

BIDDING DOCUMENTS
FOUNDERS PARK
TOWN OF KERNERSVILLE
FORSYTH COUNTY, NORTH CAROLINA

MIKE NORRIS, PLA



Engineering • Planning • Finance
1240 19TH St. Lane NW
Hickory, North Carolina 28601

MARCH 2018

PROJECT NO. 17.01701



FOUNDER'S PARK
TOWN OF KERNERSVILLE, NORTH CAROLINA

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MEMORANDUM

To: Bidding Contractors

From: Mike Norris, PLA

Date: April 04, 2018

Subject: Town of Kernersville, Founder's Park

Thank you for your interest in bidding on this project. The attached plan sheets include design and details for the purpose of bidding the project.

The Town of Kernersville desires to construct a Town park at the corner of West Mountain Street and North Main Street (101 North Main Street). The project generally consists of Construction of concrete paving, concrete pavers, concrete formwork, storm drainage, landscaping and related appurtenances.

The Contractor shall provide a certificate of insurance, naming the Town of Kernersville as an additional insured, with the following minimum coverages:

Workman's Compensation	Statutory
Comprehensive Automobile Liability	\$1,000,000 each for Bodily Injury and Property Damage
Comprehensive General Liability	\$1,000,000 each for Bodily Injury and Property Damage
Umbrella Liability	\$5,000,000

The Town of Kernersville intends to award this project soon after the bids are received but requires the bid to be valid for 90 days. Consequently, the Contractor shall complete all Base Bid elements of work related to this **project under a 45-day contract**. The Contractor agrees to pay the Town of Kernersville Liquidated Damages in the amount of **\$500** for each and every calendar day the work is not complete beyond the contract date of completion.

Bidding Contractors are asked to submit the enclosed Bid form, completed and executed to Town Manager, Curtis Swisher (phone – 336 996-3121 or fax – 336 996-4822) at the Kernersville Town Hall **by 2:00 pm on Thursday, April 19, 2018.**

If you have any questions please contact me at (828) 328-2024.

E n g i n e e r i n g • P l a n n i n g • F i n a n c e

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AFFIDAVIT OF COMPLIANCE WITH N.C. E-VERIFY STATUTE S

I, _____(the individual attesting below), being duly authorized by and on behalf of _____ (the entity bidding on project hereinafter "Employer") after first being duly sworn hereby swear or affirm as follows:

1. Employer understands that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25(5).
2. Employer is a person, business entity, or other organization that transacts business in this State and that employs 25 or more employees in this State. (mark Yes or No)
 - a. YES _____, or
 - b. NO _____
3. Employer understands that employers employing 25 or more employees in this State must use E-Verify. Each employer, after hiring an employee to work in the United States, must verify the work authorization of the employee through E-Verify in accordance with Article 2, Chapter 64 of the North Carolina General Statutes.
4. Employer's subcontractors comply with E-Verify, and if Employer is the winning bidder on this project Employer will ensure compliance with E-Verify by any subcontractors subsequently hired by Employer.

This ____ day of _____, 20____.

Signature of Affiant

Print or Type Name: _____

Title:_____

State of _____ County of _____

Signed and sworn to (or affirmed) before me, this the ____
day of _____, 20____.

My Commission Expires:

Notary Public

(Affix Official/Notarial Seal)

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

MODIFIED INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACTS

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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ARTICLE 1 – DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the Modified General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office* – The office from which the Contract Documents are to be issued and where the bidding procedures are to be administered.
 - B. *Unbalanced Bid* - An unbalanced bid is one that meets the following criteria:
 - 1. A mathematically unbalanced Bid is one that contains lump sum or unit bid items that do not appear to reflect reasonable actual costs. Those reasonable actual costs would include a reasonable proportionate share of the Bidder's anticipated profit, overhead costs, and other indirect costs that the Bidder anticipates for the performance of the items in question.
 - 2. A materially unbalanced Bid is one that produces a reasonable doubt that Award to the low Bidder, who submitted the mathematically unbalanced Bid, would result in the lowest ultimate cost to the Owner.
 - C. *Responsible Bidder* - A bidder who has demonstrated the attribute of trustworthiness, as well as quality, fitness, capacity, and experience to satisfactorily perform the work described in the Contract Documents.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office upon payment of the fee stated in the advertisement or invitation to bid. The fee is non-refundable.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids. Neither the Owner nor the 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 The Owner may make such investigations as he deems necessary to determine the qualifications of the Bidder to perform the work and the Bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such Bidder fails to satisfy the Owner that such Bidder is properly qualified to carry out the obligations of the contract, and to complete the work contemplated therein. Conditional bids will not be accepted.
- 3.02 Bidders shall comply with all applicable laws regulating the practice of General Contracting as provided in Chapter 87 of the General Statutes of the State of North Carolina and be properly licensed as a contractor.

- 3.03 To demonstrate the Bidder's qualifications to perform the Work the Bidder shall submit the following documentation with the Bid:
- A. Bidder's state Contractor's license number and evidence of Bidder's authority to do business in the state where the project is located.
 - B. A list of any projects that are either currently in or have been in arbitration or litigation over the past five (5) years. The list must include the name, address, and telephone number of the Owner and design Engineer of each project. Provide the reason for the arbitration or litigation, as applicable, along with the current status or outcome.
- 3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.
- 3.05 Bidder must hold a current contractor's license appropriate for the type and magnitude of the work.

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

4.01 *Site and Other Areas*

- A. The Site is identified in the Bidding Documents. By definition, the Site may include 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 Bidding Documents 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 Modified 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 Modified General Conditions will apply.
4. Geotechnical Report: The Bidding Documents may contain a Geotechnical Report. If included, the Geotechnical Report describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations. The Geotechnical Report is a Contract Document.
 - a. The conditions described in the Geotechnical Report are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the conditions described. Bids should be based on a comprehensive approach that includes an independent review and analysis of the Geotechnical Report, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are described in the Geotechnical Report.
 - b. Nothing in the Geotechnical Report is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or 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 4.02, 4.03, and 4.04 of the Modified General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 4.03 of the Modified General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct Site visits during normal working hours, and shall not disturb any ongoing operations at the Site. The Owner may require site visits by the Bidder to be scheduled with the Owner in advance.

- B. The Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions. However, on request, and to the extent the Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.
- C. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- D. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner's Safety Program. As the General Conditions indicate, Bidders are responsible for complying with Owner's Safety Program, if any.

4.05 *Other Work at the Site*

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

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

- A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;
- B. visit the Site 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 federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site including Underground Facilities that may be made available by the Owner and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Contract Documents.

- E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;
- F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;
- G. become aware of the general nature of any work that may 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; and
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

5.02 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 is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

5.03 No verbal agreement or conversation with any officer, agent or employee of the Owner, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations therein.

ARTICLE 6 – SITE AND OTHER AREAS

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

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to the Engineer in writing. Interpretations or clarifications considered necessary by the Engineer in response to such questions will be issued by Addenda delivered by either mail or approved electronic means to all parties recorded by the Engineer as having received the Bidding Documents. Questions received less than five (5) 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. Contractor waives the right to rely on information provided by the Engineer which is not provided in writing and in the form of a formal Addendum.
- 7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.
- 7.03 Failure of any Bidder to receive any such Addenda shall not relieve said Bidder from any obligation under his Bid as submitted.
- 7.04 All Addenda so issued shall become a part of the Contract Documents.
- 7.05 Prospective Bidders are cautioned concerning the use of a Post Office Box address as Addenda cannot be sent via overnight carrier to Post Office Boxes.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to the Owner in an amount of **five percent (5%)** of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form included or the standard form of the surety company) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the Modified General Conditions.
- 8.02 The Bid security of the apparent Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned as necessary. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within ten (10) 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. The Bid security of all other Bidders may be retained by Owner until the earlier of ten (10) days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned as necessary.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of calendar days within which, Milestones are to be achieved and 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, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or “or-equal” items. Whenever it is specified or described in the Bidding Documents that a substitute or “or-equal” item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.
- 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 The Contract Documents may require the identification of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (5) days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. 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, individual, or entity if requested by Owner. 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 a substitute. In which case apparent Successful Bidder shall submit an acceptable substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 12.02 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, 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 revocation of such acceptance after the Effective Date of the Agreement as provided in the Modified General Conditions.

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

ARTICLE 13 – PREPARATION OF BID

- 13.01 The Bid Form included with the Bidding Documents shall be used and shall not be altered, contain any unauthorized additions, deletions, or conditional bids.
- 13.02 The Bidder shall not add any provision reserving the right to accept or reject an award, or to enter into a Contract pursuant to an award.
- 13.03 The Bid shall not contain irregularities of any kind which make the Bid incomplete, indefinite, or ambiguous as to its meaning.
- 13.04 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, and unit price item listed therein. Alternative Bids will not be considered unless specifically shown on the Bid Form. In the case of optional alternatives the words “No Bid,” “No Change,” or “Not Applicable” may be entered.
- 13.05 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 seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.
- 13.06 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown.
- 13.07 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.
- 13.08 A Bid by an individual shall show the Bidder’s name and official address and shall be signed by the individual.
- 13.09 A Bid by a joint venture shall be executed by each of the joint venturers in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.10 All names shall be printed in ink below the signatures.
- 13.11 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.12 Street, postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

- 13.13 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.
- 13.14 Bidder's state contractor license number shall be shown on the Bid Form.
- 13.15 All attachments, certifications or acknowledgements attached to the Bid shall be executed in the same manner as the Bid.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 *Lump Sum*

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

14.02 *Base Bid with Alternates*

- A. Bidders shall submit a Bid for the base Bid as shown on the Bid Form and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Schedule. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

14.03 *Unit Price*

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

14.04 *Allowances*

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

- 14.05 Bids will be compared on the basis of the totals of the lump sum and/or unit prices bid. The resulting Total Contract Bid Price will be compared which will include and cover the furnishing of all materials, and the performance of all labor requisite for proper completion of all the work called for under the accompanying Contract, and in the manner set forth and described in the Contract Documents.

- 14.06 The lowest Bidder will be that Bidder whose Bid totals the lowest number of dollars as determined above.

ARTICLE 15 – SUBMITTAL OF BID

- 15.01 The Bid Form in the Bidding Documents is to be completed and submitted with the Bid security.
- 15.02 A sealed Bid shall be received no later than the time and date prescribed and at the place indicated in the advertisement or invitation for bids. The bid shall be submitted in a single (one (1)) envelope system. The envelope shall be plainly marked with the Project title, Owners name and address in the middle of the envelope and the name, address, license number, limitation and classification of Bidder in the upper left hand corner of the envelope. The envelope shall contain the Bid security, the Bid and any other required information as defined in the advertisement or invitation for bid or bid documents.
- 15.03 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:

Town of Kernersville,
134 East Mountain Street
North Carolina, 27284

- 15.04 If received prior to the designated time of opening, bids will be securely kept, sealed. Mailed bids will be treated in every respect as though filed in person and will be subject to the same requirements. Bids received subsequent to the designated time of opening will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be withdrawn prior to the Bid opening by the Bidder by providing 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 17.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 No Bid may be withdrawn for a period of 90 days after Bids have been opened pending the execution of a Contract with the successful bidder except as provided for in Section 143-129.1 of the North Carolina General Statutes. A Bidder must file a duly signed written notice within the time frame allowed under applicable General Statutes with the Owner and Engineer promptly after the time set for the opening of bids that demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, and that the Bidder desires to withdraw its Bid. The Owner and Engineer will review the request and if

approved 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 if there is a reasonable doubt that the bid will result in the lowest overall cost to the Owner even though it may be the low evaluated bid, or if it is so unbalanced as to be tantamount to allowing an advanced payment.
- 19.02 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.
- 19.03 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 19.04 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.05 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.
- 19.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

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

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

- 20.01 The Modified General Conditions, and as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds 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 required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within 10 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. The Owner shall thereafter set a time and place for a Preconstruction conference. One fully signed counterpart of the Contract Documents shall be provided to the Contractor following review from the Owner's legal counsel.

ARTICLE 22 – RETAINAGE

- 22.01 Provisions concerning Contractor's rights to deposit securities in-lieu of retainage are set forth in the Agreement.

ARTICLE 23 – COMMENCEMENT OF WORK

- 23.01 Upon execution and delivery of the Contract and the delivery of the required Performance and Payment Bonds and insurance certificates and policies by the Contractor to the Owner, the Contractor will be notified to proceed with the work of the Contract. The work of the Contract shall be commenced within ten (10) days following such notification or as otherwise specified in the Notice to Proceed.
- 23.02 The Contractor shall notify the Engineer, in writing, of his intention to enter upon the site of the work at least three (3) days in advance of such entrance.

ARTICLE 24 – PREQUALIFICATION OF EQUIPMENT SUPPLIERS

- 24.01 Certain equipment on this project may require the prequalification of manufacturers prior to the receipt of bids. When required by the Contract Documents, manufacturers wishing to supply equipment for this project must submit a prequalification submittal to the Engineer for approval. The prequalification submittal must be submitted by the equipment manufacturer and received by the Engineer by the specified time listed in the Contract Documents to receive consideration. The submittal shall demonstrate that the proposed equipment meets the requirements of the Contract Specifications and Drawings. The Engineer will issue an addendum prior to the bid date listing the approved manufacturers.

- 24.02 The submittal of prequalification information does not omit the requirement for the Contractor and manufacturers to submit complete shop drawing submittals to the Engineer in accordance with the Contract Documents.
- 24.03 The prequalification submittal shall be made in accordance with paragraph 2.1 of Specification Section 013300 “Submittal Procedures” a minimum of 14 days prior to the bid date.
- 24.04 The naming of manufacturers in the technical specifications is given as a basis for comparison and does not omit the requirement for the Contractor and manufacturers so named to provide a prequalification submittal.
- 24.05 The manufacturer is responsible for visiting the site prior to the bid. Failure to visit the site to understand all existing facility, operation, and site conditions does not relieve the manufacturer from complying with all of the requirements of the Contract Documents and specifications.
- 24.06 Refer to the individual equipment specifications for prequalification requirements.

BID FORM

Town of Kernersville Founder's Park

Contract Identification and Number

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ARTICLE 1 – BID RECIPIENT

This Bid is submitted to:

**Attention: Curtis Swisher
Town of Kernersville
134 East Mountain Street
Town of Kernersville, North Carolina 27284**

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 **90** days after the date of the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.

Addendum Date

- B. Bidder has visited the Project Site and has become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.
- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures, including Underground Facilities, at or contiguous to the Site which have been included as a part of the Contract Documents.

- E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of 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 correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder or, if no written response was made by Engineer, that Bidder has resolved the issue to its satisfaction prior to the submittal of its Bid.
- J. The Bidding Documents are sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.
- L. Bidder has not relied upon any information provided by the Engineer except information which is part of the Bidding Documents and is in writing and in the form of a formal addendum.
- M. The submission of a Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of the Bid Documents and the Instructions to Bidders, and that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents 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 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 sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

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

LUMP SUM BASE BID

Lump Sum Base Bid Price: _____

_____ dollars

(words)

(\$ _____)

(numbers)

ADDITIVE ITEMS:

Bidder shall provide unit prices for the following items to complete the work in accordance with Contract Documents. The unit prices below shall include all labor, materials, overhead, profit, insurance, taxes, etc. to complete the finished work in place. The following items will be used to determine pricing if the Owner chooses to change the scope of work not shown on the Contract Drawings.

ADDITIVE ITEMS			
ITEM NO.	DESCRIPTION	UNIT	UNIT PRICE
1	ABC Stone	Ton	
2	Pavers including subbase	SF	
3	4" Concrete Walk	SY	
4	Concrete Edging	LF	

Unit prices quoted and accepted shall apply throughout the life of the contract and to be used if the scope of the work as defined in the base bid changes. Unit prices shall be applied, as appropriate, to compute the total value of changes in scope of the work all in accordance with the Contract Documents. Fill in all blank amounts. The failure to include Unit Price amounts may result in disqualification of the bid.

The above lump sum and unit prices shall include all costs for furnishing materials and labor in accordance with the contract drawings, project specifications and the Engineer's requirements necessary to construct the complete and operable project including all sales tax and labor, material, and miscellaneous costs.

ARTICLE 6 – TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete within 45 calendar days after the date when the Contract Times commence to run as provided in the [Modified General Conditions](#), and will be completed and ready for final payment in accordance with the [Modified General Conditions](#) within 55 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 in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

- 7.01 The following documents are attached to and made a condition of this Bid:
- A. Required Bid security in the form of _____
 - B. List of Proposed Subcontractors
 - C. List of Proposed Suppliers
 - D. List of Project References
 - E. Required Bidder Qualification Statement with Supporting Data
 - F. Affidavit of Non-Collusion
 - G. (List other documents as pertinent)

ARTICLE 8 – BID SUBMITTAL

This Bid Submitted By:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

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

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

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

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

Name (typed or printed): _____

Title: _____ (CORPORATE SEAL)

Attest _____

Date of Authorization to do business in [State Where Project is Located] is _____

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

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

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

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

Name (typed or printed): _____

Title: _____

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

Bidder's Business Address _____

Phone No. _____ Fax No. _____

SUBMITTED on _____, 20____.

State Contractor License No. _____.

Notice of Award

Date: _____

Project: **Founder's Park**

Owner: **Town of Kernersville**

Owner's Contract No.:

Contract:

Engineer's Project No.: **17.01701**

Bidder:

Bidder's Address:

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

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

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

You must comply with the following conditions precedent within ten (10) days of the date you receive this Notice of Award.

1. Deliver to the Owner [_____ (____)] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] and other documents as specified.

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

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

Town of Kernersville
Owner
By: _____
Authorized Signature

Title

ACCEPTED

Contractor
By: _____
Authorized Signature

Title

MODIFIED AGREEMENT BETWEEN OWNER AND CONTRACTOR

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by



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

THIS AGREEMENT is by and between The Town of Kernersville (“Owner”) and
_____ (“Contractor”).

Effective Date of Agreement: _____

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:

**CONSTRUCTION OF CONCRETE PAVING, CONCRETE PAVERS,
CONCRETE FORMWORK, LANDSCAPING AND RELATED
APPURTENANCES.**

ARTICLE 2 – ENGINEER

- 2.01 The Project has been designed by McGill Associates, P.A. (Engineer), which is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 3 – CONTRACT TIMES

3.01 *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.

3.02 *Dates for Substantial Completion and Final Payment*

- A. The Work will be substantially completed within 45 calendar days, and completed and ready for final payment in accordance with the Modified General Conditions within 55 calendar days.

3.03 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 3.02 above, plus any extensions thereof allowed in accordance with Article 12 of the Modified General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner **\$500** for each calendar day that expires after the time specified in Paragraph 3.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner **\$500** for each calendar day that expires after the time specified in Paragraph 3.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 4 – CONTRACT PRICE

- 4.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount equal to the sum of the amounts determined pursuant to Paragraphs 4.01.A, and 4.01.B below:
- A. For lump sum work an amount equal to the percentage completed of specific items of work provided by the Contractor as a schedule of values for the Lump Sum work.
- B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the actual quantity of that item. The unit price for each item is as supplied in the Bid for the project.

ARTICLE 5 – PAYMENT PROCEDURES

5.01 *Submittal and Processing of Payments*

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

5.02 *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 25th day of each month during performance of the Work as provided in Paragraph 5.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the Modified General Conditions (and in the case of Unit Price Work based on the number of units completed).

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the Modified General Conditions.
 - a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 97.5 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the Modified General Conditions and less 250 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

5.03 *Final Payment*

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

ARTICLE 6 – CONTRACTOR'S REPRESENTATIONS

- 6.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has reviewed all General and Supplementary Conditions applicable to the Work.
 - E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and

procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

- F. Based on the information and observations referred to in Paragraph 6.01.E above, Contractor does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- 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 sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 7 – MISCELLANEOUS

7.01 *Terms*

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

7.02 *Assignment of Contract*

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

7.03 *Successors and Assigns*

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

7.04 *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.

