. Quality Control Submittals:
 - a. Designer qualifications:
 - 1). Designer: Professional engineer registered in the state of the Project.
 - 2). Must show 10 years of experience with clarifier mechanism design.
 - b. Manufacturer's Certificate of Compliance, in accordance with Division 01, GENERAL REQUIREMENTS.
 - c. ANAB-accredited ISO 9001 quality system certification.
 - d. Special shipping, storage and protection, and handling instructions.
 - e. Test procedures.
 - f. Test results, reports, and certifications.

- g. Operation and Maintenance Data: As specified in Division 01, GENERAL REQUIREMENTS.
 - h. Manufacturer's Certificate of Proper Installation.
- 3. Contract Closeout Submittals: Service records for maintenance performed during construction.

1.6 OPERATION AND MAINTENANCE DATA

- A. O&M Manuals: Content, form, and schedule for providing as specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.
- B. Maintenance Summary Forms: As specified in Section 01 78 23, OPERATION AND MAINTENANCE DATA.

1.7 WARRANTY

- A. Provide warranty for a period of 12 months after the final acceptance of the equipment by the Owner and Engineer. The warranty shall stipulate that the equipment furnished is suitable for the purpose intended and free from defects of material and workmanship for the duration of the warranty. In the event the equipment fails to perform as specified, the Manufacturer shall promptly repair or replace the defective equipment without additional cost to the Owner.
- B. Spare parts identified within this specification shall not be used to address warranty repairs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Where a manufacturer's standard equipment name and/or model number is listed, the equipment system shall be provided as modified to conform to the performance, functions, features, and materials of construction as specified herein.
- B. Materials, equipment, and accessories specified in this Section shall be products of:
 - 1. Westech Engineering
 - 2. Ovivo USA, LLC

2.2 GENERAL REQUIREMENTS

- A. Furnish units meeting performance and design requirements as specified and as shown on the Drawings.
- B. Performance Requirements:
 - 1. Separate solids from the clear liquid.
 - 2. Collect and convey thickened sludge to center sludge hopper.
 - 3. Capable of normal operation with sludge stored in the unit.
 - 4. Collect floating scum from the surface and discharge it to an outlet scum trough.
- C. Design Requirements:

1. Design Running Torque: Drive unit shall be sized such that worm gear (if used), spur gear, and pinion all meet Design Running Torque in accordance with AGMA 2001 and 6034. Design Running Torque shall be selected by Manufacturer for service conditions specified.
2. Rotational Speed: Constant speed between 0.05 rpm and 0.1 rpm.
3. Capable of withstanding, without failure or permanent deformation of any part, torque load of at least twice Duty Torque and loads generated while sweeping in floor bottom grout.
4. Gears, Bearings, Chains, and Sprockets: Above water surface of clarifier.
5. Base design upon all-welded construction except at locations requiring periodic field adjustment and as specifically approved.
6. At Ultimate Torque load, stresses in members shall not exceed 90 percent of material yield strength.
7. Slenderness Ratio: Maximum of 200 for any compression member and maximum of 300 for any tension member.

2.3 SUPPLEMENTS

- A. See supplemental data sheets to this Section for additional equipment system product, component, and accessory information and requirements.

2.4 CENTER DRIVE UNIT ASSEMBLY

- A. Ultimate Torque Rating: Not less than 200 percent of Design Running Torque.
- B. Motor, Primary and Final Speed Reducers: Separately and independently mounted at center gear head drive platform.
- C. Electric Drive Motor: In accordance with Division 26, ELECTRICAL and Scraper Drive Data Sheet located in Supplements following "END OF SECTION."
- D. Speed Reducer Unit (Option A):
 1. Cycloidal, helical, or planetary speed reducers directly connected to a motor and keyed to the pinion.
 2. Cycloidal drives shall be made of high carbon chromium bearing steel and be fixed to the drive casing.
 3. An eccentric bearing on the high speed shaft shall roll cycloidal discs of the same material around the internal circumference of this main ring gear.
 4. The lobes of the cycloid disc shall engage successively with the pins in the fixed ring gear.
 5. The movement of the cycloid discs shall be transmitted then by the pins to the low speed shaft.
 6. Speed reducer efficiency shall be a minimum of 90% per reduction stage.
 7. The reducers shall be fitted with radial and thrust bearings of proper size for all mechanism loads and be grease lubricated.
- E. Low Speed Final Reduction Unit (Option A):

1. The drive unit shall consist of a solid internal main spur gear, bearing turntable, pinion, secondary speed reducer, support base, and drive unit bearing. Unit shall be oil lubricated.
 - a. The drive bearing shall include a forged steel precision gear/bearing set, with fully contoured raceways hardened to a minimum 58-60 RC.
 2. Low Speed Gearset:
 - a. The design running torque rating of the drive gearing shall be based on the smaller of the strength and durability values determined from the above AGMA standard.
 - b. The drive main gear shall be designed to a minimum AGMA 6 rating when rated in accordance with the latest AGMA standard.
 - c. All spur gearing shall be designed to the latest AGMA spur gear standard for strength and surface durability, based on a life of 175,000 hours.
 - d. Main internal gear shall be forged of alloy hardened steel.
 - e. The pinion shall be heat treated alloy steel.
 - f. Support base shall be cast iron.
 3. Main Bearing:
 - a. Ball raceway diameter: Minimum 35"
 - b. The drive main bearing shall be designed for the total rotating mechanism loads with a minimum L-10 life of 100 years or 876,000 hours.
- F. Primary Speed Reducer (Option B):
1. Horizontally mounted cylindrical-worm or helical-worm gear motor type with gears supported by anti-friction bearings. Connected to secondary speed reducer via a chain or direct coupled drive system with drive sprocket directly mounted on its output shaft.
 2. AGMA 6034-B92 and AGMA Service Classification II.
 3. Service Factor: Minimum 1.4 based upon Design Running Torque.
 4. Overhung Load Rating: Exceed chain pull by minimum 1.75, based on Ultimate Torque.
 5. Oil Fill, Drain and Level Indicator Devices, and Lubricant: ANSI/AGMA 9005-D94.
- G. Chain Drive (Option B):
1. Roller Chain: Standard, ANSI B29.1.
 2. Connect drive sprocket on primary speed reducer to driven sprocket on secondary speed reducer input shaft.
 3. Steel Sprockets: Minimum of 12 teeth.
 4. Chain:
 - a. Service Factor: Minimum 4.0.
 - b. Power Transmission Rating: 1.75 based on pull and power required respectively at the Ultimate Torque Rating.
- H. Secondary Speed Reducer (Option B):
1. Cylindrical-Worm and Worm-Gear Type:
 - a. Shafts supported by antifriction bearings and output shaft directly driving pinion gear of low-speed main bearing assembly.
 2. Load Capacity and Torque Rating: AGMA 6034-B92.
 3. Design: ANSI/AGMA 6022-C93.

4. Output Shaft: One-piece output extending through worm-gear and low speed main gear drive pinion without intermediate couplings.
 5. Worm: Steel, heat treated, ANSI/AGMA 2004-B89, ground and polished.
 6. Worm-Gear: Centrifugally cast, high silicon bronze copper alloy, or ductile iron.
 7. Bearings: ABMA L-10, life of 180,000 hours minimum.
 8. Oil fill, drain and level indicator devices, and lubricant conforming to ANSI/AGMA 9005-D94.
 9. Enclosure: Cast iron ASTM A48, Class 30 minimum housing, and registered fit mounted to gear head drive platform.
- I. Low Speed Final Reduction Unit (Option B):
1. Enclosed turntable, balls in main bearing annular radial thrust raceway type, balls in compression and renewable strip liners, continuous multipoint contact contoured raceway type with hardened surfaces and balls.
 - a. Ring Gear: Internal or external toothed, spur pinion gear driven, attached to secondary speed reducer output shaft.
 2. Low Speed Gearset:
 - a. Design and Rated: ANSI/AGMA 2001-C95.
 - b. Service Factor: Minimum 1.5 based upon Design running Torque. Power Rating:
 - 1). Lower of pitting resistance and bending strength ratings for pinion and gears.
 - 2). Based upon continuous 24 hours per day service at Design Running Torque for 180,000 hours minimum.
 - c. Spur Pinion Gear:
 - 1) Wall Thickness (Above Keyway): Minimum depth of one tooth.
 - d. Ring Gear:
 - 1). Solid one-piece of ductile (nodular) iron (ASTM A536), cast steel (ASTM A148), or heat treated alloy steel.
 - 2). Bolt to center torque cage that support and rotate collection mechanism.
 - e. Teeth: Full depth, ANSI/AGMA 2001-C95.
 3. Main Bearing:
 - a. Ball Raceway Diameter: Minimum 35 inches, low unit ball load and stability without guide shoes or steady bearings.
 - b. Raceways and Balls: ABMA L-10 life of minimum 180,000 hours when operating continuously at Design Running Torque.
 - c. Load Carrying Balls:
 - 1). Steel: Chrome alloy, hardened to 60-65 Rockwell "C."
 - 2). Diameter: Minimum 1-1/4 inches.
 - 3). Crushing Strength: Minimum 120,000 pounds.
 - d. Spacer Balls: 1/16-inch lesser diameter than, and of same material as, load carrying balls.
 - e. Raceways: Four 1/4-inch thick by 1/2-inch wide, vacuum degassed high carbon steel renewable liner strips force fit into base and ring gear, and specially hardened to 38-46 Rockwell "C."
 4. Ring Gear, Pinion Gear, and Main Bearing Ball Races:
 - a. Oil bathed, steel dust shield, and felt seal protected.