7.05 *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 7.05:
 - 1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - 2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;
 - 3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 - 4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages __ through __, inclusive).
2. Performance bond (pages __ through __, inclusive).
3. Payment bond (pages __ through __, inclusive).
4. Other bonds (pages __ through __, inclusive).
5. Notice of Award (pages __ through __, inclusive).
6. Modified General Conditions (pages 1 through 82, inclusive).
7. Supplementary Conditions (pages __ through __, inclusive).
8. Specifications as identified in the table of contents of the bound Project Manual.
9. Drawings consisting of __ sheets with each sheet bearing the following general title: _____
10. Addenda (numbers __ through __, inclusive).
11. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages __ through __, inclusive).
12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages __ through __, inclusive).
 - b. Work Change Directives.
 - c. Change Orders.

B. The documents listed in Paragraph 8.01.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 8.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the Modified General Conditions.

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

OWNER:

Town of Kernersville

By: _____

Title: _____

Attest: _____

Title: _____

Address for giving notices:

Pre-Audit Statement: This instrument has been preaudited in the manner required by the Local Budget and Fiscal Control Act as amended.

By: _____

Title: _____

Date: _____

Approved as to Form:

By: _____

Title: _____

Date: _____

CONTRACTOR

By: _____

Title: _____

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

Attest: _____

Title: _____

Address for giving notices:

License No.: _____

Agent for service of process:

PERFORMANCE BOND

CONTRACTOR *(name and address):*

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

OWNER *(name and address):*

Town of Kernersville
134 East Mountain Street
Kernersville, NC 27284

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:

PAYMENT BOND

CONTRACTOR *(name and address)*:

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

OWNER *(name and address)*:

Town of Kernersville
134 East Mountain Street
Kernersville, NC 27284

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

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

Amount:

Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

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

CONTRACTOR AS PRINCIPAL

SURETY

(seal)

Contractor's Name and Corporate Seal

(seal)

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Signature

Attest: _____

Signature

Title

Title

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:

ATTACH INSURANCE CERTIFICATES HERE

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows:

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof. I am of the opinion that each of the aforesaid agreements are adequate and have been duly executed by the Owner acting through its duly authorized representative, who has full power and authority to execute agreements on behalf of the Owner, and that the foregoing agreements constitute valid and legally binding obligations upon the Owner executing the same in accordance with the terms, conditions and provisions thereof.

Signature: _____

Date: _____

Notice to Proceed

Date: _____

Project: Founder's Park

Owner: Town of Kernersville

Owner's Contract No.:

Contract:

Engineer's Project No.: 17.01701

Contractor:

Contractor's Address:

You are notified that the Contract Times under the above Contract will commence to run on _____. On or before the 10th day following this date, you are to commence work and start performing your obligations under the Contract Documents. In accordance with the Agreement, the date of Substantial Completion is _____, and the date of Final Completion is _____.

Contractor

Owner

Given by:

Authorized Signature

Authorized Signature

Title

Title

Date

Date

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

MODIFIED STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

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Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

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

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MODIFIED 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 and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form provided in the Contract Documents is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—the offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—the individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Construction Field Representative (CFR)*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

12. *Contract*—the entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
13. *Contract Documents*—those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
14. *Contract Price*—the Monies payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
15. *Contract Times*—The number of calendar days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
16. *Contractor*—the individual or entity with whom Owner has entered into the Agreement.
17. *Cost of the Work*—See Paragraph 11.01 for definition.
18. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. *Effective Date of the Agreement*—the date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
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 which does not involve a change in the Contract Price or the Contract Times.
22. *General Requirements*—Sections of Division 1 of the Specifications.
23. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
24. *Hazardous Waste*—the term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
27. *Milestone*—a principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.
28. *Notice of Award*—the written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement. The Notice of Award shall not be construed as an agreement or contract. Contractor has no rights or remedies against Owner until the Notice to Proceed has been issued.
29. *Notice to Proceed*—a written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
30. *Owner*—the individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
31. *PCBs*—Polychlorinated biphenyls.
32. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
33. *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.
34. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
35. *Project Manual*—the bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents. The Project Manual contains any and all addenda issued, documents executed by the Owner and Contractor or Engineer after bidding, and all attachments and exhibits thereto, up to and including the executed copy of the Notice to Proceed.
36. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

38. *Schedule of Submittals*—a schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—a schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—an individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be fully utilized for the purposes for which it is intended. As a precedent condition to Substantial Completion the Owner shall have received all certificates of occupancy and any other necessary permits for beneficial occupancy. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—the Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—that part of the Contract Documents which amends or supplements these Modified General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *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.

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

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

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

authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

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 general standards of workmanlike construction or published authorities which govern the proper use and application of a particular material or component, including but not limited to literature published by manufacturers and trade organizations; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish. The Owner shall have authority to review and reject any bonds as nonconforming.
- B. Within fifteen (15) calendar days after the Effective Date of the Agreement, but before any Work at the Site is started, Contractor shall deliver to Owner, with a copy to Engineer, certificates and other evidence of insurance requested by Owner which Contractor is required to purchase and maintain in accordance with paragraphs Article 5 of these Modified General Conditions. The Owner shall have the authority to review and reject any insurance as nonconforming.

2.02 *Copies of Document*

- A. Engineer shall furnish to the successful Contractor up to three (3) sets of the Project Manual. Additional sets will be made available by the Engineer to the Contractor at the cost set forth in the Advertisement for Bids for this project or the actual cost for reproduction whichever is greater.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contractor shall complete all of the work contracted herein, in an acceptable manner and within the established Contract Time. The Contract Time shall commence on the start date given in the Notice to Proceed, and shall run continuously each and every calendar day following, except as herein provided, and in accordance with paragraph 17.02. Times shall be of the essence of this Agreement.

2.04 *Starting the Work*

- A. The Contractor shall commence work on or before the tenth (10th) calendar day after the date of the Notice to Proceed or as may be differently stated in the Notice to Proceed. Contractor shall not start work prior to the date set in the Notice to Proceed.

2.05 (Intentionally Deleted)

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a Preconstruction 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 Contractor's schedule for completion of the work, policies and procedures for submittal of Shop Drawings and other submittals, presentation and processing of Applications for Payment, and maintaining records required by the Contract Documents. If agreed between Owner and Contractor, the Preconstruction Conference may be held prior to the commencement of the Contract Times.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the

Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of, and legally bind each respective party.

2.07 *Submission and Acceptance of Schedules*

- A. Prior to presentation of the first Application for Payment, the Contractor shall submit the following schedules. No progress payment shall be made to Contractor until acceptable Schedules are submitted to Engineer. All schedules shall be coordinated and shall be logically related in time and value for the various stages of work.
1. The Progress Schedule. The Progress Schedule shall be computer generated, utilizing the critical path method (CPM), indicating the dates and duration for completing the various stages of the Work, including any milestones. The level of detail a number of tasks shown in the Progress Schedule shall be commensurate with the complexity of the work. The Progress Schedule shall be acceptable to Engineer if at a minimum it clearly and accurately demonstrates an orderly progression and completion of the work within the contract times. Contractor shall be solely responsible for scheduling and completing the work within the contract time. Any approval or acceptance of the schedule shall 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 for completion within the contract time.
 2. The Schedule of Submittals. The Schedule of Submittals shall provide a workable arrangement for the, engineer to timely review and process the required submittals. The Schedule of Submittals shall also include a list of manufacturers and suppliers. Approval of any schedule by Engineer shall not receive the Contractor from its obligations under the Contract.
 3. The Schedule of Values. The Contractors Schedule of Values shall provide a reasonable allocation of the Contract Price to component parts of the Work. Contractor's Schedule of Values for all of the Work shall include quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail, commensurate with the complexity of the Work, to serve as the basis for progress payments during performance of the Work. The Schedule of Values shall have line items for project closeout including, demobilization, record drawings, completion of the punch list and project restoration and final cleanup. Approval of any Schedule by Engineer shall not relieve the Contractor from its obligations under the Contract.
 4. Cash Flow Schedule. Contractor's Cash Flow Schedule shall be a scheduled and forecasted value of the anticipated payment requests for the Work. The amounts shown shall be considered an estimate which may differ from the actual amounts requested.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

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

- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

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

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect as of the date Engineer sealed, signed, and dated the Contract Documents, except as may be otherwise specifically stated in the Contract Documents.
2. The Contract Documents shall be deemed to include applicable building codes, laws and regulations, relevant published industry and trade organization standards, as well as the published requirements of any product manufacturer. However, no such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby. Contractor's failure to notify Engineer of any such discrepancy prior to commencement of Work shall constitute a waiver of Contractor's right to seek additional compensation or damages for any alleged discrepancy later discovered by Contractor.
 - a. Contractor (and any Subcontractor responsible for the performance of all or any part of such Work) shall field verify the accuracy of all grades, elevations, dimensions, locations, orientation and measurements. This shall include locations of any underground utilities or other features which may be shown generally on the drawings for informational purposes only. The Engineer shall be promptly notified in writing of any discrepancies. Contractor's failure to notify Engineer of any such discrepancy prior to

commencement of Work shall constitute a waiver of Contractor's right to seek additional compensation or damages for any alleged discrepancy later discovered by Contractor.

2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04. Contractor's failure to notify Engineer of any such discrepancy prior to commencement of Work shall constitute a waiver of Contractor's right to seek additional compensation or damages for any alleged discrepancy later discovered by Contractor.
 - a. In the event Contractor determines that some aspect of the Contract Documents require clarification or interpretation by Engineer, Contractor shall submit a Request for Information (RFI) in writing to Engineer in a format provided by Engineer. RFIs may only be submitted by the Contractor and shall be in the form required by Engineer. Verbal RFI or a RFI presented on an unapproved form shall be rejected. Any delay caused by Engineer's refusal to accept a verbal RFI or a RFI presented on an unapproved form will be attributed solely to Contractor. Each RFI shall be limited to a single issue. Information that is discernible from the Contract Documents as well as issues concerning construction means, methods, techniques, sequences or safety will not be addressed by Engineer.
 - b. Contractor shall clearly and concisely state the issue for which clarification or interpretation is sought and why a clarification or interpretation is needed. The RFI process shall not be used by Contractor to seek approval for proposed "or-equal" or substitute materials or equipment.
 - c. Engineer's review of or responses to RFIs shall not constitute an approval, direction, or procedure related to the construction means, methods, techniques, sequences, or safety.
 - d. Responses to Contractor RFIs will not change any requirement of the Contract Documents. In the event Contractor believes that a response to an RFI will cause a change in the Contract Price or Contract Time, Contractor shall give written notice of the Claim to Engineer.
 - e. If Contractor wishes to make Claim for an adjustment of the Contract Price or an extension of the Contract Times, or both, written notice as provided in Paragraph 10.05 shall be given before proceeding to execute the Work. Failure to give such written notice shall waive Contractor's right to seek an adjustment of the Contract Price or an extension of the Contract Times.

B. Resolving Discrepancies:

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

3.04 Amending and Supplementing Contract Documents

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

3.05 Reuse of Documents

- A. Contractor and any Subcontractor or Supplier shall not:
 1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation of such documents by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for ordinary record keeping purposes.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify, defend, and hold harmless Engineer, and the Owner and their employees, principals, agents, successors, insurers, sureties and assigns, from and against any and all liabilities, claims, causes of actions, suits of any nature, fines, penalties, expenses, 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, resulting from, or relating to the unauthorized use, reuse, or modification of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions, by Contractor, its employees, agents, or any other person or entity for whom Contractor is legally liable.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, surveys, graphics, or other types are furnished, if at all, only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. To the extent that any discrepancy exists between the electronic files and the hard copies, the hard copies shall govern.
 - 1. The Engineer may, but shall not be obligated to, make copies of requested Drawings in electronic format for the Contractor's convenience and to facilitate the Contractor's administration of the Project. Because information presented on electronic files can be modified, unintentionally or otherwise, the Engineer reserves the right to remove all indications of ownership from each electronic display. Notwithstanding the removal of indicia of ownership, the Engineer's copyright interest in such files and the information contained therein shall not be abridged or abated by such action. The use of electronic files prepared by the Engineer shall not in any way relieve the contractor of its duty to fully comply with the Contract Documents nor negate the Contractor's responsibility for coordination of other trades, and taking field measurements.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. To the extent that any errors are detected, the receiving party shall provide written notice to the transferring party, which party shall correct such errors identified within the 60 day acceptance period.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

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

4.01 *Availability of Lands*

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

unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefore as provided in Paragraph 10.05.

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

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Contract Documents identify:

- 1. If during the preparation of these Contract Documents, subsurface or geotechnical explorations were conducted which are relevant in the discretion of the Engineer to the scope of the work, the findings of such will be included in the Appendix of the Specifications. The Contractor shall be responsible for obtaining such reports and explorations it deems necessary and advisable for the performing of the Work in accordance with the Contract Documents.
- 2. Information and data reflected in the Contract Documents with respect to existing structures and facilities at or contiguous to the Site are based upon information obtained from varying sources which may include reports, drawings or other data of those facilities presently on file with the Owner. The Owner and Engineer do not guarantee the accuracy of any such information. The Contractor shall be responsible for field verifying all conditions and measurements and for determining the suitability of the site for the proposed Work.

B. *Limited Reliance by Contractor on Technical Data Authorized:* any reports and drawings which have been identified in Article 4.02 A 1 are not Contract Documents. However, in the event the Engineer specifically calls out and designates certain information in such reports and drawings as "Technical Data" than Contractor shall have a limited right to rely upon the accuracy of the designated Technical Data. Other than the designated Technical Data, any information provided and depicted on the Drawings is merely intended to be a general representation of the physical conditions likely be encountered during the Work and shall not constitute a guarantee or warranty by the Engineer or Owner that actual conditions will not vary from that which is depicted. Except for the Contractor's right to rely on the designated technical data, which is limited as more specifically shown below, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

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

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.
4. The information provided herein and depicted on the project drawings are not guaranteed by the Owner or Engineer to be more than a general representation of the physical conditions likely to be encountered during the Work.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor discovers or should reasonably have discovered, or otherwise reasonably believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any “Technical Data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; and is not in the area of the project bid as Unclassified Excavation;

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

B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such circumstance must meet the conditions of Paragraph 4.03. A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any consequential damages, including but not limited to claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project, and Contractor expressly and specifically releases any and all damages related thereto. Any damages for suspension or idle time shall be limited to the Contractor's actual cost of labor or equipment costs, including a reasonable markup for overhead but shall not include a markup for profit.

4.04 *Underground Facilities*

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

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

B. Not Shown or Indicated:

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

C. Underground Utility Damage Prevention Act:

1. Contractor shall be required and agrees to comply with all the provisions of any applicable underground utility damage prevention act (however titled) and hereby agrees, to the fullest extent permitted by Laws and Regulations, to indemnify, defend, and hold harmless Owner, Engineer, and their employees, principals, agents, successors, sureties, insurers and assigns, including any of their Related Entities, if any, 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 Contractor's failure, or the failure of anyone for whom Contractor is responsible, to so comply with the requirements of said act, except the Contractor shall not be required to indemnify any person or entity for acts attributable to the sole negligence of such person or entity.

4.05 *Reference Points*

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

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* Reference is made to the Contract Documents for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.
- B. *Limited Reliance by Contractor on designated Technical Data Authorized:* Contractor may rely upon the accuracy of any designated "Technical Data" contained in such reports and drawings, but such reports and drawings are not Contract Documents, and Contractor's reliance on the designated Technical Data is limited to the extent specifically described in set forth in Article 4.02 B. Except for such reliance on such "Technical Data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for

Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefore as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefore as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

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

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions. The Owner shall be responsible for determining the sufficiency and adequacy of such bonds and insurance.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Contract Documents, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain. The Owner shall be solely responsible for determining the adequacy and sufficiency of the insurance requested under the Contract Documents and any certificates of insurance which are furnished hereunder.

- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Contract Documents, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Neither Owner nor Engineer represents that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the cap contract documents, including under the indemnities granted in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting there from; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle; and

7. claims for damages arising out of Contractor's performance or providing of professional architectural or engineering services in accordance with Paragraph 6.21.B.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insured's (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Contract Documents, all of whom shall be listed as additional insured's, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insured's, and the insurance afforded to these additional insured's shall provide primary coverage for all claims covered thereby;
2. include the specific coverages herein required or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 60 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Contract Documents to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Contract Documents to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

- C. Satisfactory certificates of insurance shall be submitted and attached to the executed Agreement for Construction between the Owner and Contractor. In connection with the provisions set forth in the Modified General Conditions, the Notice to Proceed will not be issued until satisfactory certificates of insurance are filed.

D. Specified Limits of Insurance Required to be Carried by Contractor

1. Worker's Compensation and Employer's Liability

This insurance shall protect the Contractor and Owner and the Engineer against all claims under applicable state workmen's compensation laws. The Contractor and Owner shall also be protected against claims for injury, disease, or death of employees that, for any reason, may not fall within the provisions of a workmen's compensation law. This policy shall include an "all states" endorsement.

The liability limits shall be not less than:

Worker's Compensation	Statutory
Employer's Liability	\$500,000 each occurrence

2. Comprehensive Automobile Liability

This insurance shall be written in comprehensive form and shall protect the Contractor and Owner and engineer against all claims for injuries to members of the public and damage to property of others arising from the use of motor vehicles, and shall cover operation on or off the site of all motor vehicles licensed for highway use, whether they are owned, non-owned, or hired.

The liability limits shall be not less than:

Bodily Injury	\$1,000,000 each person
	\$1,000,000 each occurrence
Property Damage	\$1,000,000 each occurrence
	\$1,000,000 aggregate

3. Comprehensive General Liability

This insurance shall be written in comprehensive form and shall protect the Contractor and Owner against all claims arising from injuries to persons other than his employees or damage to property of the Owner or others arising out of any act or omission of Contractor or his agents, employees, or Subcontractors. The policy shall also include protection against claims insured by usual personal injury liability coverage and shall include a "protective liability" endorsement to insure the contractual liability assumed by the Contractor under the indemnification provisions in the Modified General Conditions, and "Completed Operations and Products Liability" coverage (to remain in force during the correction or warranty period required under this Agreement).

To the extent that the Contractor's work, or work under his direction, may require blasting, explosive conditions, or underground operations, the comprehensive general liability coverage shall contain no exclusion relative to blasting, explosion, collapse of building, or damage to underground property.

Bodily Injury	\$1,000,000 each person
	\$1,000,000 each occurrence
Property Damage	\$1,000,000 each occurrence
	\$2,000,000 aggregate

4. Umbrella Liability Policy

This insurance shall protect the Contractor against all claims in excess of the limits provided under the workmen's compensation and employer's liability, comprehensive automobile liability, and general liability policies. The liability limits of the umbrella liability policy shall not be less than \$5,000,000.

E. Contractor covenants and agrees that the insurance coverage and limits required by the Contract Documents shall in no way be considered or used in any manner as a limit or cap of any kind on any liability or obligation that Contractor may otherwise have, including, without limitation, liability under the indemnification provisions contained herein.

1. by requiring such insurance and insurance limits, neither Owner nor Engineer represents that such coverage and limits will necessarily be adequate to protect Contractor.
2. Contractor shall be responsible for any deductible or self-insured retention.

5.05 *Owner's Liability Insurance*

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

5.06 *Property Insurance*

A. Contractor shall purchase and maintain Builder's Risk insurance for the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Contract Documents or required by law). Contractor shall be responsible for all associated costs for such insurance. This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Contract Documents, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Contract Documents.
3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials

and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued. The Owner shall be solely responsible for determining the adequacy and sufficiency of such Builders Risk insurance.
- B. Unless otherwise provided in the Contract Documents, Contractor shall purchase and maintain such boiler and machinery insurance or any other additional property insurance required by the Contract Documents or Laws and Regulations, which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Contract Documents, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest in the project and shall be listed as an insured or additional insured.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 60 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Contract Documents. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. (Intentionally deleted)

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees there under. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of

or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued. This Waiver of Subrogation shall survive the completion or termination of this Agreement.