- b. Oil fill, drain and level indicator devices, and lubricant conforming to ANSI/AGMA 9005-D94.
 - c. Casing with manual condensate drain.
- 5. Oil filling and level pipe, drain plug, and sight gauge. Attach pipe to turntable bottom within base center for easy access.

J. Mechanism Overload Device:

- 1. Mechanical: Actuate integral contacts to indicate impending overload and shutoff drive motor at predetermined load.
- 2. Impending Overload Contact (Alarm Torque): Actuate at 90 percent of Design Running Torque.
- 3. Motor Shutdown Contact (Cutout Torque): Actuate at 120 percent of Design Running Torque.
- 4. Provide shear pin limit switch to protect drive unit in case of control system failure. Pin shall break at 160 percent of Design Running Torque or as recommended by Manufacturer.
- 5. Contacts: Single-pole, double-throw rated 5 amps, 120V ac.
- 6. Enclosure: NEMA Type 4X cast aluminum.
- 7. Indicating Pointer: Indicate relative load on graduated scale up to Ultimate Torque.

2.5 STATIONARY CENTER INFLUENT COLUMN

- A. A stationary cylindrical steel influent column of ¼" minimum wall thickness shall be provided. One end shall have a support flange for bolting to the tank floor over the influent line, with a similar flange at the top for supporting the drive unit and walkway. The structure and anchor bolts shall provide adequate support for the entire mechanism dead load plus live load and torque with an adequate factor of safety to eliminate excessive deflection or vibration. Suitable openings shall be provided in the upper portion of the column to allow unrestricted passage of the flow into the energy dissipating inlet.
- B. Prior to the center column being plumbed and grouted in place, the drive unit shall be installed, positioned and leveled.

2.6 FEEDWELL AND ENERGY DISSIPATING INLET (EDI)

- A. Steel, ASTM A36, minimum 3/16-inch thick plates and minimum 1/4-inch thick shapes.
- B. Feedwell Configuration:
 - 1. The feedwell shall efficiently and evenly disperse the influent liquid into the tank without disturbance and provide a flocculation zone.
 - 2. Extend minimum 6 inches above clarifier static liquid level.
 - 3. Feedwell well depth below clarifier static liquid level: As indicated on data sheets.
 - 4. Feedwell diameter: As indicated on data sheets.
- C. A rotating circular energy dissipating inlet (E.D.I), or FEDWA, with bottom shall be supported by the cage and be designed to diffuse the liquid into the feed well in a tangential or bi-directional direction without excessive disturbance or formation of vertical velocity currents.

1. The E.D.I. shall be designed to positively prevent sludge from depositing within the E.D.I. and shall include bottom drain holes.
2. EDI diameter: As indicated on data sheets.

2.7 ACCESS WALKWAY

A. Access Walkway Support System:

1. All-welded rolled wide flange beam type bridge or truss construction supported rigidly at one end on clarifier wall with thermal expansion compensating anchorage.
2. Field verify and coordinate access walkway to the extent of the clarifier outer wall.
3. Diagonally cross brace and space beams as necessary to carry loads and produce required clear walkway width.