- B. Owner, and Contractor waive all rights against each other, 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, or any other loss of profits or other consequential damages; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them. This provision shall survive the completion and/or termination of the Agreement.

5.08 Receipt and Application of Insurance Proceeds

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

adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

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

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party fails to purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

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

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. The 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 provide competent, qualified, on-site, supervision at all times during construction activities including supervision of the activities of the sub-contractor(s), vendors and suppliers through a Resident Superintendent. The Resident Superintendent shall be on-site at any time that work is ongoing at the project. Sub-contractors shall not work independently on the project without on-site supervision provided Resident Superintendent. A resume for the Resident Superintendent shall be submitted to the Engineer for approval prior to commencing work. Such resumes shall include projects that they were in responsible charge of, that are of similar work in scope and value with owner's references. Contractor shall not change the

Resident Superintendent without written approval from the Engineer. However, the approval of any supervisor by the Engineer shall not relieve the Contractor of its obligation to properly supervise and perform the Work.

- B. If at any point during the progress of the Work the Owner determines, in its sole discretion, that the Resident Superintendent is inadequately performing its services, the Owner may direct in writing the Contractor to replace the Resident Superintendent within thirty (30) days of such notification. The resumes of any proposed new Resident Superintendent shall be submitted to the Engineer for approval prior to their commencement of work on the project.
1. The Resident Superintendent shall provide Owner and Engineer with a written daily field report containing, as a minimum, the following information:
 - a. the number of personnel on site, identified by craft or trade, employer and work activity, and the number of hours worked during the workday;
 - b. the types and numbers of equipment on site and the time each piece of equipment was used or stood idle during the workday;
 - c. any materials or equipment received on site during the workday; and
 - d. the identification and quantity of any unit price work, if any, installed during the day.

Said daily field reports shall be submitted to Owner and Engineer not less than weekly.

- C. For purposes of giving or receiving notices, directives, Change Orders, or any other information from Owner or Engineer to Contractor, Contractor shall designate a specific individual as Project Manager to receive such notices, directives, Change Orders, or other information. If the person so designated by Contractor is not available, Contractor shall (in writing addressed to Owner and Engineer) identify the individual who is acting as his authorized representative.
- D. Contractor acknowledges that its obligation to complete the Work in accordance with the Contract Documents shall not be affected or amended as a result of any act by Engineer or any other Owner's consultant, or as a consequence of any field inspections or observations or approval of any Application for Payment, or in regard to any other duty performed by Engineer or other Owner's consultant for the benefit of Owner, unless Owner and Engineer shall expressly approve Contractor's action in advance in writing specifically identifying the action approved. Furthermore, Contractor shall not be relieved of any responsibility to complete the Work in conformity with the contract Documents as a consequence of any knowledge of non-conformity obtained by an Owner's representative, including Engineer, whether or not such representative acts or fails to act on such knowledge. Contractor acknowledges and agrees that any representative retained by Owner to act for Owner's benefit, including Engineer, shall have no duty or responsibility to Contractor, except where specifically stated herein, and no act or failure to act by such Owner's representative shall relieve Contractor of its obligations to perform all requirements under this Contract, except as specifically approved in writing otherwise.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.
- C. No Work shall be done between 6 p.m. and 7 a.m. without permission of Owner. However, emergency work may be accomplished without prior permission. No Night Work may be undertaken without permission of Owner.
- D. Each occasion Contractor works in excess of 45 hours per week, or outside of the hours of 7:00 am and 6:00 pm, or on weekends or holidays, the Contractor shall reimburse Owner for any and all costs and expenses (including, but not limited to, Engineer's fees and expenses associated with additional Observation and Contract Administration) incurred by Owner as a result of such schedule. Contractor covenants and agrees that Owner may retain, deduct, and/or offset monies due to Owner pursuant to this Paragraph from monies due to Contractor under the Agreement. Contractor further covenants and agrees that Owner retains the right to make such deduction or offset at any time prior to and including final payment and that the imposition and the deduction and/or offset of such monies shall not be subject to any notice or claim provisions of the Contract Documents.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All 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.
 - 1. To the extent possible, all warranties shall run to and be enforceable by Owner. Contractor agrees to assign to Owner at the time of final completion of the Work, or as otherwise required by the Contract Documents, any and all Subcontractor and Supplier warranties relating to materials and labor used in the Work and Contractor further agrees to perform the Work in such a manner to preserve any and all Subcontractors' and Suppliers' warranties. Contractor shall provide Owner assistance, throughout the duration of such warranties, in enforcing the obligations of Subcontractors and Suppliers. If necessary as a matter of law, Contractor may retain the right to enforce directly any such Subcontractors' and Suppliers'

warranties during the one-year period following the date of Substantial Completion established by Paragraph 14.04. Contractor includes in this warranty materials and equipment specified by Engineer by brand name. The warranty provided in this Paragraph 6.03 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law and shall be in addition to all other rights and remedies available to Owner. All warranty obligations are cumulative to and in addition to all remedies available to Owner pursuant to the Contract Documents and applicable law.

- 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.
- D. Materials and equipment stored off site shall be stored in a bonded, secure warehouse. Any such materials and equipment stored off site shall be available for review by Engineer's representative. Material and equipment shall be stored and maintained while in storage in a manner consistent with the manufacturer's recommendations. Such maintenance during storage, or prior to startup shall be documented and presented to the Engineer. Risk of loss of stored materials and equipment shall be on Contractor, whether titled in the name of the Contractor or whether title previously passed to the Owner as a result of payment for the stored materials and equipment.
- E. The Contractor shall have responsibility for the care of all equipment and materials, including those furnished by the Owner, if any, and shall bear the risk of injury, loss, or damage to any part thereof by action of the elements or from any other cause, until final completion. Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the Work or the equipment or materials occasioned by any cause before completion and acceptance of the Work and shall bear the expense therefore. Contractor shall, at no additional cost to Owner, provide temporary measures and suitable structures as they might be necessary to protect the Work or any portion thereof from damage.
- F. Suspension of the Work or the granting of an extension of time for any cause whatever shall not relieve Contractor of his responsibilities for the Work as specified herein including the continuing care and maintenance of stored materials and equipment as well as work accomplished to date.
- G. If the equipment furnished by the Contractor differs in dimension, orientation, horsepower requirements, pipe connection sizes, or is otherwise non-conforming to the Contract Documents, the Contractor shall be responsible for the furnishing of all properly-sized connecting piping, motor starters, motor controls, and electrical wiring and connections, and all other work required to properly install the equipment in complete operating condition. Further, such non-conforming equipment or materials shall be submitted as a "Substitute" in accordance with Section 6.05 of the Modified General Conditions, including and subject to Paragraph 6.05. E. *Engineer's Cost Reimbursement*. No additional compensation by the Owner to the Contractor will be made with respect to such "Substitutes".

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.
3. Contractor shall submit to the Engineer an adjusted Progress Schedule whenever the progress of the Work is behind the current, approved Progress Schedule as defined in paragraph 2.07 A.1 of the Modified General Conditions, or upon the Engineer's request and whenever the Engineer determines in its discretion that the Work cannot be substantially complete in the time remaining. The adjusted Progress Schedule must be submitted within ten (10) days of Engineer's written request and prior to the Contractor's next application for payment.
4. Owner shall have the right to direct a postponement or rescheduling of any date or time for the performance of any part of the Work that may interfere with the operation of Owner's premises or any tenants or invitees thereof. Contractor shall, upon Owner's request, reschedule any portion of the Work affecting operation of the premises during hours when the premises are not in operation. Any postponement, rescheduling, or performance of the Work under this Paragraph 6.04.A.3 may be grounds for an extension of the Contract Times, if permitted under Article 12, and an equitable adjustment in the Contract Price, if permitted under Article 12 and (i) the performance of the Work was properly scheduled by the Contractor in compliance with the requirements of the Contract Documents and (ii) such rescheduling or postponement is required for the convenience of the Owner.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the Contract Documents contain a description followed by words reading "or an approved equivalent" or "or approved equal" item or "substitution is permitted," other items of material or equipment or material or equipment of other suppliers may not be submitted to Engineer for review. If the description contains or is followed by words reading "or an approved equivalent" or "or approved equal" item or "substitution is permitted," other items of material or equipment or material or equipment of other suppliers may be substituted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that

no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

- a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics; and
 - 2) it will reliably perform at least equally well the function and achieve the results intended by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is equal or better in form, features, operation and maintenance cost and general configuration; and
 - 5) it conforms to the requirements of the Contract Documents in all respects, except for make and manufacturer or supplier and minor details of specified equipment; and
- b. Contractor certifies in writing that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items:

- a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances. Applications for approval of substitute items of material or equipment will not be accepted by the Engineer if made as part of a Shop drawing submittal. The application for use of substitute material or equipment must be made prior to the submission of a shop drawing by a written communication clearly labeled "Request for Substitution". Substitute items proposed by Shop Drawings for materials or

equipment will be rejected by the Engineer unless previously approved in a separate application.

- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified; and
 - d) Contractor accepts the installation instructions, warranty and correction obligations contained in the product manufacturer's literature in connection with the proposed substitution as if such, information pertaining to the new product was originally specified in the Contract Documents; and
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty; and
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) And shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.
- e. If a proposed substitution affects a correlated function, adjacent construction, or the work of other contractors, then the necessary changes and modifications to the affected work are considered an essential part of the proposed substitution, to be accomplished by Contractor as a part of the Work, if and when approved.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
1. Proposed substitutions may be rejected without explanation and will not be considered unless one or more of the following conditions exists:
 - a. Required for compliance with interpretation of code requirements or insurance regulations then existing.
 - b. Unavailability of specified products, through no fault of Contractor.
 - c. Subsequent information discloses inability of specified products to perform properly or to fit in designated space.
 - d. Manufacturer/fabricator refuses to certify or guarantee performance or specified product as required.
 - e. When in the judgment of Owner or Engineer, that a substitution would be substantially to Owner's best interests, in terms of cost, time, or other considerations.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Contractor shall be liable to Owner for any and all costs and expenses (including, but not limited to, Engineer's fees and expenses) incurred by Owner as a result of evaluating a substitute proposed or submitted by the Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B, and reflecting changes in the Contract Documents, whether or not Engineer approves a substitute so proposed or submitted by Contractor. Contractor covenants and agrees that Owner may retain, deduct, and/or offset monies due to Owner pursuant to this Paragraph 6.17.D.4 from monies due to Contractor under the Agreement. Contractor further covenants and agrees that Owner retains the right to make such deduction or offset at any time prior to and including final payment and that the imposition and the deduction and/or offset of such monies shall not be subject to any notice or claim provisions of the Contract Documents. Such payment is an obligation separate and apart from the Contractor's obligation to pay liquidated damages for delay, if any.

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

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- B. As part of the Bid or the Proposal, the Owner may require the identity of the Contractor's proposed Subcontractors and Suppliers of Equipment or Materials in order to better evaluate the Proposal or Bid. In the instance where identification of Suppliers is required, supply only one name per equipment or material item.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other individual, entity, or organization, to the extent practicable, information about amounts paid to Contractor for Work performed. 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 Monies due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade. Owner and Engineer assume no responsibility for the overlapping or omission of parts of the Work by various Subcontractors or Suppliers in their subcontracts with the Contractor, as this is solely the Contractor's responsibility.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured's or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same. This Waiver of Subrogation provision shall survive the completion and/or termination of this Agreement.
- H. As soon as possible, but in no case more than 30 days after receipt of the Notice of Award, and prior to the first application for payment, the Contractor shall provide the Engineer with a list of sub-contractors along with the division of their work.

6.07 *Patent Fees and Royalties*

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

6.08 *Permits*

- A. Unless otherwise provided in the 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.
- B. A certified sales tax statement shall be provided with each and every pay application, even if there were no sales tax during that period.

6.11 *Use of Site and Other Areas*

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

- 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
- 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
 4. Only materials and equipment that are to be used directly in the Work shall be brought to and stored on the Project site by Contractor. After equipment is no longer required for the Work, it shall be promptly removed from the Project site. If Contractor uses any portion of the new Work prior to the date of Substantial Completion of the entire Work, such items shall be restored to their new condition.
- B. *Removal of Debris during Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction including, but not necessarily limited to, (i) deviations from the Drawings and Specifications made during construction; (ii) details in the Work not previously shown; (iii) changes to existing conditions or existing conditions found to differ from those shown on the Drawings; (iv) the actual installed position of all mechanical, electrical equipment, piping, ductwork, access panels, valves, drains, stub outs, etc.; and (v) such other information as Owner or Engineer may reasonably request. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to Engineer and Owner for reference. Contractor's Record Documents shall be available for review by Engineer as part of the pay application process. A pay application will not be considered until the Record Documents are shown complete through that application period. Upon completion of the Work, these Record Documents, Samples, and Shop Drawings will be delivered to Engineer for Owner. Final payment and any retainage shall not be due and owing to Contractor until the Record Documents, marked by Contractor, as required above are delivered as required above.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
- G. Nothing contained in the Contract Documents shall be construed to require or authorize Engineer or Owner to supervise or be in any way responsible for Contractor's compliance with any applicable safety regulations, codes, or procedures. Engineer and Owner shall have no duty to

inform the Contractor of any safety violations, and should Engineer or Owner voluntarily point out safety violations, such actions shall not be construed to mean that Engineer or Owner has assumed any responsibility for Contractor's compliance with any applicable safety regulations, codes, or procedures. Contractor is solely responsible for Project safety.

- H. Contractor shall promptly report in writing to Owner and Engineer all accidents arising out of or in connection with the Work that cause death, personal injury, or property damage, giving full details and statements of any witnesses.

6.14 *Safety Representative*

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

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07) and the submittal procedures described elsewhere in these Contract Documents. In the event of any conflict between the submittal procedures noted above and this Paragraph 6.17, the more stringent requirements shall control. Each submittal will be identified as Engineer may require. Contractor represents and warrants that all Shop Drawings shall be prepared by persons and entities possessing expertise and experience in the trade for which the Shop Drawing is prepared and, if required by the Contract Documents or applicable Laws or Regulations, be a licensed architect or engineer, as appropriate.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to

show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

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

C. *Submittal Procedures:*

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

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples. Engineer's review and approval will be only to determine if the items covered by the submittals will, after

installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. Engineer's review is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance responsibility of Contractor as required by the Contract Documents. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Except as otherwise expressly provided herein, Engineer's approval of any submittal shall not in any way be deemed to release Contractor from full responsibility for complete and accurate performance of the Work in accordance with the Contract Documents; neither shall such approval release Contractor from any liability imposed upon Contractor by any provision of the Contract Documents. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.
4. Contractor acknowledges that the processing of Shop Drawings and other submittals often requires extensive and time-consuming reviews by many individuals and that the time required for such reviews are directly related to the clarity, completeness, and accuracy of such submittals. Contractor covenants and agrees that Contractor's responsibilities include, but are not limited to, reviewing and coordinating each submittal with all other related or affected work and approving each submittal before submitting same to Engineer for approval. As a part of its Basic services to Owner, Engineer will review up to two submissions of all Contractor submittals required by the Contract Documents. However, if Engineer is required to:
 - a. review a third or subsequent submission of any submittal, or
 - b. review more than the number of copies of each submittal specified in the Contract Documents, or
 - c. review submittals in addition to those required by the Contract Documents, or
 - d. review submittals for proposed substitutions for previously approved items, then

Contractor shall be liable to Owner for any and all costs and expenses (including, but not limited to, Engineer's fees and expenses) incurred by Owner as a result thereof. Contractor covenants and agrees that Owner may retain, deduct, and/or offset Monies due to Owner pursuant to this Paragraph 6.17.D.4 from monies due to Contractor under the Agreement.

Contractor further covenants and agrees that Owner retains the right to make such deduction or offset at any time prior to and including final payment and that the imposition and the deduction and/or offset of such monies shall not be subject to any notice or claim provisions of the Contract Documents. Contractor acknowledges that this obligation is separate and apart from the obligation to pay liquidated damages for delay, if any.

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.

F. *Professional Certification:*

1. When professional certification of performance criteria of materials, systems, or equipment is required by the Contract Documents, Contractor shall provide the person or party providing the certification with full information on the relevant performance requirements and on the materials, systems, or equipment that are expected to operate at the Project site. The certification shall be based on performance under the operating conditions generally prevailing or expected at the Project site. Engineer shall be entitled to rely upon the accuracy and completeness of such certification.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing. Contractor's refusal or failure to continue with the Work in a timely manner as a result of any dispute that arises will constitute a material breach of the Agreement. Owner shall be entitled to specific performance of provisions requiring delivery of warranties and other required documentation.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee. Unless otherwise stipulated elsewhere within the Contract Documents, the Contractor's warranty period will begin at Owner's acceptance and remain in effect for a period of 12 months. If an equipment or material failure occurs during the Contractor's warranty period, the Contractor's warranty period shall be extended by a period of time, equal to the down time of the equipment, or time until the material failure was corrected to the Owner's satisfaction.
- 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 which is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;
 3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
 4. use or occupancy of the Work or any part thereof by Owner;
 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
 6. any inspection, test, or approval by others; or
 7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor and Subcontractor(s) (the "Indemnitors") shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, insurers, agents, consultants and subcontractors of each and any of them (the "Indemnitees") 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, resulting from, or relating to the Contractor's or its employees', agents' or Subcontractors' (or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable) actions, activities or omissions, negligent or otherwise, or breach or failure to perform this Agreement on or near Owner's property or easement, or arising in any way out of, resulting from, or relating to any of the Work to be performed under this Contract, including, without limitation, claim for bodily injuries, sickness, disease, or death, or to injury to or destruction of tangible property, or other economic damages such as fines, penalties, or other losses, including the loss of use resulting therefrom, except such obligation shall not require indemnity in favor of any party whose negligence solely call such loss. To the extent that any portion of this provision is deemed contrary to law or to otherwise be unenforceable, the parties agree that such offending portion or portions shall be severed from this provision and the remaining provisions shall be enforceable to the maximum extent permitted at law. In the event of any conflict in the construction of this provision, the parties agree that the interpretation requiring the fullest obligation and indemnity shall prevail.

- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, and Contractor expressly waives any right to any such limitation. Contractor shall include in any and all subcontracts a provision requiring each Subcontractor to likewise waive any limitation on amount or type of damages, compensation, or benefits payable for or to the Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. Contractor's indemnity obligations under this Paragraph 6.20 shall also specifically include, without limitation, all fines, penalties, damages, liability, costs, expenses (including, but not limited to, reasonable fees and charges of engineers, architects, attorneys, and other professionals, and all court or mediation or other dispute resolution costs), and punitive damages (if any) arising out of, or in connection with, any (i) violation of or failure to comply with any law, statute, ordinance, rule, regulation, code, or requirement of a public authority that bears upon the performance of the Work by Contractor, a Subcontractor, or any person or entity for whom either is responsible, specifically including, but not limited to, any violations of the federal Occupational Safety and Health Act (as applied in the state in which the Project is located or any of the Work is performed) or the safety requirements under Article 6 of these Modified General Conditions; (ii) means, methods, procedures, techniques, or sequences of execution or performance of the Work; and (iii) failure to secure and pay for permits, fees, approvals, licenses, and inspections as required under the Contract Documents, or any violation of any permit or other approval of a public authority applicable to the Work, by Contractor, Subcontractor, or any person or entity for whom either is responsible.
- D. Contractor shall indemnify and hold harmless all of the Indemnities from and against any and all costs and expenses (including, but not limited to, reasonable fees and charges of attorneys) incurred by any of the Indemnities in enforcing any of Contractor's defense, indemnity, and hold-harmless obligations under this Contract.
- E. No contention by Contractor that a certain claim is beyond its indemnity obligations herein required shall relieve Contractor of the obligation to provide indemnity until final judgment by a court of competent jurisdiction holding that there exists no duty on the part of Contractor to undertake any indemnity obligation under the circumstances of any particular claim.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures or safety precautions and programs in connection with the Work.
- 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 of which the Owner and Engineer have knowledge that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional, whom shall comply with reasonable requirements of the Owner regarding qualifications and insurance. 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 of which the Owner and Engineer have knowledge that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. (Intentionally deleted)

6.22 *Owner-Purchased Material and Equipment*

- A. Contractor accepts assignment of, and liability for, all purchase orders and other agreements for procurement of Owner-purchased materials and equipment that are identified as part of the Contract Documents, if any. Contractor shall be responsible for any such pre-purchased items as if Contractor were the original purchaser. The Contract Price shall include, without limitation, all costs and expenses in connection with delivery, handling, storage, insurance, installation, and testing of items covered in any assigned purchase orders or agreements. All warranty and correction of the Work obligations under the contract documents shall also apply to any pre-purchased items, unless the Contract Documents specifically provide otherwise.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefore, or have other work performed by utility owners that does not unreasonably interfere with Contractor's Work.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or

otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

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

7.02 *Coordination*

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

7.03 *Legal Relationships*

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

7.04 *Claims between Contractors*

- A. Should Contractor cause damage to the Work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.
- B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold harmless Owner and its officers, directors, partners, employees, agents, consultants, and subcontractors from and against all liabilities, claims, causes of action, suits of any nature, fines, penalties, expenses, costs, losses, and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, or, indirectly, out of any controversy arising between Contractor any other contractor

oversight, including, without limitation, any action, legal or equitable, brought by any other contractor against Owner to the extent said claim is based on or arises out of Contractor's performance of the Work. Should the presence of another contractor at the Site give rise to any other Claim, Contractor agrees its sole remedy with respect to such claim shall be against the of the contractor and Contractor agrees it shall not institute any action, legal or equitable, against owner or its officers, directors, partners, employees, agents, consultants, and subcontracts, or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter, which seeks to impose liability on or to recover damages from Owner or its officers, directors, partners, employees, agents, consultants, and subcontractors on account of any such damage or Claim.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

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

8.03 *Furnish Data*

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

8.04 *Pay When Due*

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

8.05 *Lands and Easements; Reports and Tests*

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

8.06 *(Intentionally deleted)*

8.07 *Change Orders*

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

8.08 *Inspections, Tests, and Approvals*

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

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

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

8.11 *(Intentionally deleted)*

8.12 *(Intentionally deleted)*

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer. Except for those responsibilities of the Engineer to decide matters in dispute between the Owner and contractor, the Engineer's services are being performed solely for Owner's benefit, and no other party or entity shall have any claim against Engineer because of the performance or non-performance of such services.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work. No act or omission of the Engineer and performing observation of the Work shall relieve the Contractor of its primary obligation to perform Work in strict accordance with the Contract Documents. No deviation from the

Contract Documents shall be deemed to be conforming Work and unless documented in a written Change Order signed by all Parties, except as provided for minor deviations which may be addressed by Field Orders as set forth below.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Construction Field Representative (CFR)*

- A. Engineer may furnish a CFR to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such CFR and assistants will be as provided in the Contract Documents, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Contract Documents.
- B. Limitations of Authority: Contractor shall have no right to rely on the CFR in performing any of the following unless Contractor first receives a written instructions of the Engineer and otherwise the CFR shall not:
 - 1. shall not undertake any of the responsibilities of the Contractor, the Subcontractors, or the Contractor's superintendent;
 - 2. shall not authorize any deviation from the Contract Documents;
 - 3. shall not stop Work;
 - 4. shall not expedite the work for the Contractor;
 - 5. shall not advise on or issue directions relative to any aspect of the means, methods, techniques, safety, sequences, or procedures of construction;
 - 6. shall not authorize the Owner to occupy the Project in whole or in part;
 - 7. shall not participate in the performance of specialized field or laboratory tests.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If

Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefore as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

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

9.06 *Shop Drawings, Change Orders and Payments*

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

9.07 *Determinations for Unit Price Work*

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

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work there under. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 21 days of the event giving rise to the question in accordance with the provisions of Paragraph 10.5 with a request for formal decision.
 - 1. In connection with Contractor's responsibilities with respect to requests for information (RFIs), see Paragraph 3.03.A.2.a and 3.03.A.2.b.

- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision with respect to any such Claim will be a condition precedent to any exercise of rights or remedies a party may have under law.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision unless either party proves, by the preponderance of the evidence, that Engineer's decision was made arbitrarily and capriciously, with no evidence whatsoever to support Engineer's decision.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them. As a condition of the Contractor accepting the right to perform the Work required under this Agreement, the Contractor on behalf of itself, its subcontractors, employees, sureties, and assigns does prospectively release any such claim as to Engineer and Contractor agrees its sole remedy shall be under the Contract to request additional time and compensation from the Owner in strict accordance with the provisions of this Agreement.
- 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. Neither the professional activities of Engineer, nor the presence of Engineer or its employees or consultants at the Project site, shall relieve Contractor of its obligations, duties, and responsibilities under the Contract Documents.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Construction Field Representative, if any, and assistants, if any.

9.10 *(Intentionally deleted)*

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided). A change in the Contract Price or the Contract Times shall be accomplished only by a written Amendment, a written Change Order, or a written Work Change Directive. Contractor waives the right to additional compensation or time unless it first obtains such documents, properly executed by the appropriate parties, prior to performing any additional Work. No course of conduct or dealings between the parties, no expressed or implied acceptance of alterations or additions to the Work, and no claim that Owner has been unjustly enriched by any alterations or additions to the Work shall be the basis of any claim for an increase in any amount due under the Contract Documents or a change in any time period provided for in the Contract Documents unless such written documentation is obtained, as such written documentation is a condition precedent to the Contractor's recovery of additional money or time.
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefore as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

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

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A, or otherwise nonconforming work or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.
- B. Agreement on any Change Order shall constitute a full and final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect (including without limitation delay, disruption, impact, loss of efficiency, and extended overhead) costs associated with such change, or the cumulative effect of changes through the date of the subject Change Order, and any and all adjustments to the Contract Price and the Contract Times. Implied in every Change Order, unless expressly reserved by Owner or Contractor, is a waiver of all known and unknown claims arising out of or otherwise associated with the Change Order, including a waiver of an applicable federal or state anti-claim waiver statute or common law principal of similar effect. In the event a Change Order increases the Contract Price, Contractor shall include the Work covered by such change Order in Applications for Payments as if such Work were originally part of the contract Documents.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change. Owner shall be charged with responsibility for enforcing this provision.
- B. Contractor shall keep the surety informed of the progress of the Work, and, where necessary, obtain the surety's consent to, or waiver of, (i) notice of changes in the Work; (ii) request for reduction or release of retention; (iii) request for final payment; and/or (iv) any other item required by the surety. Owner shall be notified by Contractor and shall be carbon copied, in writing, with all communications between the Contractor and the surety. Owner may, in Owner's sole discretion, inform the surety of the quality and progress of the Work and obtain consents as necessary to protect Owner rights, interest, privileges, and benefits under and pursuant to any bond issued in connection with the Work.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 21 days) after the start of the event giving rise thereto; provided, however, that the claimant shall use its best efforts to furnish Engineer and the other party, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with Engineer and the party against whom the Claim is made in any effort to mitigate the alleged or potential damages, delay, or other adverse consequences arising out of the condition that is the cause of such a Claim. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. Deny the Claim in whole or in part;
 2. Approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05. C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.
1. The notice required by Paragraph 10.05.B is a condition precedent to the assertion of any claim by Contractor. The right of Owner to receive written notice of claims under Paragraph 10.05.B may not be waived or modified by Owner or Engineer except in writing signed by Owner, and Contractor waives the right to rely on any purported waiver of this written notice by verbal instructions or other conduct of Owner or Engineer.

2. Contractor's written notice of a Claim shall be made by written request seeking a Change Order and specifying the grounds therefore and the relief sought. Contractor shall attach to each Application for Payment a schedule of outstanding and unresolved Contractor Claims. By attaching and submitting such schedule with its Application for Payment, Contractor shall be deemed to have certified that the only outstanding and unresolved Claims of which it has notice at the time of the Application for Payment are those identified in the schedule attached to its Application for Payment. A schedule of outstanding and unresolved requests for change orders and claims shall be required of each Subcontractor submitting an application for payment to Contractor that is to be included in Contractor's Application for Payment to Owner. Owner and Engineer shall each rely upon Contractor's schedule of outstanding and unresolved Claims as inclusive of any and all Claims Contractor is then on notice of, and Contractor's acceptance of payment in response to an Application for Payment shall constitute a waiver and release of any and all Claims not identified in Contractor's schedule of outstanding and unresolved Claims not identified in Contractor's schedule accompanying such Application for Payment. Contractor shall require that each Subcontractor waive and release any and all requests for change orders and claims the Subcontractor is on notice of at the time it submits its application for payment to Contractor and which is not identified in its application for payment by acceptance of payment from Contractor.

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

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits

funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work, but only to the extent authorized and approved by Owner in writing before such charges and expenses are incurred.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for

whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

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

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
 - 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
 - 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Unless otherwise stipulated in the Contract Documents, for Unit Price Work, Contractor shall be paid an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the actual quantity of each item as determined by the Engineer pursuant to paragraph 9.07. Variations between the actual quantity and the estimated quantity for items of Unit Price Work, including increases and decreases in quantities, as a result of any Change Orders, shall not serve as a basis for an adjustment in the unit price of the item.

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

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
1. If Owner is entitled to reimbursement or payment from Contractor under or pursuant to the Contract Documents, such payment shall be made promptly upon demand of Owner. Notwithstanding anything contained in the Contract Documents to the contrary, if Contractor fails to promptly make any payment due Owner, or Owner incurs any costs and expenses to cure any default of Contractor or to correct defective Work, Owner shall have an absolute right to offset such amount against the Contract Price and may, in Owner's sole discretion, elect either to (1) deduct an amount equal to that which Owner is entitled from any payment then or thereafter due Contractor from Owner, including payment of retainage, or (2) issue a written notice to Contractor reducing the Contract Price by an amount equal to that which Owner is entitled.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to new unit prices or a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

- c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
- e. where Work is deleted from the Contract prior to commencement of that Work without substitution of other similar Work, one hundred percent (100%) of the Contract cost attributable to the Work, plus a Contractor's markup of ten percent (10%) on the amount of deleted cost, shall be deducted from the Contract Price. However, in the event that material submittals have been approved and orders placed for said materials, a lesser amount equal to the greater of (i) one hundred percent (100%) of the Contract cost attributable to the deleted Work, minus reasonable order cancellation, material restocking, and similar fees, plus a Contractor's fee of five percent (5%) on the amount of deleted cost, or (ii) eighty percent (80%) of the Contract Price shall be deducted from the Contract Price. The credit to the Owner as a result of deletions in the work which results in a for reduced premiums on labor and material bonds, payment and performance bonds shall in all cases be one hundred percent (100%) of the reduction in premium. When both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.
- f. To the extent the Owner performs work as a result of any omission or breach of the Contractor, the Owner shall be entitled to an overhead mark-up consistent with the provisions set forth in this section.

12.02 *Change of Contract Times*

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

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times may be extended in an amount equal to the time lost due to such delay if a Claim is made therefore as provided in Paragraph 12.02.A and if the performance of the Work is not, was not, or would not have been delayed by any other cause for which the Contractor is not entitled to an extension of the Contract Times under the Contract Documents. Delays beyond the control of Contractor shall include, but not be

limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God. Contractor acknowledges and agrees that adjustments in the Contract Times will be permitted for a delay only to the extent such delay (i) is not caused, or could not have been anticipated, by Contractor; (ii) could not be limited or avoided by the Contractor's timely notice to Owner of the delay or reasonable likelihood that a delay will occur; and (iii) is of a duration not less than one day. In no event will claims for delay be allowed where alleged delays do not impact the critical path of the Contractor as demonstrated on the relevant schedule provided by the Contractor for the period of time in which the delay allegedly occurred.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
 1. If a claim is made as provided in Paragraph 12.03.A and this Paragraph 12.03.C for delay due to abnormal weather conditions, the time extension to be awarded to Contractor, if any, shall be calculated using the following standard baseline ("standard Baseline") of monthly anticipated adverse weather delay days for the project location, and extensions shall only be granted for days lost in any given month in excess of the number of days shown in the Standard Baseline for the same given month. The Standard baseline shall be regarded as the established normal and anticipatable number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline shall be included in the Contractor's scheduling of weather-dependent activities and shall not be eligible for extension of Contract Time.

Monthly Contract Allowance (MCA) in days												
Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Days	8	6	6	7	5	8	7	5	6	3	5	7

2. Adverse Weather is defined as the occurrence of one or more of the following conditions which prevents exterior construction activity or access to the site within twenty-four (24) hours:
 - a. Precipitation (rain, snow, and/or ice) in excess of two-tenths inch (0.20") liquid measure.

- b. Standing Snow in excess of one inch (1.00")
- 3. Adverse Weather may include, as deemed by Engineer, "dry-out" or "mud" days:
 - a. For rain days above the standard baseline,
 - b. Only if there is a hindrance to site access or site work such as earthwork; and,
 - c. At a rate no greater than one (1) make-up day for each day or consecutive days of rain beyond the standard baseline that total one inch (1.00") or more, liquid measure, unless specifically recommended otherwise by Engineer.
- 4. Actual adverse weather delay days must prevent work on critical exterior activities for fifty percent (50%) or more of Contractor's scheduled workday. The number of actual adverse weather delay days shall be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather days exceeds the number of days anticipated by the Standard Baseline in Paragraph 12.03.C.1, and providing that all other contractually-required conditions are met, qualifying delays will be converted to calendar days and additional calendar days will be added to the Contract times for each qualifying delay in excess of the Standard Baseline.
- 5. Upon commencement of on-site activities and continuing throughout construction, Contractor shall be responsible for accurately measuring and recording the daily the occurrence of adverse weather on-site.
- 6. Within 30 days of the last day of any month (hereinafter referred to as the "Reporting Month"), Contractor shall submit a written Adverse Weather Report, including copies of Contractor's daily weather reports and applicable climatological data from the National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location, unless Engineer allows an additional period of time for submission of said report. Notwithstanding any other provisions, failure to submit the required written report within the time specified above shall be deemed to be and shall constitute a waiver by Contractor of any and all claims for delay due to adverse weather conditions occurring during said Reporting Month.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project. Time extensions due to weather delay shall not entitle Contractor to any claim, compensation, or recovery for extended overhead.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.
- F. Contractor shall be liable to Owner and shall pay Owner for a percentage of all costs incurred by Owner and Engineer in investigating, analyzing, negotiating, arbitrating, and litigating any claim

against Owner or Engineer for costs or damages due to any alleged delaying or Contractor in the performance of the Work, which percentage shall be equal to the percentage of Contractor's total delay claim which is determined to be false or to have no basis in law or in fact.

- G. To the fullest extent permitted by law, and notwithstanding anything to the contrary in the Contract Documents, an extension of the Contract Time, to the extent permitted under Paragraph 12.02, shall be the sole remedy of Contractor for any (1) delay in the commencement, prosecution, or completion of the Work, (ii) hindrance or obstruction in the performance of the Work, (iii) loss of productivity, or (iv) other similar claims (collectively referred to in this Paragraph 12.03.G as "Delays" whether or not such Delays are foreseeable, unless a Delay is caused by acts of Owner constituting active interference with Contractor's performance of the Work, and only to the extent such acts continue after Contractor furnishes Owner with notice of such interference. In no event shall Contractor be entitled to any compensation with any Delay, including, without limitation, consequential damages, lost opportunity costs, impact damages, or other similar remuneration. Owner's exercise of any of its rights under the Contract Documents (including, without limitation, ordering changes in the Work, or directing suspension, rescheduling, or correction of the Work), regardless of the extent or frequency of Owner's exercise of such rights or remedies, shall not be construed as active interference with Contractor's performance of the Work.

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

13.01 Notice of Defects

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

13.02 Access to Work

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

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.
- G. Contractor shall be responsible for inspection of portions of the work already performed to determine that such portions are in proper condition to receive subsequent Work. Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the Work conforms strictly to the Contract requirements. Contractor shall keep full and detailed inspection records and Owner and Owner's authorized representatives shall be afforded access to, and shall be permitted to audit and copy, Contractor's inspection records relating to the Project., and Contractor shall preserve these records for a period of five years after final payment or for such longer period of time as may be required by law.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory

replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefore as provided in Paragraph 10.05.

- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefore as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others). Retesting which is necessary as a result of failed testing or defective work shall be at the Contractor's expense.
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- C. At any time during the progress of the Work and up to the date of final acceptance, the Engineer shall have the right to reject any Work that does not conform to the requirements of the Contract Documents, even though such Work has been previously inspected and paid for. Any omissions or failure on the part of the Engineer to disapprove or reject any Work or materials at the time of inspection shall not be construed as an acceptance of any defective Work or materials.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use

by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

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

If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefore as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

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

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.
- B. Detail Breakdown of Contract Amount: except in cases where unit prices form the basis for payment under the Contract, the Contractor shall, in accordance with Paragraph 2.07.3, submit a complete itemization of the Contract Amount showing the value assigned to each part of the work, including an allowance for profit and overhead. Upon approval of the itemization of the Contract Amount by the Engineer, it shall be used as the basis for all Applications for Payment.

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At the date established for each progress payment (but not more often than once a month), Contractor shall submit to the Engineer an Application for Payment for Work done and materials delivered and stored on the Site. Each Application for Payment shall be computed on the basis of Work completed on all items listed in the Detail Breakdown of Contract Amount (or on unit prices), less retainage. The Contractor shall furnish the Engineer and Owner all reasonable information required for obtaining the necessary data relative to the progress and execution of the Work. 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 another location agreed to in writing, the Application for Payment shall be accompanied by evidence that the materials and equipment are covered by appropriate property insurance, all of which must be satisfactory to the 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 shall be governed by N.C. General Statute Section 143-134.1.
4. Payment for Stored Materials and Equipment: The following conditions apply to payment for stored materials and equipment allowed by Article 14.02.A.1.:
 - a. Except in the instance of a material or equipment item that involves little or no installation cost, payment for stored materials or equipment shall not exceed fifty percent (50%) of the value of the item on the Schedule of Values (for lump sum contracts) or fifty percent (50%) of the value the pay item (for unit price contracts) that covers the materials or equipment being claimed. For material or equipment items that involve little or no installation cost, the percentage of the value of the item that will be paid for stored materials will be as agreed upon by the Engineer, Owner, and Contractor.

- b. Contractor shall submit paid invoices or releases of Lien from the materials and equipment suppliers with each Application for Payment containing a request for payment for that particular item of stored materials or equipment.
 - c. Payment for stored materials and equipment is generally intended to apply only to major materials and equipment items, as determined by the Engineer.
5. Each Application for Payment shall be accompanied by the following, all in form and substance in accordance with the Contract Documents and satisfactory to Owner:
- a. In accordance with Paragraph 10.05.F.2, a current schedule of outstanding and unresolved Contractor Claims;
 - b. A current Contractor's lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and Suppliers with whom contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for an Subcontractor and Supplier in the requested progress payment, and the amount to be paid to Contractor from such progress payment, together with similar sworn statements from all Subcontractors and Suppliers;
 - c. Duly executed waivers of mechanic's and material man's liens from all Subcontractors and, when appropriate, from Suppliers and lower tier subcontractors establishing payment or satisfaction of payment of all amounts requested by Contractor on behalf of such entities or persons in any previous Application for Payment; and
 - d. All information and materials required to comply with the requirements of the Contract Documents or reasonably requested by Owner or Engineer.
 - e. Contractor's social security number (if an independent contractor) or federal employer identification number (if a corporation, partnership, or proprietorship), as appropriate.
 - f. Contractor shall annotate the record copy of the Drawings to show all changes made each period as a condition for Engineer's recommendation of payment.
 - g. Contractor shall provide a certified sales tax statement with its pay application.
6. Contractor shall also comply with the following specific requirements:
- a. Title to all materials and equipment purchased by the Contractor for the Work shall pass to the Owner at the time Owner makes payment for such materials and equipment. The Contractor shall comply with any procedures established by the Owner to secure, evidence, or establish the Owner's title to such materials and equipment.
 - b. With each application for payment, Contractor shall submit to Owner a written list identifying each location where materials are stored off the Project site and the value of materials at each location. Contractor shall procure insurance satisfactory to Owner for materials stored off the Project site in an amount not less than the total value thereof.