B. Bridge Design:

1. Maximum Vertical Deflection: $1/360$ of span under uniform 50-pound per square foot of walkway surface live load, plus dead load. Camber for $1/3$ live load plus dead load.
2. Maximum Horizontal Deflection: $1/360$ of span under uniform horizontal loading of 50 pounds per linear foot.
3. Walkway Surface Elements: Do not utilize to reduce calculated bridge deflections.
4. Designed to support mechanism.

C. Walkway Surface: 1-1/2-inch minimum thickness aluminum grating and extend in width to at least guardrail/handrail supports.

D. Walkway Width: 36 inches minimum clear between guardrails/handrails.

E. Guardrails/Handrails:

1. Extend all along both sides of bridge and all around center platform.
2. Anodized Aluminum: In accordance with Division 05, METALS.
3. Truss type bridge members shall not be used as guardrail/handrail. Attach top and intermediate rails specified to bridge elements using standard premanufactured wall bracket units.

F. Kickplates:

1. Anodized Aluminum: In accordance with Division 05, METALS.
2. Four-inch minimum high by $3/16$ -inch minimum thickness anodized aluminum, attached with Type 316 stainless steel fasteners.
3. Located around center platform perimeter and full length of both sides of access walkway.

2.8 RAKE ARMS AND SLUDGE WITHDRAWAL

A. Quantity: Two full radius per mechanism (minimum).

B. Full radius, all-welded steel diagonally braced box truss design that supports and rotates spiral type sludge scraper blades. Supported from center shaft.

- C. Sufficient strength and rigidity such that at Ultimate Torque load and while sweeping in floor grout no member will be stressed to level beyond maximums allowed by current AISC Specifications.
- D. Steel: ASTM A36, angular and tubular elements. Designed to meet or exceed current AISC Specifications when continuous torque of the drive unit is applied.
- E. Scraper blades shall be designed for sufficient sludge transport capacity to handle the design solids loading rate with the depth of the blade varying from a minimum at the tank periphery to a maximum at the tank center.
- F. Squeegees: Materials: 20-gauge Type 316 stainless steel.
 - 1. Bolts, Nuts, and Washers: Type 316 stainless steel.
 - 2. Vertical Alignment: Between 1/2-inch minimum and 1-1/2-inch maximum clearance above grouted clarifier bottom. Designed for a 2-inch minimum adjustment in the vertical plane.
 - 3. Attached to steel sludge scraper blades.

2.9 SCUM COLLECTION

- A. The clarifier mechanism shall be provided with scum collection and removal devices to move and remove any floating scum from the entire tank's water surface to a fabricated steel outlet scum beach, as shown on the Drawings.
- B. The scum removal device shall consist of a scum deflector blade; support boom; and a hinged blade with neoprene strips on the bottom and inner edges to seal the entrapped scum and water when discharging into the scum beach.
- C. The scum removal mechanism shall be supported by structural steel members bolted through field adjustable connections to two rake collector arms and shall extend from the influent chamber to the scum baffle on the effluent launder.
- D. The scum beach shall be fabricated from 1/4-in thick steel plate and supported from the tank wall by structural steel braces.
 - 1. The scum beach width shall be as indicated on data sheets and have a minimum length of 2-feet of sloped ramp and 3-feet of horizontal extension along the tank effluent baffle including the adjustable approach ramp. Provide for 4-inch vertical adjustment of scum beach.
 - 2. The scum trough shall have a 6-in diameter plain end pipe stub. The manufacturer is responsible for providing a section of flexible pipe of length required to connect new scum trough to existing scum piping.
 - 3. The outer edge of the scum beach shall extend to form an extra deep scum baffle to prevent spillage of scum to the effluent launder.
 - 4. If required by the equipment arrangement, provide a counter weight to the rake arm to balance the scum skimmer arms during rake arm motion.

2.10 ELECTRICAL COMPONENTS AND ACCESSORIES

A. General:

1. Conform to Division 26, ELECTRICAL.
2. Provide all necessary electrical components and wiring for a complete, functional system.
3. Where indicated, motor starters for constant-speed, 460-volt motors shall be provided in a separate motor control center specified in Division 26, ELECTRICAL. Provide all necessary control functions to properly interface with this motor starter.

B. Wiring: The Drawings and Specifications indicate the anticipated wiring for the equipment provided under this section. If additional wiring is required, or if required wiring does not match what is indicated, the Contractor shall make the necessary modifications to the electrical wiring and documentation as part of the lump sum price. Wiring shall meet the requirements of Division 26, ELECTRICAL, and NFPA 70. Insulation shall be rated 600 volts, minimum. Low-voltage (24V) signals shall be run in twisted, shielded pair cable.

C. Electrical Raceways: Electrical wiring shall be installed in conduit meeting the requirements of Division 26, ELECTRICAL. Raceways shall be installed in accordance with Division 26, ELECTRICAL, and NFPA 70.

2.11 INSTRUMENTATION AND CONTROLS

A. All instrumentation and control components shall be provided in accordance with the requirements of Division 26.

B. General: The Drawings and these Specifications depict the minimum functional requirements of the control system to be provided. Provide all items not specifically called out which are required to implement the functions described herein. The supplier shall provide all instrumentation and controls necessary to provide a safe and operable system. The specific control system proposed shall be subject to the approval of the Engineer.

C. Instrumentation: Provide and install an electromechanical torque sensing-device that is actuated by thrust from the worm gear. The device shall provide indication of torque sensed and shall provide two independently adjustable SPDT torque alarm contacts (HIGH and HIGH-HIGH). The device shall be mounted in a NEMA 4X enclosure with an integral conduit box and terminals. Contacts shall be rated for a minimum of 5A at 120V ac.

D. Control Panel: The control panel shall at a minimum be provided with the following functions.

1. Hand switches and other controls:
 - a. Clarifier ON/OFF
 - b. Reset
2. Alarms:
 - a. Clarifier Failure (To indicate motor trip)
 - b. 90% High Torque
3. Status:
 - a. Clarifier ON/OFF

- b. High Torque (90% High Torque)
- c. Clarifier Shutdown (120% High Torque)

2.12 DISSIMILAR METALS

- A. Isolate dissimilar metals or connectors to prevent direct contact and electrical conductivity.
 - 1. Use 1/8-inch thick continuous neoprene gasket to insulate aluminum gratings, checker plate and handrail post bases from access walkway support bridge and other components.
 - 2. Use insulating washers and Teflon sleeves at bolted connections.

2.13 ACCESSORIES

- A. Lifting Lugs: Provide on equipment assemblies and components weighing over 100 pounds.
- B. Anchor Bolts: Provide coated Type 316, stainless steel bolts, sized by equipment manufacturer and at least 1/2 inch in diameter.
- C. Fasteners: Provide coated Type 316 stainless steel assembly hardware, compliant with ASTM F 593.
- D. Equipment Identification Plates: Provide 16-gauge, Type 316 stainless steel, identification plate securely mounted on each separate equipment component and panel in a readily visible location. Plate shall bear 1/4-inch high engraved block type black enamel filled equipment identification number and letters.

2.14 TOOLS AND SPARE PARTS

- A. Tools: The work includes furnishing one complete set of special tools recommended by the manufacturer for maintenance and repair of each separate type of equipment; tools shall be stored in tool boxes, and identified with the equipment number by means of stainless steel or solid plastic name tags attached to the box.
- B. Spare Parts:
 - 1. All equipment shall be furnished with the specified manufacturers spare parts, as indicated in the individual equipment sections.
 - 2. Spare parts shall be tagged by project equipment number and identified as to part number, equipment manufacturer, and subassembly component (if appropriate). Spare parts subject to deterioration such as ferrous metal items and electrical components shall be properly protected by lubricants or desiccants and encapsulated in hermetically sealed plastic wrapping. Spare parts with individual weights less than 50 pounds and dimensions less than 2 feet wide, or 18 inches high, or 3 feet in length shall be stored in a wooden box with hinged wooden cover and locking clasp. Hinges shall be strap type. The box shall be painted and identified with stenciled lettering stating the name of the equipment, equipment numbers, and the words "spare parts." A neatly typed inventory of spare parts shall be taped to the underside of the cover.

3. At a minimum furnish, tag, and box for shipment and storage the following spare parts and special tools:

Item	Quantity
Gaskets, O-rings, keys, dowels, and Pins	One complete set
Gear reducer bearings and seals	One complete set
Drive chain and/or belts (if used)	One set each type
Shear pins	12
Special tools required to maintain or dismantle drive unit except for low speed main bearing, but including that required for removal/insertion of main bearing race balls (if required)	One complete set
Lubricants	As required for 1 year of continuous operation. Lubricants to be furnished by Contractor per clarifier manufacturer requirements.