- c. The consent of any surety shall be obtained to the extent required prior to payment for any materials stored off the Project site.
- d. Representatives of Owner and Owner's lender, if any, shall have the right to make inspections of the storage areas at any time.
- e. Such materials shall be: (1) protected from diversion, destruction, theft, and damage to the satisfaction of Owner and Owner's lender, if any; (2) specifically marked for use on the Project; and (3) segregated from other materials at the storage facility.

B. Review of Applications:

- 1. Engineer will, within 10 days after receipt of each complete Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
- 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
- 3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. That Engineer is legally liable or responsible for any defects in the Work performed by the Contractor; or
 - c. 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 Monies 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
 - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.
 - e. there are other items warranting a set-off against the amount requested by Contractor, including, but not by way of limitation, errors or overpayments on prior payments to Contractor.

C. Payment Becomes Due:

1. Within thirty (30) days after receipt of a Contractor's Request for Payment with Engineer's recommendation, the Owner shall:
 - a. Pay the Application for Payment as recommended by the Engineer.
 - b. Pay such other amount as Owner decides is due the Contractor, informing the Contractor and Engineer in writing stating the reasons for paying the amended amount.

- c. Withhold payment informing the Contractor and the Engineer of his reasons for withholding payment.

D. Reduction in Payment:

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

E. Other Payment to Contractor Provisions

1. Credit for Uncorrected Work: Should the Owner direct the Contractor to leave uncorrected Work that has been damaged or that was not performed in accordance with the Contract Documents, an equitable deduction from the Contract Amount shall be made to compensate the Owner for the Uncorrected Work.
2. Payment for Removal of Rejected Work and Materials: The removal of Work and materials rejected in accordance with paragraph 13.06.A of the Modified General Conditions and the re-execution of acceptable work by the Contractor shall be at the expense of the Contractor, and he shall pay the cost of replacing the Work of other contractors destroyed or damaged by

the removal of the rejected Work or materials and the subsequent replacement of acceptable Work.

- a. Removal by Owner: Removal of rejected Work or materials and storage of materials by the Owner, in accordance with paragraph 13.09.A of the Modified General Conditions, shall be paid by the Contractor within thirty (30) days after written notice to pay is given by the Owner. If the Contractor does not pay the expenses of such removal and after ten (10) days written notice being given by the Owner of his intent to sell the materials, the Owner may sell the materials at auction or at private sale and will pay the Contractor the net proceeds therefrom after deducting all the costs and expenses that should have been borne by the Contractor.

14.03 *Contractor's Warranty of Title*

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

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall review 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 therefore.
 1. If after the performance of such Substantial Completion Review, Engineer determines that the Work is not substantially complete, Contractor shall be liable to Owner for any and all costs and expenses (including, but not limited to, Engineers fees and expenses) incurred by the Owner as a result of each such failed review thereafter.. Contractor covenants and agrees that Owner may retain, deduct, and/or offset monies due to the Owner pursuant to this Paragraph 14.04.B.1 from monies due to Contractor under the Agreement. Contractor further covenants and agrees that Owner retains the right to make such deduction or offset at any time prior to and including final payment and that the imposition and the deduction and/or offset of such monies shall not be subject to any notice or claim provisions of the Contract Documents.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a proposed certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a proposed list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the proposed certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the proposed certificate to Owner, notify Contractor in writing, stating the reasons therefore. If, after consideration of Owner's objections, Engineer considers the Work substantially complete,

Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised list of items to be completed or corrected) reflecting such changes from the proposed certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the proposed certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the final certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

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

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is fully complete, inclusive of all requirements of the Contract, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.
1. If after the performance of such final completion inspection, Engineer determines that punch list items, site or project cleanup activities remain or the Work is otherwise not fully complete in accordance with all of the requirements of the Contract Documents, Contractor shall be liable to Owner for any and all costs and expenses (including, but not limited to, Engineer's fees and expenses) incurred by the Owner as a result thereof. Contractor covenants and agrees that Owner may retain, deduct, and/or offset Monies due to the Owner pursuant to this Paragraph 14.06.A.1 from Monies due to Contractor under the Agreement. Contractor further covenants and agrees that Owner retains the right to make such deduction or offset at any time prior to and including final payment and that the imposition and the deduction and/or offset of such Monies shall not be subject to any notice or claim provisions of the Contract Documents.

14.07 *Final Payment*

A. *Application for Payment:*

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

bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

4. Contractor must submit to the Engineer within thirty (30) days of the Final Completion date, all Maintenance and Operating Manuals, schedules, guarantees, equipment test reports, and record drawings noting all changes during construction. Failure to submit all items listed will give cause to the Engineer to deny final payment recommendation to the Owner.

B. Engineer's Review of Application and Acceptance:

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

C. Payment Becomes Due:

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

14.08 Final Completion Delayed

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

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

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

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

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

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's repeated disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient, including hiring contractors on any contractual basis including payment under a cost plus contract
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 10 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of Monies due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Owner may, at any time, terminate the contract in whole or in part for Owner's convenience and without cause. Termination by Owner under this Paragraph 15.03 shall be by a notice of termination prepared by the Owner and delivered to Contractor indicating intent to terminate for convenience and the effective date thereof.
1. (Intentionally deleted)
 2. (Intentionally deleted)
 3. (Intentionally deleted)
 4. (Intentionally deleted)
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

- C. Upon receipt of a notice of termination for convenience, Contractor shall immediately, in accordance with instruction from Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph 15.03.B:
1. Cease operations as specified in the notice;
 2. Place no further order and enter into no further subcontracts for materials, labor, services, or facilities except as necessary to complete continued portions of the Contract;
 3. Terminate all subcontracts and orders to the extent they relate to the Work terminated;
 4. Proceed to complete the performance of Work not terminated; and
 5. Take actions that may be necessary, or that Owner may direct, for the protection and preservation of the Work.
- D. Upon such termination, Contractor shall recover as its sole remedy payment of the percentage of the Contract Price equal to the percentage of the Work performed satisfactorily and not previously paid for as determined by the Engineer. Contractor hereby waives and forfeits all other claims for payment and damages, including, without limitation, anticipated profits or revenue or other economic loss arising out of or resulting from such termination.
- E. Owner shall be credited for:
1. Payments previously made to Contractor for the terminated portion of the Work;
 2. Claims which Owner has against Contractor under the contract; and
 3. The value of the materials, supplies, equipment, or other items that are to be disposed of by contractor that are part of the Contract Price.

15.04 *Contractor May Stop Work or Terminate*

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

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

If this project is a State Construction Project and/or for a public Owner, Dispute Resolution shall be governed by RULES IMPLEMENTING MEDIATED SETTLEMENT CONFERENCES IN NORTH CAROLINA PUBLIC CONSTRUCTION PROJECTS adopted February 26, 2002.

If the project is a private project, Dispute Resolution shall be as follows:

- A. Either Owner or Contractor, when mutually agreed to by both parties, may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the North Carolina Rules of Mediated Settlement Conferences then in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the Engineer and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
 1. Files for Arbitration in accordance with the N.C. Arbitration Act, which arbitration shall be governed by the current Construction Arbitration rules of the American Arbitration Association; or
 2. Agrees with the other party to submit the Claim to another dispute resolution process;

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

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

17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

MEET NORTH CAROLINA ONE-CALL CENTER

North Carolina One-Call is a Corporation formed and funded by participating utility companies and municipalities in the interest of community and job safety and improved service through damage reduction to the utilities.

A one call toll free number, **1-800-632-4949**, provides an avenue to all of the participating members from any point within the State of North Carolina.

Anyone proposing to excavate, dig, bore, tunnel, blast or disturb the earth in any manner in which buried utilities may be damaged is requested to call the toll-free number between the hours of 7:00 a.m. and 5:00 p.m., Monday through Friday, forty-eight hours before starting the proposed work.

Within minutes of your telephone call, the participating members will be made aware of your plans and will be given pertinent information that has been provided by you about your planned work. You will be told the names of the participating members from whom you can expect a response. If there are buried facilities in the path of your activity, the route of the utilities will be staked and/or marked at no expense to you. If there are no facilities in the area of the planned work, you will be called or notified by a representative of the participating company accordingly.

Should a non-participating utility operator be serving your area, we recommend that you call them on an individual basis. All utility operators, whether company or municipality, will be provided an opportunity to become a member of North Carolina One-Call.

Naturally, knowing the route of the utilities, the excavator is expected to exercise caution and to avoid damage as the project progresses.

Damage prevention doesn't just happen - it is a planned and orderly process through which each of us can participate - **Yes, we can and will dramatically reduce damages to the utilities in the State of North Carolina! Thanks for your help.**

BEFORE YOU DIG

IN THE INTEREST OF COMMUNITY AND JOB SAFETY

AND IMPROVED SERVICE

CALL NORTH CAROLINA ONE-CALL

1-800-632-4949



Contractor's Application for Payment No. _____

	Application Period:	Application Date:
To _____ (Owner): Town of Kernersville	From (Contractor):	Via (Engineer):
Project: Founder's Park	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.: 17.01701

Application For Payment Change Order Summary

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

1. ORIGINAL CONTRACT PRICE..... \$ _____

2. Net change by Change Orders..... \$ _____

3. Current Contract Price (Line 1 ± 2)..... \$ _____

4. TOTAL COMPLETED AND STORED TO DATE
(Column F total on Progress Estimates)..... \$ _____

5. RETAINAGE:

a. X _____ Work Completed..... \$ _____

b. X _____ Stored Material..... \$ _____

c. Total Retainage (Line 5.a + Line 5.b)..... \$ _____

6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)..... \$ _____

7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)..... \$ _____

8. AMOUNT DUE THIS APPLICATION..... \$ _____

9. BALANCE TO FINISH, PLUS RETAINAGE
(Column G total on Progress Estimates + Line 5.c above)..... \$ _____

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

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

is recommended by: _____
(Engineer) (Date)

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

is approved by: _____
(Owner) (Date)

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

Work Change Directive

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Founder's Park	Owner: Town of Kernersville	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

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

Item No.	Description

Attachments (list documents supporting change):

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- ☐ Nonagreement on pricing of proposed change.
- ☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \$ _____ (increase/decrease) Contract Time _____ (increase/decrease)
days

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Founder's Park	Owner: Town of Kernersville	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 17.01701

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

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:

Original Contract Price:

\$ _____

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

\$ _____

Contract Price prior to this Change Order:

\$ _____

[Increase] [Decrease] of this Change Order:

\$ _____

Contract Price incorporating this Change

\$ _____

CHANGE IN CONTRACT TIMES:

Original Contract Times: ☐ Working ☐ Calendar days

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

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

Substantial completion (days): _____

Ready for final payment (days): _____

Contract Times prior to this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

[Increase] [Decrease] of this Change Order:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

Contract Times with all approved Change Orders:

Substantial completion (days or date): _____

Ready for final payment (days or date): _____

RECOMMENDED:

By: _____
Engineer (Authorized Signature)

Date: _____

Approved by Funding Agency (if applicable):

ACCEPTED:

By: _____
Owner (Authorized Signature)

Date: _____

ACCEPTED:

By: _____
Contractor (Authorized Signature)

Date: _____

Date: _____

Change Order

Instructions

A. GENERAL INFORMATION

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

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

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

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

B. COMPLETING THE CHANGE ORDER FORM

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

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

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

Field Order
No. _____

Date of Issuance: _____ Effective Date: _____

Project: Founder's Park	Owner: Town of Kernersville	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 17.01701

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

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

Description:

Attachments:

Engineer:

Receipt Acknowledged by Contractor:	Date:
-------------------------------------	-------

Copy to Owner

Certificate of Substantial Completion

Project: Founder's Park

Owner: Town of Kernersville

Owner's Contract No.:

Contract:

Engineer's Project No.:17.01701

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

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

Date of Substantial Completion

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

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

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

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

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

Executed by Engineer

Date

Accepted by Contractor

Date

Accepted by Owner

Date

AFFIDAVIT of COMPLIANCE

With N.C. E-Verify Statutes

STATE OF NORTH CAROLINA

I, _____ (hereinafter the "Affiant"), duly authorized by and on behalf of _____ (hereinafter the "Employer") after being first duly sworn deposes and says as follows:

1. I am the _____ (President, Manager, CEO, etc.) of the Employer and possess the full authority to speak for and on behalf of the Employer identified above.

2. Employer understands that "E-Verify" means the federal E-Verify program operated by the United States Dept. of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law.

3. _____ Employer employs 25 or more employees in the State of North Carolina, and is in compliance with the provisions of N.C. Gen. Stat. §64-26. Employer has verified the work authorization of its employees through E-Verify and shall retain the records of verification for a period of at least one year.

_____ Employer employs fewer than 25 Employees and is therefore not subject to the provisions of N.C. Gen. Stat. §64-26.

4. All subcontractors engaged by or to be engaged by Employer have or will have likewise complied with the provisions of N.C. Gen. Stat. §64-26.

5. Employer shall keep the Town of Blowing Rock informed of any change in its status pursuant to Article 2 of Chapter 64 of the North Carolina General Statutes.

Further this affiant sayeth not.

This the ____ day of _____, 20____.

Affiant _____

STATE OF NORTH CAROLINA

COUNTY OF _____

Sworn to and subscribed before me, this the ____ day of _____, 20____ .

[SEAL]

Notary Public

My commission expires: _____

NON-COLLUSION AFFIDAVIT, DEBARMENT CERTIFICATION AND GIFT BAN CERTIFICATION

CORPORATION

The prequalified bidder being duly sworn, solemnly swears (or affirms) that neither he, nor any official, agent or employee has entered into any agreement, participated in any collusion, or otherwise taken any action which is in restraint of free competitive bidding in connection with any bid or contract, and that the prequalified bidder intends to do the work with his own bonafide employees or subcontractors and will not bid for the benefit of another contractor.

By submitting this non-collusion affidavit, the Contractor is certifying his status under penalty of perjury under the laws of the United States in accordance with the Debarment Certification attached, provided that the Debarment Certification also includes any required statements concerning exceptions that are applicable.

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

SIGNATURE OF PREQUALIFIED BIDDER

Full name of Corporation

Address as Prequalified

Attest _____

Secretary/Assistant Secretary
Select appropriate title

By _____

President/Vice President/Assistant Vice President
Select appropriate title

Print or type Signer's name

Print or type Signer's name

CORPORATE SEAL

AFFIDAVIT MUST BE NOTARIZED

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

Signature of Notary Public
of _____ County
State of _____
My Commission Expires: _____

NOTARY SEAL

DEBARMENT CERTIFICATION OF PREQUALIFIED BIDDER

Conditions for certification:

1. The prequalified bidder shall provide immediate written notice to the Department if at any time the bidder learns that his certification was erroneous when he submitted his debarment certification or explanation that is file with the Department, or has become erroneous because of changed circumstances.
2. The terms *covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded*, as used in this provision, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. A copy of the Federal Rules requiring this certification and detailing the definitions and coverages may be obtained from the Contract Officer of the Department.
3. The prequalified bidder agrees by submitting this form, that he will not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in NCDOT contracts, unless authorized by the Department.
4. For Federal Aid projects, the prequalified bidder further agrees that by submitting this form he will include the Federal-Aid Provision titled *Required Contract Provisions Federal-Aid Construction Contract (Form FHWA PR 1273)* provided by the Department, without subsequent modification, in all lower tier covered transactions.
5. The prequalified bidder may rely upon a certification of a participant in a lower tier covered transaction that he is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless he knows that the certification is erroneous. The bidder may decide the method and frequency by which he will determine the eligibility of his subcontractors.
6. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this provision. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
7. Except as authorized in paragraph 6 herein, the Department may terminate any contract if the bidder knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available by the Federal Government.

DEBARMENT CERTIFICATION

The prequalified bidder certifies to the best of his knowledge and belief, that he and his principals:

- a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b. Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records; making false statements; or receiving stolen property;
- c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph b. of this certification; and
- d. Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- e. Will submit a revised Debarment Certification immediately if his status changes and will show in his bid proposal an explanation for the change in status.

If the prequalified bidder cannot certify that he is not debarred, he shall provide an explanation with this submittal. An explanation will not necessarily result in denial of participation in a contract.

Failure to submit a non-collusion affidavit and debarment certification will result in the prequalified bidder's bid being considered non-responsive.

☐ Check here if an explanation is attached to this certification.

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 - 1. Division 01 Section "Alternates" for products selected under an alternate.
 - 2. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 3. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor and/or Owner.

1.4 SUBMITTALS

- A. Substitution Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to Engineer.
2. Documentation: Show compliance with substitution requirements contained in the Modified General Conditions.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation of a request for substitution. Engineer will promptly notify Contractor of acceptance or rejection of proposed substitution.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time necessary to avoid delay.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change.
 1. Conditions: Engineer will consider Contractor's request for substitution when the conditions described in the Modified General Conditions are satisfied. If those conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
- B. Substitutions for Convenience: Engineer will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Engineer.
 1. Conditions: Engineer will consider Contractor's request for substitution when the conditions described in the Modified General Conditions are

satisfied. If those conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections:
 - 1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

- b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Engineer.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Engineer.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: Refer to Division 01 Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit Price Adjustment: Refer to Division 01 Section "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor.

1.7 WORK CHANGE DIRECTIVE

- A. Work Change Directive: Engineer may issue a Work Change Directive. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
 - 4. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. A cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the Schedule of Values.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's Construction Schedule.

2. Submit the Schedule of Values to Engineer at earliest possible date but no later than 7 days prior to the date scheduled for submittal of the initial Applications for Payment.
 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values correlated with each element.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Dollar value as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal contract amounts as appropriate which include separate costs for items such as shop drawings, and project closeout items such as, but not limited to demobilization, project restoration and final cleanup, furnishing Operation and Maintenance manuals, punch list activities, equipment demonstration, operator training and Project Record Documents.
 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place shall be proportionately applied to other line items in the Schedule of Values.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Progress payments shall be submitted to Engineer by a specific day of the month to be established at the pre-construction conference. The period covered by each Application for Payment is one month, ending on the specific day of the month that is established at the pre-construction conference.
- C. Application for Payment Forms: Use forms provided in Contract Documents.
- D. Application Preparation: Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts for all work completed since the previous Application for Payment by including amounts for all work completed on the project and subtracting those quantities included on previous Applications for Payment. Include only amounts for work completed through the cut-off date established at the pre-construction conference.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Materials previously stored and included in previous Applications for Payment.
 - b. Work completed for this Application utilizing previously stored materials.
 - c. Additional materials stored with this Application.
 - d. Total materials remaining stored, including materials with this Application.
 4. Reimbursement for stored materials shall not exceed 50 percent of the unit price bid for the associated line item or as shown in the Schedule of Values for that portion of the work, unless otherwise agreed upon by the Engineer and Owner .
- F. Retainage: The Owner may retain a portion of the amount otherwise due the Contractor. Except as provided elsewhere, the amount retained by the Owner shall be limited to the following:
1. Withholding of not more than 5 percent of the payment claimed until work is 50 percent complete.
 2. When the contract is 50 percent complete no further retainage shall be withheld from periodic payments. However, the Owner may reinstate retainage (up to 5 percent) if they feel the work is unsatisfactory. The Owner may withhold additional retainage as necessary from periodic payments in a sum necessary to maintain total retainage of 2.5 percent of contract cost through the completion of the project.

3. When the work is substantially complete (operational or beneficial occupancy), the withheld amount shall be further reduced below 5 percent to only that amount necessary to assure completion.
 4. The Owner may accept securities negotiable without recourse, conditions or restrictions, a release of retainage bond or an irrevocable letter of credit provided by the Contractor in lieu of all or part of the cash retainage.
- G. For unit price projects, the Contractor may use the "Progress Estimate – Unit Price Work" form included with the Contract Documents, or a similar form that provides the required information.
- H. Sales Tax Statement: When requested by the Owner, each request for progress payment submitted by the Contractor shall include a sales tax reimbursement statement. The Contractor shall utilize the form provided with the Contract Documents, or a similar form that provides the required information and certification.
- I. Transmittal: Submit three (3) signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- J. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- K. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's construction schedule.
 4. Sales tax statement (as necessary)

5. Combined Contractor's construction schedule incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 6. Products list.
 7. Schedule of unit prices.
 8. Submittal schedule.
 9. List of Contractor's staff assignments.
 10. List of Contractor's principal consultants.
 11. Copies of building permits.
 12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 13. Any other requirements described in the Modified General Conditions of the Contract.
- L. Progress Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of each Progress Application for Payment include the following:
1. Updated Schedule of Values.
 2. Updated Contractor's construction schedule.
 3. Sales tax statements (as necessary).
 4. Certified payroll statements (as necessary).
 5. Summary of stored materials.
 6. Any other requirements described in the Modified General Conditions of the Contract.
- M. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
 3. Any other requirements described in the Modified General Conditions of the Contract.
- N. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.

3. Updated final statement, accounting for final changes to the Contract Sum (Final Adjusting Change Order issued by Engineer).
4. Contractor's Affidavit of Release of Liens.
5. Consent of Surety to Final Payment.
6. Evidence that claims have been settled.
7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
8. Final liquidated damages settlement statement.
9. Record Documents.
10. General warranty letter.
11. Sales tax statements (as necessary).
12. Any other requirements described in the Modified General Conditions of the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination drawings.
 - 4. Requests for Information (RFIs).
 - 5. Project meetings.
- B. Related Sections:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Division 01 Section "Execution Requirements" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.
 - 4. Division 01 Section "General Commissioning Requirements" for coordinating the Work with Owner's commissioning authority.

1.3 DEFINITIONS

- A. RFI (Request for Information): Request from Contractor seeking information and clarification from the Engineer during construction.

1.4 COORDINATION

- A. Coordination: The Contractor shall coordinate its construction operations with those of others to ensure efficient and orderly installation of each part of the Work. The Contractor shall be responsible for the coordination of each of their

subcontractors' schedules. Contractor and each subcontractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Startup and adjustment of systems.
 8. Project closeout activities.

1.5 KEY PERSONNEL

- A. Key Personnel Names: Within 15 days after the Notice to Proceed date, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Make copies of list available on site at all times for Owner's and Engineer's use and keep list current at all times.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings in accordance with requirements in individual Sections, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately upon discovery of the need for additional information, interpretation, or clarification of the Contract Documents, Contractor shall prepare and submit an RFI.
 1. RFIs shall originate with Contractor. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.

2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name, including Owner.
 2. Date.
 3. Name of Contractor.
 4. Name of Engineer.
 5. RFI number, numbered sequentially.
 6. RFI subject.
 7. Specification Section number and title and related paragraphs, as appropriate.
 8. Drawing number and detail references, as appropriate.
 9. Field dimensions and conditions, as appropriate.
 10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 11. Contractor's signature.
 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form acceptable to Engineer.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven (7) working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Engineer's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.

3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.
- E. Upon receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven (7) days if Contractor disagrees with response.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Contractor shall be prepared to discuss the log and the status of pending RFIs at all Progress or Coordination Meetings.
- G. Improper or Frivolous RFI: Improper and/or Frivolous RFI's shall be defined as RFI's that request information that is clearly indicated on or reasonably inferable from Contract Documents.
 1. Will be returned unanswered, will be removed from the Contractor's RFI log, and the number assigned will be assigned to subsequent RFI.
 2. At the Contractor's request, after notification by Engineer that a RFI is improper or frivolous, the RFI will be processed with processing costs charged to Contractor as follows:
 - a. The Contractor shall reimburse the Owner for the Engineer's account for time spent in processing improper or frivolous RFI's at the rate of the Engineer's current standard hourly fee schedule for personnel and associated expenses.

1.8 PROJECT MEETINGS

- A. General: Engineer will schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Engineer will record significant discussions and agreements achieved and distribute the meeting minutes to everyone concerned, including Owner and Contractor.

- B. Preconstruction Conference: Engineer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress of the work.
 4. Minutes: Engineer will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Contractor shall advise Engineer of potential scheduled meeting dates. Engineering will coordinate with Owner and respond with acceptable meeting date and time.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Engineer will conduct progress meetings on a monthly basis or as necessary.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity involved with current progress or planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Topics for discussion at these meetings will be determined as necessary based on the status of Project including, but limited to:
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present.
 4. Minutes: Engineer will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Engineer will conduct Project Coordination meetings as necessary. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous Coordination Meeting. Review other items of significance that could affect progress. Topics for discussion at these meetings will be determined as necessary based on the status of Project.
 3. Contractor's Construction Schedule: Review progress since the last Coordination Meeting. Determine whether contract is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether

schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- a. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
4. Reporting: Engineer shall record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- F. Project Closeout Conference: Engineer shall schedule and conduct a Project Closeout Conference, at a time convenient to Owner and Contractor, prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals schedule.
 - 3. Field condition reports.
 - 4. Start-up construction schedule.
 - 5. Special reports.
- B. Related Sections:
 - 1. Division 1 Section "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section "Submittal Procedures" for submitting schedules and reports.
 - 4. Division 1 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.

- 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Engineer.
- C. CPM: Critical Path Method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of the Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.
- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date. No claims shall arise from the use of float by either party.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

- A. Format for Submittals: Submit indicated submittals in accordance with Section 013300.
- B. Construction Schedule: Initial schedule, of size required to legibly display entire schedule for entire construction period.
- C. Submittals Schedule: Arrange the following information in a tabular format:
 - 1. Scheduled date for initial submittals.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Description of the Work covered.

- 5. Scheduled date for Engineer's final release or approval.
- D. Field Condition Reports: Submit at time of discovery of differing conditions.
- E. Start-up construction schedule.
 - 1. Approval of cost-loaded start-up construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- F. Special Reports: Submit at time of unusual event.

1.5 COORDINATION

- A. Contractor shall coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of subcontractors.
- B. Contractor shall coordinate Construction Schedule with the Schedule of Values, subcontractors, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM METHOD)

- A. CPM Schedule: Prepare Contractor's construction schedule using a cost-loaded, time-scaled CPM network analysis diagram for the Work.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each aspect of the work as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities such that no activity is longer than 20 days, unless specifically allowed by Engineer.

2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Construction Schedule with submittal schedule.
 4. Startup and Testing Time: Within the Construction Schedule, include an appropriate number of days for startup and testing based on the scope of the project.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include not more than 30 days for punch list and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Work Restrictions: Construction Schedule shall account for and show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial use/occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Seasonal variation/restrictions.
 - g. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.

- c. Purchases.
 - d. Fabrication.
 - e. Sample testing.
 - f. Deliveries.
 - g. Installation.
 - h. Tests and inspections.
 - i. Adjusting.
 - j. Curing.
 - k. Startup and placement into final use and operation.
- 7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for items including, but no limited to the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, Final Completion and other project-specific milestones.
- F. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
 - 1. Refer to Division 01 Section "Payment Procedures" for cost reporting and payment procedures.
- G. Upcoming Work Summary: At monthly intervals, prepare a summary report indicating activities scheduled to occur or commence prior to submittal of the next schedule update. Summarize the following:
 - 1. Unresolved issues.
 - 2. Unanswered RFIs.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
- H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

- I. Computer Scheduling Software: Prepare schedules using a software program that has been developed specifically to manage construction schedules.

2.2 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by Progress schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Progress Schedule.
 2. Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.3 FIELD CONDITION REPORTS

- A. Immediately upon discovery of a difference between field conditions and the Contract Documents, notify Engineer to discuss these differences. Based on those conversations, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 START-UP CONSTRUCTION SCHEDULE

- A. In conjunction with the initial submittal of a Construction Schedule, submit an equipment start-up schedule which includes information detailing the start-up of each piece of equipment on the Project.

2.5 SPECIAL REPORTS

- A. General: Submit special reports to Engineer within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Engineer in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue updated schedule one week prior to each regularly scheduled progress meeting or prior to submission of Application for Payment.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, Owner, subcontractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
 - 4. Preconstruction video recordings.
 - 5. Periodic construction video recordings.
- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures" for submitting photographic documentation.
 - 2. Division 01 Section "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
 - 3. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
 - 4. Division 02 Section "Demolition" for photographic documentation before building demolition operations commence.
 - 5. Division 31 Section "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 COSTS

- A. The cost for photographic documentation services shall be considered incidental to the work and shall be included in the bid. No separate payment will be made for photographic documentation.

1.4 INFORMATIONAL SUBMITTALS

- A. Construction Photographs: Submit two (2) copies of each photographic view within seven (7) days of taking photographs.
 - 1. Format: Submit all photographs in a digital format acceptable to Engineer on a CD.
 - 2. Identification: Each CD shall be labeled with the following information:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date(s) photographs were taken.
 - 3. The digital file for each photograph shall include the following:
 - a. Date stamp by camera.
 - b. File names indicative of the description of the photographs.
 - c. Unique sequential identifier (as necessary).
- B. Video Recordings: Submit video recordings within seven (7) days of recording.
 - 1. Submit video recordings in digital video disc format acceptable to Engineer.
 - 2. Identification: With each submittal, provide the following information:
 - a. Name of Project.
 - b. Name of Contractor.
 - c. Date video recording was recorded.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - e. Weather conditions at time of recording.
 - 3. The digital file for each video shall include the following:
 - a. Date stamp by video camera.
 - b. File names indicative of the description of the videos.
 - c. Unique sequential identifier (as necessary).

1.5 USAGE RIGHTS

- A. Contractor shall transfer copyright usage rights to Owner for unlimited reproduction of photographic documentation.

PART 2 - PRODUCTS

2.1 PHOTOGRAPHIC MEDIA

- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 1600 by 1200 pixels and 300 dpi.
- B. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to Engineer.

PART 3 - EXECUTION

3.1 CONSTRUCTION PHOTOGRAPHS

- A. General: 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. Digital Images: 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. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Engineer.
- C. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Engineer.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take photographs necessary to show existing conditions adjacent to property before starting the Work.
 - 3. Take photographs of existing buildings either on or adjoining property as necessary 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 monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage

points to show status of construction and progress since last photographs were taken.

- E. Engineer-Directed Construction Photographs: From time to time, Engineer will instruct Contractor about number and frequency of photographs and general directions on vantage points. Select actual vantage points and take photographs to show the status of construction and progress since last photographs were taken.
- F. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as project record documents. Engineer will inform Contractor of desired vantage points.
- G. Additional Photographs: Engineer may request photographs in addition to periodic photographs specified.
 - 1. Three days' notice will be given, where feasible.
 - 2. In emergency situations, take additional photographs within 24 hours of request.
 - 3. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.
 - f. Owner's request for special publicity photographs.

3.2 CONSTRUCTION VIDEO RECORDINGS

- A. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of construction. Display continuous running time and date. At start of each video recording, record weather conditions from local newspaper or television and the actual temperature reading at Project site.
- B. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 - 1. Confirm date and time at beginning and end of recording.

2. Begin each video recording with name of Project, Contractor's name, and Project location.
- C. Preconstruction Video Recording: Before starting construction, record video recording of Project site and surrounding properties from different vantage points, as directed by Engineer.
1. Flag construction limits before recording construction video recordings.
 2. Show existing conditions adjacent to Project site before starting the Work.
 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of construction.
 4. Show protection efforts by Contractor.
- D. Periodic Construction Video Recordings: Record video recording monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last video recordings were recorded.

END OF SECTION 013233

PART 1 - GENERAL**1.1 REQUIREMENTS**

- A. This section specifies the methods and requirements for the submissions applicable to Shop drawings, Working drawings, Product data, Samples, Request for substitutions, Test procedures, and Construction and Submittal schedules. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Specification Sections, apply to this Section.
- B. All submittals shall be clearly identified by reference to the Specification Section, Paragraph, Drawing number, or Detail as applicable.
- C. All submittals shall be submitted by the Contractor and the Contractor shall be solely responsible for the coordination and management of all submittals. No submittals received directly from material/equipment suppliers or subcontractors will be accepted unless otherwise agreed upon by all parties. The Engineer's review comments and markup submittals will be returned to the Contractor who shall promptly coordinate and return the comments and markup submittals to the appropriate parties.
- D. The Contractor shall submit to the Engineer a detailed submittal schedule in accordance with the Modified General Conditions.
- E. The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, and method of work shall be as described in the submittal. Submittal documents shall be edited to clearly show only those items to be included in the contract. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall be solely responsible for the coordination of submittals so that work will not be delayed. Different categories of submittals shall be scheduled so that one will not be delayed for lack of coordination or approval of another. No extensions of time will be allowed because of failure to properly schedule or manage submittals.

1.2 SUMMARY

- A. Related Sections:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals or those inferred by the work shown on the drawings or detailed in the project documents.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.
- E. Time/Days: Where days are referenced as a measurement of time the unit shall be calendar days.

1.4 SUBMITTALS SCHEDULE

- A. Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Engineer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action, informational.
 - d. Name of subcontractor, if applicable.
 - e. Description of the Work covered.
 - f. Scheduled date for Engineer's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled dates for installation.
 - i. Activity or event number from Construction Schedule.
- B. Submit revised submittal schedule as necessary to reflect changes in current status and timing for submittals.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic copies of the Contract Drawings and project specifications may be provided by Engineer for Contractor's use in preparing submittals only if detailed in other Sections of the Contract Documents. In cases where Engineer provides electronic copies of these documents, Engineer makes no representations as to the accuracy or completeness of digital data files as they relate to the Contract Drawings. Please refer to the Modified General Conditions for more details regarding the use of the Engineer's digital data files.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
- C. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Based on the complexity of the submittal, allow 7 to 21 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Based on the complexity of the submittal, allow 7 to 21 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Engineer's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- E. Each submittal shall be accompanied by the transmittal cover contained in this section. The cover sheet shall be printed in a bright unique color of paper (color selected per project) and affixed to paper copies of each submittal. The information required for each submittal is contained on the cover sheet and shall be furnished for each submittal.
- F. Submittal Identification Number: A unique four (4) character number shall be assigned by the Contractor and shall be noted on the transmittal cover sheet accompanying each submittal. Submittal numbers shall have the following format:
1. The first character shall be a SD, W, S, or M, which represents Shop Drawing Data (SD), Working Drawing (W), Sample (S), or Operating/Maintenance Manual (M).
 2. The next digits shall be the specification section number.
 3. The next digits shall be a three digit number (001 – 999) assigned to sequentially number each submittal.
 4. The last character is a letter, A-Z, indicating the submission, or resubmission of the same data, i.e., A – 1st submittal, B- 2nd submittal, etc.

5. A typical submittal number would be:

SD-15800-013-A

where:

SD = shop drawing

15800 = technical specification section 15800

013 = contractor's submittal number 013

A = 1st submittal

- G. Deviations: All deviations from the Contract Documents shall be identified on submittals.
- H. Paper and Electronic Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- I. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Engineer will discard submittals received from sources other than Contractor.
- J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Engineer.
- K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- L. Use for Construction: Use only final submittals that are marked with approval notation from Engineer.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submittals: Submit two (2) paper copies and one electronic copy in a PDF format of each submittal, unless otherwise indicated. Engineer will return one (1) copy.
 2. All submittals shall include a copy of the specification section, with addendum updates included, and all referenced and applicable sections, and each paragraph shall be check-marked to indicate that the submitted material is in compliance with the specification or marked to indicate requested deviations from the specified requirements. If deviations are noted and/or requested each deviation shall be underlined and denoted by a number in the margin to the right with a detailed description of the deviation on a separate sheet.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. Mark each copy of each submittal to show which products and options are applicable.
 2. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance or variations with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 3. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 4. Submit Product Data before or concurrent with Samples.
 5. Submit Product Data in the following format:
 - a. Submit two (2) paper copies and one electronic copy in a PDF format of each submittal, unless otherwise indicated. Engineer will return one (1) copy.

- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance and variation with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 24 by 36 inches.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit 2 full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return one (1) submittal with options selected.
- E. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Documentation."
- F. Application for Payment: Comply with requirements specified in Division 01 Section "Payment Procedures."
- G. Schedule of Values: Comply with requirements specified in Division 01 Section "Payment Procedures."
- H. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment. Include the following information in tabular form:
 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
 4. Submit subcontract list in the following format:
 - a. Submit two (2) paper copies and one electronic copy in a PDF format, unless otherwise indicated.
- I. Coordination Drawings: Comply with requirements specified in Division 01 Section "Project Management and Coordination."
- J. Equipment Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that the manufacturer has reviewed the Contract drawings and specifications, including all addendums, and that the equipment and related accessories included in the shop drawing submittal are suitable for installation in the applications proposed for the project. Include evidence of manufacturing experience where required.
- K. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- L. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and

regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit two (2) paper copies and one electronic copy in a PDF format of design documents, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, design calculations and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01 Section "Closeout Procedures."
- C. Submittal Transmittal: Contractor shall include with each submittal a transmittal form as contained at the end of this section. Include all information required by the form including Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 **ENGINEER'S ACTION**

- A. Engineer will not review submittals that do not bear required cover sheet and ***Contractor's approval and signature*** and will return them without action.
- B. Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. The transmittal form included in this section contains a copy of the review stamp to be completed by the Engineer. The Engineer will complete the stamp for each submittal and will mark stamp appropriately to indicate action.
- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.
- F. Submittals will be returned to the Contractor under one of the following codes.

Code 1 – FURNISH AS SUBMITTED, No Exceptions – The review indicates that the material, equipment or work method complies with the project documents. In this event the contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

Code 2 – FURNISH AS SUBMITTED, Make corrections noted – The review indicates that there are limited corrections required for the material, equipment or work method. In this event the contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal in accordance with the noted corrections.

Code 3 – NOT APPROVED (See Notes), Revise and resubmit – The review indicates that the submittal is insufficient or contains incorrect data, copies or other information. Except at his own risk, the Contractor shall not undertake work covered by this submittal until such time as it is revised and meets the requirements of code 1 or 2.

Code 4 – NOT APPROVED, Rejected – The review indicates that the submittal does not comply with the project documents and is unacceptable for incorporation into the project. Except at his own risk, the Contractor shall not undertake work covered by this submittal until such time as it is revised and meets the requirements of code 1 or 2.

Code 5 – Receipt Acknowledged – The review indicates that the material is for information purposes only and the Engineer has taken no action as none is required.

3.3 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. The Engineer's review of submittal information provided by the Contractor based upon his review of the drawings, specifications, other project documents and proposed methods of work or information regarding materials or equipment shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liability by the Owner or the Engineer, or by any officer or employee thereof, and the Contractor shall have no claim under the contract on the account of the failure, or partial failure, of the method of work, material, or equipment so reviewed. A mark of "No Exceptions" or "Make Corrections Noted" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

3.4 COSTS FOR REVIEW OF RESUBMITTALS

- A. The Contractor shall be responsible for the completeness of each submittal and identifying deviations from the project requirements. Any submittal that may require more than two (2) reviews by the Engineer shall be assessed a review charge for time spent in processing shop drawings at the rate of the Engineer's current standard hourly fee schedule for personnel assigned to the shop drawing review and associated expenses. This charge, covering the cost of engineering and administration, shall be assessed against progress payments.

3.5 SUBMITTAL LOG

- A. Prepare, maintain, and submit a tabular log of submittals organized by the submittal number. Contractor shall be prepared to discuss the log and the status of pending submittals at all Progress or Coordination Meetings.

3.6 CONTRACTOR'S APPROVAL COVER SHEET

- A. To be printed on a bright unique color of paper selected for this project and used to designate a Shop Drawing or Informational Submittal and permanently attached or made a part of each submittal.

3.7 ENGINEER'S APPROVAL COVER SHEET

To be attached to each submittal.

CONTRACTOR'S SUBMITTAL TRANSMITTAL
Submittal # _____

McGILL ASSOCIATES, P.A.