2.15 FABRICATION AND FINISHES

- A. General: Fabricate bridge beam or stringer sections in continuous unbroken pieces.
- B. Shop Assembly:
1. Shop fabricate and assemble mechanism components in the largest sections practicable and permitted by transportation carrier regulations.
 2. Properly match-mark units for ease of field erection.
 3. Completely assemble center drive unit in manufacturer's shop and test to assure proper operation, and calibration of torque controls.
 4. Completely shop assemble and test control panels.
 5. Divide large assemblies into flanged sections. Bolt together with Type 316 stainless steel fasteners and provide continuous field seal welds at all connections.
- C. Finishes:
1. Exposed metal surfaces of motors, gear reducers, and assemblies shall be factory prepared and primed and field finish coated in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 3.
 2. Submerged surfaces shall be prepared, primed, and finished in accordance with Section 09 90 00, PAINTING AND PROTECTIVE COATINGS, System No. 2.
 3. Seal welding shall be provided for submerged welded joints. Skip welds are not acceptable.

PART 3 - EXECUTION

3.1 ASSEMBLY AND PREPARATION FOR SHIPMENT

- A. Each drive unit, including motor, shall be completely factory assembled, aligned, and securely crated for shipment. Accessory equipment which cannot be shipped assembled to the unit, such as shafts, baseplates, impellers, spare parts, and anchorage materials, shall be separately crated, clearly marked as to the contents, and shipped on the same shipment as the drives.
- B. For shipment, exposed surfaces subject to rust, such as mounting flange faces, etc., shall be covered with a rust-preventive compound such as Kendall No. 5, or equal.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Comply with Section 01 60 00, PRODUCT REQUIREMENTS.
- B. Delivery of Materials: Products shall be delivered in original, unbroken packages, containers, or bundles bearing the name of the manufacturer.
- C. Storage: Products shall be carefully stored in a manner that will prevent damage and in an area that is protected from the elements.
- D. Protection of Equipment: Equipment shall be boxed, crated, or otherwise protected from damage and moisture during shipment, handling, and storage. Equipment shall be protected from exposure to corrosive fumes and shall be kept thoroughly dry at all times. Mechanisms, motors, drives, electrical equipment, and other equipment with anti-friction or sleeve bearings shall be stored in weathertight and heated storage facilities prior to installation. For extended storage periods, plastic equipment wrappers shall not be used to prevent accumulation of condensate in gears and bearings.

3.3 INSTALLATION

- A. Installation shall be by the Contractor with coordination from Manufacturer.
- B. Anchor Bolts: Provide templates and specify bolts for furnishing by Contractor.
- C. Manufacturer shall coordinate with Contractor during all phases of installation to ensure that manufacturer's representative is present during critical installation operations.

3.4 FIELD QUALITY CONTROL

- A. Prior to placement of clarifiers into service, check weir plate settings by filling clarifiers with water to design elevation shown on the Drawings. Readjust as recommended by Engineer.
- B. Weirs: Level to within plus or minus 1/16 inch of design elevation.
- C. Functional Tests: Conduct on each mechanism. Test for continuous 3-hour period without malfunction, as witnessed by and approved by Owner or Engineer.

D. Performance Test:

1. Conduct on each completed assembly in accordance with accepted test procedures.
2. Perform under actual or approved simulated operating conditions.
3. Perform to confirm mechanical and structural compliance with specified torque requirements.
4. Load each mechanism to 120 percent of Design Running Torque to demonstrate mechanism's structural capability to withstand resulting loads.
 - a. Apply loads to mechanism's rake arms through cables or other means anchored to basin floor or wall. Utilize hydraulic cylinder, springs, or other means that allows machine to rotate for peripheral distance of at least 3 feet under load.
 - b. Accomplish testing with machine in operation.
 - c. Conduct static torque test on mechanism. Anchor both collector arms, start collector drive, and load drive to 120 percent of Design Running Torque to demonstrate mechanism's structural capability to withstand resulting loads.
5. Demonstrate mechanism overload devices; verify actual torques at which Alarm and Cutout (shutdown) contacts are actuated.
 - a. Correlate with scale indications.
 - b. Prepare test report containing results.