OWNER: _____

- ☐ 55 Broad Street, Asheville, NC 28801
☐ 1240 19th Street Lane NW, Hickory, NC 28601
☐ 118 Mabry Hood Road, Suite 400, Knoxville, TN 37922
☐ 5 Regional Circle, Suite A, Pinehurst, NC 28374

ADDRESS: _____

Date:	Engineer's Project No:
Project:	Spec. Reference:
Contractor:	Drawing Reference:

TO:	CONTRACTOR'S SUBMITTAL NO: (Check One): <input type="checkbox"/> An Original Submittal <input type="checkbox"/> A 2 nd Submittal of (original Submittal No.) <input type="checkbox"/> A _____ Submittal of (original Submittal No.) <input type="checkbox"/> Product Data for Information Only <input type="checkbox"/> An O&M Submittal for Information Only
ATTN: FROM:	

Item #	Subject of Submittal / Equipment Supplier	Equipment Designations(s) / Specification Section(s):

Complete Either (a) or (b) below:

- ☐ (a) We have verified that the material, equipment or other information contained in this submittal meets all the requirements specified or shown (no exceptions).
- ☐ (b) We have verified that the material, equipment or other information contained in this submittal meets all the requirements specified or shown, except for the following deviations (list deviations):

Notes/Comments:

By this submittal, I hereby represent that I have determined and verified all field measurements and dimensions, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable shop drawings, equipment, trades and all Contract requirements.

Signature of Contractor's Authorized Representative

Date

SHOP DRAWING REVIEW

ENGINEER'S REVIEW	RESPONSE REQUIRED OF CONTRACTOR
<input type="checkbox"/> Furnish As Submitted, No Exceptions <input type="checkbox"/> Furnish As Submitted , Make Corrections Noted <input type="checkbox"/> Not Approved (See Notes), Revise and Resubmit <input type="checkbox"/> Not Approved, Rejected, See Notes	<input type="checkbox"/> Confirm <input type="checkbox"/> Resubmit
<input type="checkbox"/> Receipt Acknowledged (Not subject to Engineer's Review or Approval)	

The Engineer's review of this shop drawing is for general conformance with the design concept, contract documents, specifications and drawings. Markings or comments shall not be construed as relieving the Contractor from compliance with the project plans and specifications, nor departures there from, and does not relieve the Contractor from errors and omissions in the submittal or from the Contractor's responsibility of addressing any deviations from the contract documents, specifications and drawings. The Contractor remains solely responsible for details and accuracy, for confirming and correlating and verifying all quantities and dimensions at the jobsite, for selecting fabrication processes, for the means, methods, techniques, and sequence of construction, coordinating work with other trades, and performing all work in a safe manner. Engineer's approval shall not relieve Contractor of its obligation to perform construction in accordance with the Contract Documents. Any approval by Engineer shall not constitute an approved change or substitution unless Contractor has previously advised Engineer in writing of such proposed change or substitution and obtained Engineers written approval of such change or substitution.

McGill Associates, P. A.

By: _____

Date: _____

END OF SECTION 013300

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Sections:
 - 1. Division 01 Section "Allowances" for testing and inspecting allowances.
 - 2. Division 01 Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
 - 3. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and

deficiencies and substantiate that proposed construction will comply with requirements.

- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Product Testing: Tests and inspections that are performed by a Nationally Recognized Testing Laboratory (NRTL), an National Voluntary Laboratory Accreditation Program (NVLAP), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- D. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- E. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- F. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- G. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- H. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainty and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.

- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 SUBMITTALS

- A. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.

- B. **Manufacturer's Technical Representative's Field Reports:** Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on field condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. **Factory-Authorized Service Representative's Reports:** Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Payment for these services will be made either directly by the Owner or from testing and inspecting allowances, as authorized by the Contract documents, if such allowances are include in the Contractor's construction contract.
 - 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are the Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 96 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, Contractor shall provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 6. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Engineer.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution Requirements."
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION 014000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 **INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference. In all cases, the standards referenced within these Contract Documents shall be construed to reference the most current version, amendment or applicable replacement pertaining to the work.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 **ABBREVIATIONS AND ACRONYMS**

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960

AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	(301) 972-1700
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
API	American Petroleum Institute www.api.org	(202) 682-8000
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASME	ASME International (American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500

AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPPA	Corrugated Polyethylene Pipe Association www.plasticpipe.org	(800) 510-2772 (202) 462-9607
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	Canadian Standards Association	(800) 463-6727 (416) 747-4000
CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-4000
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
FM Approvals	FM Approvals LLC www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000

FMRC	Factory Mutual Research Corporation (Now FM Global)	
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(973) 267-9700
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IES	Illuminating Engineering Society www.ies.org	(212) 248-5000
IESNA	Illuminating Engineering Society of North America (Now IES)	
IENT	Institute of Environmental Sciences and Technology www.ient.org	(847) 981-0100
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ITS	Intertek Testing Service NA (Now ETL SEMCO)	(972) 238-5591
ITU	International Telecommunication Union	41 22 730 51 11

www.itu.int/home

LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-2300
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NelMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NESC	National Electrical Safety Code	(212) 419-7900

<http://standards.ieee.org/nesc/>

NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NWWDA	National Wood Window and Door Association (Now WDMA)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.cee.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	
SDI	Steel Deck Institute	(847) 458-4647

	www.sdi.org	
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WDMA	Window & Door Manufacturers Association www.wdma.com	(800) 223-2301 (847) 299-5200
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ICC	International Code Council www.iccsafe.org	(888) 422-7233
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UBC	Uniform Building Code (See ICC)	
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- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
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DOE	Department of Energy www.energy.gov	(202) 586-9220
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EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
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FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
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HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
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NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
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OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
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RUS	Rural Utilities Service (See USDA)	(202) 720-9540
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USDA	Department of Agriculture www.usda.gov	(202) 720-2791
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- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Engineerural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from U.S. Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
DOD	Department of Defense Military Specifications and Standards Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil	(215) 697-2664
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.wbdg.org/ccb	(215) 697-2664 (202) 619-8925 (202) 289-7800
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections:
 - 1. Division 1 Section "Summary" for limitations on utility interruptions and other work restrictions.
 - 2. Division 1 Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section "Execution Requirements" for progress cleaning requirements.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Price unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Engineer, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Pay sewer service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Construction Surveying: All work shall be constructed in accordance with the lines, grades and elevations shown on the plans or as given by the Engineer in the field. The Contractor shall be fully responsible for maintaining alignment and grade. All principal controlling points and base lines for locating the principal components of the work together with a suitable number of benchmarks adjacent to the work will be provided by the Engineer. From this information, the Contractor shall verify benchmarks and develop and make all detail surveys needed for construction. The Contractor shall protect and safeguard all points, stakes, grade marks, monuments, and benchmarks at the site of the work and shall reestablish, at his own expense, any marks which are removed or destroyed due to his construction operations.
 - 1. It is imperative that the Contractor work within the shown rights of way or easements at all times, unless approved otherwise by the property owner and the Engineer.
 - 2. The Contractor shall, at his expense, provide competent engineering survey services and shall provide and maintain accurate, detailed, survey work.
 - 3. The plans and supplementary drawings shall not be scaled and the Contractor must verify all dimensions and elevations at the site prior to proceeding with the work. The Contractor shall also verify existing utility locations prior to purchasing materials affected by these locations.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts;

minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts with 1-5/8-inch OD top rails with galvanized barbed-wire top strand.

- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch, thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch OD line posts and 2-7/8-inch OD corner and pull posts, with 1-5/8-inch OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts.
- C. Wood Enclosure Fence: Plywood, 6 feet high, framed with four 2-by-4-inch rails, with preservative-treated wood posts spaced not more than 8 feet apart.
- D. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mils minimum thickness, with flame-spread rating of 15 or less per ASTM E 84.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures".
- C. Air Filtration Units: HEPA primary and secondary filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Water Service: If available at the site and if authorized by the Owner, connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use or as required for project completion. Otherwise, Contractor shall provide non-potable water from sources acceptable to authorities having jurisdiction by installing water service and distribution piping in sizes and pressures adequate for construction. If temporary utilities require connection to municipal systems, Contractor shall provide these connections as directed by authorities having jurisdiction and install metering devices as required.
- B. Sanitary Facilities: Contractor shall provide temporary toilets, wash facilities, drinking water and associated piping and appurtenances for use of Owner, Engineer, and construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. If temporary utilities require connection to municipal systems, Contractor shall provide these connections as directed by authorities having jurisdiction.
- C. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed in accordance with approved coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- E. Ventilation and Humidity Control: If necessary, provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- F. Electric Power Service: Contractor shall provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Comply with all requirements of authorities having jurisdiction.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Provide construction for temporary offices, shops, and sheds located within construction area. All work shall comply with NFPA 241.
 2. Maintain support facilities until Substantial Completion inspection is scheduled. Remove before Final Completion.

- B. Temporary Roads and Paved Areas: As necessary, construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of Permanent Roads and Paved Areas: As necessary, locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to other specification sections.
 3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to other specification sections.
- D. Traffic Maintenance:
1. The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient warning lights, danger signals, and signs, shall provide a sufficient number of flagmen to direct the traffic and shall take all necessary precautions for the protection of the work and the safety of the public.
 2. All barricades and obstructions or hazardous conditions shall be illuminated as necessary to provide for safe traffic conditions.
 3. Warning and caution signs shall be posted throughout the length of any portion of the project where traffic flow is restricted.
 4. Protect existing site improvements to remain including curbs, pavement, and utilities.
 5. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Special Provisions: North Carolina Department of Transportation (NCDOT):
1. All Contractors doing work within the NCDOT right of way are to have a copy of the approved encroachment agreement plans, and special provisions on the job site.

2. The travelling public shall be warned of the construction with signing that is in accordance with the latest Manual on Uniform Traffic Control Devices.
3. Contact the appropriate utility company(ies) involved and make satisfactory arrangements to adjust utilities in conflict with the proposed work prior to construction.
4. Materials and workmanship shall conform to the NCDOT's Standards and Specifications Manual.
5. Strict compliance with the Policies and Procedures for Accommodating Utilities on Highway Rights of Way Manual shall be required.
6. All earth areas disturbed shall be regraded and seeded in accordance with the NCDOT standards and specifications.
7. Complete restoration including reestablishing ditch line, fertilizing, seeding, mulching, tacking of straw and all areas disturbed during construction will follow within a maximum of thirty (30) working days of the initial disturbing activity.
8. All open cuts shall conform to the NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way Manual.
9. All roadway signs which are removed due to installation will be reinstalled on the same day or as soon as possible.
10. The Contractor shall notify the local NCDOT office at least 24 hours prior to construction.

F. Parking: Provide temporary parking areas for construction personnel.

G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

H. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated within the Contract Documents.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. As necessary, provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touchup signs so they are easily legible at all times.

- I. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management."
- J. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 01 Section "Execution Requirements" for progress cleaning requirements.
- K. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- L. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- M. Existing Stair Usage: Where and when approved by the Owner, use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- N. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties, according to requirements of authorities having jurisdiction.
 - 1. Install erosion control measures as shown on the Drawings and as specified in the Contract Documents as necessary to prevent erosion and

- prevent soil-bearing water runoff from reaching nearby waterways, and storm water conveyance systems.
2. Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 3. Clean, repair, and restore adjoining properties, roads, storm water systems and other areas affected by erosion and sedimentation from the project site during the course of the project.
 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- E. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- F. Security Enclosure and Lockup: As necessary, install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- I. Covered Walkway: As necessary, erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
1. Construct covered walkways using scaffold or shoring framing.

2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 3. Paint and maintain appearance of walkway for duration of the Work.
- J. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- K. Temporary Partitions: When necessary, provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.
 2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.
 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 4. Insulate partitions to control noise transmission to occupied areas.
 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- L. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Prohibit smoking in construction areas.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from all surfaces.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of appropriate construction area, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed areas.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard, replace or clean stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the construction areas but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside area by maintaining effective dry-in conditions.
 - 2. Use permanent HVAC system to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record daily readings over a forty-eight hour period. Identify materials

containing moisture levels higher than allowed. Report findings in writing to Engineer.

- c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 015000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Sections:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Alternates" for products selected under an alternate.
 - 3. Division 01 Section "Substitution Procedures" for requests for substitutions.
 - 4. Division 01 Section "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where approved as a product substitution, to have the indicated qualities related to type, function, dimension, in-service

performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named, including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 **SUBMITTALS**

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
 - 3. Completed List: Within 30 days after date of commencement of the Work, submit copies of completed product list in accordance with Section 013300. Include a written explanation for omissions of data and for variations from Contract requirements.
 - 4. Engineer's Action: Engineer will respond in writing to Contractor as indicated in Section 013300. Engineer's response will include a list of unacceptable product selections and a brief explanation of reasons for this

action. Engineer's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit copies of each request for consideration in accordance with Section 013300. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

- a. Statement indicating why specified material or product cannot be provided.
- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
- g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
- i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
- j. Cost information, including a proposal of change, if any, in the Contract Sum.
- k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
- l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation and notify Contractor of acceptance or rejection of proposed substitution in accordance with Section 013300.
- C. Comparable Product Requests: Submit copies of each request for consideration in accordance with Section 013300. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation and notify Contractor of acceptance or rejection of proposed comparable product in accordance with Section 013300.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products upon delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, exposure to sunlight, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.
6. Provide a secure location and enclosure at Project site for storage of materials and equipment. Coordinate location with Owner.
7. Provide periodic rotation or movement of equipment as required by manufacturer.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by, or incorporated into, the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 3. Refer to Divisions 02 through 33. Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 - 4. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 5. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article below to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
 - 1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 - 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
 - 3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
 - 4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
 - 5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
 - 6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with

provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.

7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article below for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

- A. All product substitutions shall be made in accordance with Division 01 Section "Substitution Procedures".

2.3 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer may return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require revisions to the Contract Documents that it is consistent with the Contract Documents, and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Sections:
 - 1. Division 01 Section "Submittal Procedures".
 - 2. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 3. Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 SUBMITTALS

- A. Qualification Data: For professional land surveyor.
- B. Certificates: Submit certificate signed by professional land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by professional land surveyor.

1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from the Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operational elements include, but are not limited to the following:
 - a. Primary operational systems and equipment.
 - b. Fire-suppression systems.
 - c. Mechanical systems piping and ducts.
 - d. Control systems.
 - e. Communication systems.
 - f. Conveying systems.
 - g. Electrical wiring systems.
 - h. Operating systems of special construction.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or

safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Equipment supports.
 - d. Piping, ductwork, vessels, and equipment.
 - e. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the structure's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to the Engineer for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before

beginning work, investigate and verify the existence and location of all structures, underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and/or Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Engineer according to requirements in Division 01 Section "Project Management and Coordination." Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage a professional land surveyor to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

- A. Identification: Contractor shall identify existing or establish benchmarks, control points, and property corners as necessary.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: Upon completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Attachment: Provide blocking, attachment plates, anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.

2. Allow for structure movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. 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.
- H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 01 Section "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption of services.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 5. Mechanical and Electrical Services: Cut off pipe or conduit to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 6. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: When required, coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 degrees F.
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Utilize containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Division 01 Section "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- E. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.11 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections:
 - 1. Division 01 Section "Temporary Facilities and Controls" for environmental-protection measures during construction, and location of waste containers at Project site.
 - 2. Division 02 Section "Demolition" for disposition of waste resulting from demolition of buildings, structures, and site improvements, and for disposition of hazardous waste.
 - 3. Division 04 Section "Unit Masonry" for disposal requirements for masonry waste.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 PERFORMANCE REQUIREMENTS (Not Used)

1.5 SUBMITTALS (Not Used)

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan including responsibilities of Contractor's waste management coordinator.
 - 2. Review requirements for documenting each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 - 5. Review waste management requirements for each trade.

1.7 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan consisting of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing, and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in hauling and tipping fees by donating materials.
 7. Savings in hauling and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.
 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.
 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.
- C. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area as designated by Owner.
 5. Protect items from damage during transport and storage.

- D. Plumbing Fixtures: Separate by type and size.
- E. Lighting Fixtures: Separate lamps by type and protect from breakage.
- F. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 4. Store components off the ground and protect from the weather.
 - 5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphaltic Concrete Paving:
 - 1. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.

- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 1-1/2-inch size.
 - 2. Crush concrete and screen to comply with requirements in Division 31 Section "Earth Moving" for use as satisfactory soil for fill or subbase.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Pulverize masonry to maximum 1-1/2-inch size.
 - a. Crush masonry and screen to comply with requirements in Division 31 Section "Earth Moving" for use as satisfactory soil for fill or subbase.
 - 2. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.
- H. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Site-Clearing Wastes: Chip brush, branches, and trees on-site, if permitted by Owner, or at landfill facility.
 1. Comply with requirements in other specification sections for use of chipped organic waste as organic mulch.
- C. Wood Materials:
 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
 - a. Comply with requirements in other specification sections for use of clean sawdust as organic mulch.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 017419

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Related Sections:
 - 1. Division 1 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
 - 2. Division 1 Section "Execution Requirements" for progress cleaning of Project site.
 - 3. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Division 1 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
 - 5. Divisions 2 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete with request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.

3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 5. Prepare and submit Project Record Documents, operation and maintenance manuals, property surveys, and similar final record information.
 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. Upon receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 2. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 3. As necessary, submit pest-control final inspection report and warranty.

4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. As necessary, remove snow and ice to provide safe access to the work area.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep floors broom clean.
 - i. Vacuum any carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other

damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- k. Remove labels that are not permanent.
- l. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates.
- m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
- n. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
- o. Clean any and all plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
- p. Replace any and all disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
- q. Clean any and all ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter upon inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report upon completion of cleaning.
- r. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
- s. Leave Project clean and ready for operation.

- B. Construction Waste Disposal: Comply with waste disposal requirements in the Modified General Conditions of this contract.

END OF SECTION 017700

(Standard Form Attached)

CONTRACTOR'S FINAL AFFIDAVIT AND WAIVER OF LIEN

PROJECT: _____ OWNER: _____

CONTRACTOR: _____

CONTRACT AMOUNT: _____
STATE OF: _____
COUNTY OF: _____

CONTRACT DATE: _____
DATE: _____

This is to certify that all claims for labor, material, services and any other just claims arising out of the performance of this Contract have been satisfied, except for payment to subcontractors to be made out of retainage presently being held by the Owner, and that no claims or liens exist against this Contractor in connection with this contract; that to the best of our knowledge no claims or liens exist, and if any such claims or liens appear after payment of the retained amount due on the Contract, this Contractor shall save the Owner harmless on account thereof. After payment of the retained amount the undersigned does hereby waive, release and relinquish any and all claims or rights of lien presently held or hereafter accruing upon the above project.

CONTRACTOR: _____

BY: _____

TITLE: _____

Sworn to and subscribed before me this _____ day of _____ 201 _____

(Notary Public)

My Commission expires: _____

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Miscellaneous record submittals.
- B. Related Sections:
 - 1. Division 01 Section "Closeout Procedures" for general closeout procedures.
 - 2. Divisions 2 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints and one digital copy as described below.
- B. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit one paper copy and one digital copy of each submittal as described below.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below grade.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Changes made by Change Order or Work Change Directive.
 - i. Changes made following Engineer's written orders.
 - j. Details not on the original Contract Drawings.
 - k. Field records for variable and concealed conditions.
 - l. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Change Order or Work Change Directive numbers, alternate numbers, and similar identification, where applicable.

- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a digital copy of those Contract Drawings.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location. Provide information in the following formats:
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Record Digital Data Files on a disk: Organize digital data information into separate PDF electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 3. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Contractor.

2.2 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit three (3) paper copies and two (2) digital copies of all miscellaneous records.
 - 1. Include a miscellaneous record submittals directory organized by specification section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of Project.

- B. Maintenance of Record Documents: Store record documents in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Engineer's reference during normal working hours.