3.5 MANUFACTURERS' SERVICES

- A. A manufacturer's representative for the equipment specified herein shall be present at the job site for the minimum person-days listed for the services listed, travel time excluded:
1. Installation, Startup, and Testing Services:
 - a. 1 person day for installation assistance, inspection, and Certificate of Proper Installation.
 - b. 1 person-day for functional and performance testing.
 - c. Provide Qualifications of Manufacturer's Representative.
 2. Training Services:
 - a. 1 person-day of prestart classroom or jobsite training of Owner's personnel.
 - b. Training of Owner's personnel shall be at such times and at such locations as required and approved by the Owner.
- B. See Section 01 79 00, DEMONSTRATION AND TRAINING.

3.6 MANUFACTURER'S CERTIFICATES

- A. Provide Manufacturer's certificate(s) in accordance with Section 01 79 00, DEMONSTRATION AND TRAINING.

3.7 SUPPLEMENTS

- A. Supplement listed below, following "END OF SECTION," is part of this Specification.
1. Clarifier Mechanism Data Sheet – Primary Clarifier No. 1

END OF SECTION

Section 44 42 23.2 - CLARIFIER MECHANISM DATA SHEET			
PROJECT:	KILGORE PRIMARY CLARIFIER REHABILITATION		
OWNER:	CITY OF KILGORE		
EQUIPMENT NAME(S):	PRIMARY CLARIFIER NO. 1		
EQUIPMENT TAG NUMBER(S):	20PCM01		
LOCAL CONTROL PANEL(S):			
MANUFACTURERS			
Wes-Tech Engineering			
Ovivo, LLC			
SERVICE CONDITIONS	PERFORMANCE REQUIREMENTS		
Liquid Handled: <u>Screened Degritted Raw Sewage</u> Influent TSS: <u>50 – 1,000 mg/L</u> Liquid Temperature: <u>50-85°F</u> Liquid pH: <u>5.5 – 9.0</u> Elevation: <u>See Drawings</u>	The clarifier shall perform as specified at the following flow rates: Influent Flow Rate: <u>0.1-11</u> MGD Under Flow Rate: <u>0 – 300</u> gpm Under Flow Solids: <u>2% - 8%</u>		
EQUIPMENT DESCRIPTION			
Clarifier Diameter: <u>55'-0" (field verify)</u> SWD: <u>9'-0" (field verify)</u> Floor Slope: <u>1:12 (field verify)</u> Center Pier Dia.: <u>20" (field verify)</u> Type: <u>Pier Supported, Center Drive</u> Scraper Blades: <u>Spiral</u> Sludge Collection: <u>Center Hopper</u> EDI Diameter: <u>Manufacturer Sized</u>	Furnish complete with components as necessary to meet the performance requirements specified herein and as shown on the Drawings: Design Running Torque: <u>25,000</u> ft-lb Maximum Tip Speed: <u>18</u> fpm Scum Box Width: <u>3' – 0"</u> Scum Beach Spray: <u>No</u> Inlet/Stilling Well Diameter: <u>Manufacturer Sized</u> Inlet Well Depth: <u>4' – 0"</u> (min)		
MOTOR DATA			
Type: <u>Squirrel-cage induction meeting requirements of NEMA MG1.</u> Manufacturer: <u>For multiple units of the same type of equipment, furnish motors and accessories of a single manufacturer.</u> Hazardous Location: ☒ <u>Furnish motors for hazardous (classified) locations that conform to UL 674 and have an applied UL listing marking.</u> Motor Horsepower: <u>0.75 (max)</u> Voltage: <u>460</u> Phase: <u>3</u> Frequency: <u>60</u> Synchronous Speed: <u>1,725</u> rpm Service Factor: ☐ 1.0 ☒ 1.15 ☐ Variable Speed Drive: See Division 26, ELECTRIC, Provide Inverter Duty Rated Motors. Enclosure Type: <u>TEFC</u> Material: <u>Cast Iron A48 Class 35B</u> Mounting Type: ☐ Horizontal ☐ Vertical Load Class: <u>Constant Torque</u> ☐ Multispeed, Two Speed: _____ rpm Winding: ☐ One ☐ Two ☒ Thermal protection embedded in windings Motor nameplate horsepower shall not be exceeded at any operational point. Provide: ☒ Space Heater ☒ Oversize main terminal (conduit) box for motors ☐ Moisture detection switches			
SPECIAL FEATURES / NOTES			
New walkway and control panel to be included with equipment package.			