END OF SECTION 017839

PART 1: GENERAL**1.01 SCOPE OF WORK****A. General:**

1. The work covered by this section shall consist of furnishing all materials, labor, equipment and services for the excavation and backfill at all areas within the limits of the project. Work is limited to the areas of construction, and includes (but is not necessarily limited to) stockpiling of topsoil, site grading, excavation of footings and trenches, filling, backfilling, compaction, finish grading, spreading of topsoil, disposal of waste material, and proof rolling.
2. Perform all excavation, dewatering, sheeting, bracing, and backfilling in such a manner as to eliminate all possibility of undermining or disturbing the foundations of existing structures.
3. Requirements of the General and Supplemental Conditions apply to all work in this section. Provide all labor, materials, equipment, and services indicated on the drawings, or specified herein, or reasonably necessary for or incidental to a complete job.
4. Excavations shall provide adequate working space and clearances for the work to be performed therein and for installation and removal of concrete forms. In no case shall excavation faces be undercut for extended footings.
5. Subgrade surfaces shall be clean and free of loose material of any kind when concrete is placed thereon.
6. Backfilling during freezing weather shall not be done except by permission of the Engineer. No backfill, fill, or embankment materials shall be installed on frozen surfaces, nor shall frozen materials, snow, or ice be placed in any backfill, fill, or embankment.

1.02 SYSTEM DESCRIPTION

- A. Excavation, General: Excavation consists of the removal and disposal of all materials encountered for footings, foundations, pipework, and other construction as shown on the drawings. Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.03 QUALITY ASSURANCE

- A. Referenced Standards: Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards. Comply with the provisions of the following codes and standards, except as otherwise shown or specified.
1. ASTM C33: Standard Specifications for Concrete Aggregate
 2. ASTM D698: Standard Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12" Drop.
 3. ASTM D3282: Standard Recommended Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.
 4. Standard Specifications for Roads and Structures, North Carolina Department of Transportation, January 1, 2002 edition.
 5. Erosion and Sediment Control Planning and Design Manual.
- B. Unauthorized Excavation: Except where otherwise authorized, indicated, or specified, all materials excavated below the bottom of concrete walls, footings, slabs on grade, and foundations shall be replaced, by and at the expense of the Contractor, with concrete placed at the same time and monolithic with the concrete above.
- C. Existing Utilities:
1. Locate existing underground utilities in the area of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.

2. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Engineer immediately for directions as to procedure. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of utility companies.

1.04 SITE CONDITIONS

- A. Site Information: Test borings and their associated report of subsurface exploration have been included in these specifications. **These investigations and the report are provided for reference only, the City and Engineer make no guarantee as to the completeness or accuracy of these reports.** Any further test borings or other exploratory operations may be undertaken by the Contractor at his own expense provided such operations are acceptable to the Owner.

PART 2: PRODUCTS

2.01 MATERIALS

- A. Classification of Excavated Materials: Classification of excavated materials will be made as follows:
 1. All materials excavated for this project, regardless of its nature or composition shall be classified as **Unclassified Excavation**, and shall be part of the base bid price. No separate payment will be made for the excavation of rock or any unsuitable materials.
- B. Classification of Other Materials:
 1. Satisfactory Subgrade Soil Materials: Soils complying with ASTM D 3282, soil classification Groups A-1, A-2-4, A-2-5, and A-3.
 2. Unsatisfactory Subgrade Soil Materials: Soils described in ASTM D 3282, soil classification groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also peat and other highly organic soils, unless otherwise acceptable to the Engineer.
 3. Cohesionless Soil Materials: Gravels, sand-gravel mixtures, sands, and gravelly-sands.
 4. Cohesive Soil Materials: Clayey and silty gravels, sand-clay mixtures, gravel-silt mixtures, clayey and silty sands, sand-silt mixtures, clays, silts, and very fine sands.

5. Backfill and Fill Materials: Provide satisfactory soil materials for backfill and fill, free of masonry, rock, or gravel larger than 4" in any dimension, and free of metal, gypsum, lime, debris, waste, frozen materials, vegetable, and other deleterious matter. Use only excavated material that has been sampled, tested, and certified as satisfactory soil material.
6. Select Backfill: Select backfill is defined as backfill and fill material that is transported to the site from outside the project limits, and which meets the soil requirements specified above under "Backfill and Fill Materials." Material excavated in conjunction with the construction of this project cannot be considered as "select backfill" for payment purposes.
7. Pipe Bedding: Crushed stone or crushed gravel meeting the requirements of ASTM C 33, Gradation 67.
8. Inundated Sand: Sand for inundated sand backfill shall be clean with not more than 25% retained on a No. 4 sieve and not more than 7% passing a No. 200 sieve and shall have an effective size between 0.10 mm and 0.30 mm. Sand shall be deposited in, or placed simultaneously with application of, water so that the sand shall be compacted by a mechanical probe type vibrator. Inundated sand shall be compacted to 70% relative density as determined by ASTM D4253 and D4254.
9. Graded Gravel: Gravel for compacted backfill shall conform to the following gradation:

Sieve Size	Percent Passing by Weight
1"	100
3/4"	85 - 100
3/8"	50 - 80
No. 4	35 - 60
No. 40	15 - 30
No. 200	05 - 10

The gravel mixture shall contain no clay lumps or organic matters. The fraction passing the No. 4 sieve shall have a liquid limit not greater than 25 and a plasticity index not greater than 5. Gravel backfill shall be deposited in uniform layers not exceeding 12" in uncompacted thickness. The backfill shall be compacted by a suitable vibratory roller or platform vibrator to not less than 70% relative density as determined by ASTM D4253 and D4254.

2.01 EQUIPMENT

A. Mechanical Excavation:

1. The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, or other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.
2. Mechanical equipment used for trench excavation shall be of a type, design, and construction and shall be controlled, that uniform trench widths and vertical sidewalls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that trench alignment is such that pipe when accurately laid to specified alignment will be centered in the trench with adequate clearance between the pipe and sidewalls of the trench. Undercutting the trench sidewall to obtain clearance will not be permitted.

PART 3: EXECUTION

3.01 PREPARATION

A. Dewatering:

1. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.
2. All excavations for concrete structures or trenches that extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations 12" or more below the bottom of the excavation.
3. Surface water shall be diverted or otherwise prevented from entering excavated areas or trenches without causing damage to adjacent property.

4. The Contractor is responsible for obtaining any required permits or permissions necessary for the disposal of groundwater that is removed. Any discharged groundwater shall be clean and free of sediment.
5. The Contractor shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.
6. Where trench sheeting is left in place, such sheeting shall not be braced against the pipe, but shall be supported in a manner which will preclude concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe to support sheeting may be removed after pipe embedment has been completed.

B. Stabilization:

1. Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; free from mud and muck; and sufficiently stable to remain firm and intact under the feet of the workmen.
2. Subgrades for concrete structures or trench bottoms, which are otherwise solid but which become mucky on top due to construction operations, shall be reinforced with one or more layers of crushed rock or gravel. The stabilizing material shall be spread and compacted to a depth of not less than 6" below the bottom of the structure or pipe. Not more than 1/2" depth of mud or muck shall be allowed to remain on stabilized trench bottoms when the pipe bedding material is placed thereon. The finished elevation of stabilized subgrades for concrete structures shall not be above subgrade elevations indicated on the drawings.

C. Cutting Concrete or Asphalt Surface Construction:

1. All pavement cutting and repair shall be done in accordance with local ordinances. Cuts in concrete and asphaltic concrete shall be no larger than necessary to provide adequate working space for proper installation of pipe and appurtenances. Cutting shall be performed with a concrete saw in a manner which will provide a clean groove the complete thickness of the surface material along each side of the trench and along the perimeter of cuts for structures.

2. Concrete and asphaltic concrete over trenches excavated for pipelines shall be removed so that a shoulder not less than 12" in width at any point is left between the cut edge of the surface and the top edge of the trench. Trench width at the bottom shall not be greater than at the top and no undercutting will be permitted. Cuts shall be made to and between straight or accurately marked curved lines which, unless otherwise required, shall be parallel to the center line of the trench.
3. Pavement or other surfaces removed for connections to existing lines or structures shall not be of greater extent than necessary for the installation.
4. Where the trench parallels the length of concrete walks and the trench location is all or partially under the walk, the entire walk shall be removed and replaced. Where the trench crosses drives, walks, curbs, or other surface construction, the surface construction shall be removed and replaced between existing joints or between saw cuts as specified for payment.

D. Site Grade:

1. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finish the surface within specified tolerances; compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
2. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Shape the subgrade as indicated on the drawings by forking, furrowing, or plowing so that the first layer of new material placed thereon will be well bonded to it.

3.02 FIELD MEASUREMENTS

A. Alignment, Grade, and Minimum Cover:

1. Vertical and horizontal alignment of pipes, and the maximum joint deflection used in connection therewith, shall be in conformity with requirements of the section covering installation of pipe.

2. Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe cover depths may be necessary on vertical curves or to provide necessary clearance beneath existing pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevation except where future surface elevations are indicated on the drawings.

- B Limiting Trench Widths: Trenches shall be excavated to a width that will provide adequate working space and sidewall clearances for proper pipe installation, jointing, and embedment. For the purposes of quantity measurements and payments, maximum trench widths shall be no greater than the pipe outside diameter plus 24" (12" either side of pipe).

3.03 PROTECTION

- A. Temporary Protection: Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Sheeting and Bracing: Make all excavations in accordance with Federal, State, and Local health and safety rules and regulations, including those promulgated by the Department of Labor, Occupation Safety and Health Administration, "Safety and Health Regulations for Construction". Furnish, put in place, and maintain such sheeting, bracing, etc., as may be necessary to support the sides of the excavation to comply with the above mentioned rules and regulations.
- C. Blasting:
 1. The Contractor shall be responsible for all damage caused by blasting operations. Suitable methods shall be employed to confine all materials lifted by blasting within the limits of the excavation or trench.
 2. All rock which cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with backfill or embankment materials except as specified or directed.

D. Care and Restoration of Property:

1. Enclose the trunks of trees which are to remain adjacent to the work with substantial wooden boxes of such height as may be necessary to protect them from piled material, equipment or equipment operation. Use excavating machinery and cranes of suitable type and operate the equipment with care to prevent injury to remaining tree trunks, roots, branches and limbs.
2. Do not cut branches, limbs, and roots except by permission of the Engineer. Cut smoothly and neatly without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, neatly trim the cut or injured portions and cover with an application of grafting wax and tree healing paint as directed.
3. Protect by suitable means all cultivated hedges, shrubs and plants that might be injured by the Contractor's operations. Promptly heel in any such trees or shrubbery necessary to be removed and replanted. Perform heeling in and replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is reestablished.
4. Replace cultivated hedges, shrubs, and plants injured to such a degree as to affect their growth or diminish their beauty or usefulness, by items of kind and quality at least equal to the kind and quality existing at the start of the work.
5. Do not operate tractors, bulldozers or other power-operated equipment on paved surfaces if the treads or wheels of the equipment are so shaped as to cut or otherwise injure the surfaces.
6. Restore all surfaces, including lawns, grassed, and planted areas that have been injured by the Contractor's operations, to a condition at least equal to that in which they were found immediately before the work was begun. Use suitable materials and methods for such restoration. Maintain all restored plantings by cutting, trimming, fertilizing, etc., until acceptance. Restore existing property or structures as promptly as practicable and do not leave until the end of construction period.

- E. Protection of Streams: Exercise reasonable precaution to prevent the silting of streams. Provide at Contractor's expense temporary erosion and sediment control measures to prevent the silting of streams and existing drainage facilities. The Contractor shall size structures and conform fully with the North Carolina Sedimentation Pollution Control Act.
- F. Air Pollution:
 - 1. Comply with all pollution control rules, regulations, ordinances, and statutes which apply to any work performed under the Contract, including any air pollution control rules, regulations, ordinances and statutes, or any municipal regulations pertaining to air pollution.
 - 2. During the progress of the work, maintain the area of activity, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the Engineer decides that it is necessary to use calcium chloride or more effective dust control, furnish and spread the material, as directed, and without additional compensation.

3.04 TRENCH EXCAVATION

- A. Length of Trench:
 - 1. No more trenches shall be opened in advance of pipe laying than is necessary to expedite the work. One block or 400 feet (whichever is the shorter) shall be the maximum length of open trench on any line under construction.
 - 2. Except where tunneling is indicated on the drawings, is specified, or is permitted by the Engineer, all trench excavation shall be open cut from the surface.
- B. Trench Excavation:
 - 1. General: Perform all excavation of every description and of whatever substance encountered so that the pipe can be laid to the alignment and depth shown on the drawings.
 - 2. Brace and shore all trenches, where required, in accordance with Federal, State, and Local health and safety rules and regulations, including those promulgated by the Department of Labor, Occupation Safety and Health Administration, "Safety and Health Regulations for Construction".

3. Make all excavations by open cut unless otherwise specified or indicated on the drawings.
4. Width of Trenches: Excavate trenches sufficiently wide to allow proper installation of pipe, fittings and other materials. Measurement and payment quantities will be based on a maximum trench width of not more than 12" clear of pipe on either side at any point. Do not widen trenches by scraping or loosening materials from the sides.
5. Trench Excavation in Earth: Earth excavation includes all excavation of whatever substance encountered. In locations where pipe is to be bedded in earth excavated trenches, fine grade the bottoms of such trenches to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the pipe, fill the part excavated below such grade with pipe bedding material and compact at the Contractor's expense.
6. Trench Excavation in Fill: If pipe is to be laid in embankments or other recently filled material, first place the fill material to the finish grade or to a height of at least one foot above the top of the pipe, whichever is the lesser. Take particular care to ensure maximum consolidation of material under the pipe location. Excavate the pipe trench as though in undisturbed material.
7. Trench Bottom in Poor Soil: Excavate and remove unstable or unsuitable soil to a width and depth, as directed by the Engineer, and refill with a thoroughly compacted gravel bedding.
8. Bell Holes: Provide bell holes at each joint to permit the joint to be made properly and to provide a continuous bearing and support for the pipe.

C. Trench Backfill:

1. General: Unless otherwise specified or indicated on the drawings, use suitable material for backfill which was removed in the course of making the construction excavations. Do not use frozen material for the backfill and do not place backfill on frozen material. Remove previously frozen material before new backfill is placed. Start backfilling as soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, and proceed until its completion.

2. With the exception mentioned below in this paragraph, do not backfill trenches at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the Contractor wish to minimize the maintenance of lights, and barricades, and the obstruction of traffic, he may, at his own risk, backfill the entire trench as soon as practicable after installation of pipe, and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.
3. Material: The nature of the materials will govern both their acceptability for backfill and the methods best suited for their placement and compaction in the backfill. Both are subject to the approval of the Engineer. Do not place stone or rock fragments larger than 4" in greatest dimension in the backfill. Do not drop large masses of backfill material into the trench in such a manner as to endanger the pipeline. Use a timber grillage to break the fall of material dropped from a height of more than 5 feet. Exclude pieces of bituminous pavement from the backfill unless their use is expressly permitted.
4. Zone Around Pipe: Place bedding material to the level shown on the Drawings and work material carefully around the pipe to insure that all voids are filled, particularly in bell holes. For backfill up to a level of 2 feet over the top of the pipe, use only selected materials containing no rock, clods or organic materials. Place the backfill and compact thoroughly under the pipe haunches and up to the mid-line of the pipe in layers not exceeding 6" in depth. Place each layer and tamp carefully and uniformly so as to eliminate the possibility of lateral displacement. Place and compact the remainder of the zone around the pipe and to a height of one foot above the pipe in layers not exceeding 6" and compact to a maximum density of at least 100 % as determined by ASTM D0698.
5. Tamping: Deposit and spread backfill materials in uniform, parallel layers not exceeding 12" thick before compaction. Tamp each layer before the next layer is placed to obtain a thoroughly compacted mass. Furnish and use, if necessary, an adequate number of power driven tampers, each weighing at least 20 pounds for this purpose. Take care that the material close to the bank, as well as in all other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done

effectively and without damage to the pipe, backfill may, on approval of the Engineer, be compacted by the use of suitable rollers, tractors, or similarly powered equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling and compacting as furnished by the Contractor.

6. Wet the material by sprinkling, if necessary, to insure proper compaction by tamping (or rolling). Perform no compaction by tamping (or rolling) when the material is too wet either from rain or applied water to be compacted properly.
7. Trench Compaction: Compact backfill in pipe trenches to the maximum density as shown on the drawings, or as listed in the subsection entitled COMPACTION, with a moisture content within the range of values of maximum density as indicated by the moisture-density relationship curve.

3.05 SITE GRADE

A. Placement and Compaction:

1. Place backfill and fill material in layers not more than 8" in loose depth. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to the required percentage of maximum density for each area classification. Do not place backfill or material on surfaces that are muddy, frozen, or contain frost or ice.
2. In areas not accessible to rollers or compactors, compact the fill with mechanical hand tampers. If the mixture is excessively moistened by rain, aerate the material by means of blade graders, harrows, or other approved equipment, until the moisture content of the mixture is satisfactory. Finish the surface of the layer by blading or rolling with a smooth roller, or a combination thereof, and leave the surface smooth and free from waves and inequalities.
3. Place backfill and fill materials evenly adjacent to structures, to the required elevations. Take care to prevent wedging action of backfill against structures. Carry the material uniformly around all parts of the structure to approximately the same elevation in each lift.

4. When existing ground surface has a density less than that specified under the subsection entitled COMPACTION for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- B. Grading Outside Building Lines: Grade to drain away from structures to prevent ponding of water. Finish surface free from irregular surface changes.
- C. Planting Areas: Finish areas to receive topsoil to within not more than one inch (1") above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes.
- D. Walks: Shape the surface of areas under walks to line, grade, and cross-section, with the finish surface not more than 0" above or 1" below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.
- E. Pavements:
1. Shape the surface of the areas under pavement to line, grade and cross section, with finish surface not more than 1/2" above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction.
 2. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material.
 3. Shape to line, grade, and cross section as shown on the drawings.
- F. Protection of Graded Areas: Protect newly graded areas from traffic and erosion, and keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- G. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather prior to acceptance of work, scarify surface, reshape, and compact to required density prior to further construction.

H. Unauthorized Excavation:

1. Unauthorized excavation consists of the removal of materials beyond indicated elevations without the specific direction of the Engineer. Under footings, foundations, bases, etc., fill unauthorized excavation by extending the indicated bottom elevation of the concrete to the bottom of the excavation, without altering the required top elevation. Lean concrete fill may be used to bring elevations to proper position only when acceptable to the Engineer.
2. For pipe trenches and elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

3.06 BACKFILL AROUND STRUCTURES

- A. General: Unless otherwise specified or indicated on the drawings, use suitable material for backfill which was removed in the course of making the construction excavations. . Do not use frozen material for the backfill and do not place backfill upon frozen material. Remove previously frozen material before new backfill is placed.
- B. Material: Approved selected materials available from the excavations may be used for backfilling around structures. Obtain material needed in addition to that of construction excavations from off-site borrow pits selected by the Contractor. Furnish all borrow material needed on the work. Place and compact all material, whether from the excavation or borrow, to make a dense, stable fill. Use fill material which contains no vegetation, masses of roots, individual roots over 18" long or more than 1/2" in diameter, stones over 4" in diameter, or porous matter. Organic matter must not exceed negligible quantities.
- C. Placing Backfill: Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage. Make special leakage tests, if required, as soon as practicable after the structures are structurally adequate and other necessary work has been done. Use the best of the excavated materials in backfilling within 2 feet of the structure. Avoid unequal soil pressures by depositing the material evenly around the structure.

3.07 COMPACTION

- A. General: Control soil compaction during construction providing at least the minimum percentage of density specified for each area classification.
- B. Percentage of Maximum Density Requirements: After compaction, all fill will be tested in accordance with Method "C" of ASTM D-698, unless specified otherwise. Except as noted otherwise for the zone around pipe, provide not less than the following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material-in-place:

UNPAVED AREAS	Compact Full Depth to 92%
DRIVES AND PARKING	Top 24" - 100%
TRENCH BACKFILL (PAVED AREAS)	Compact full depth to 100%
TRENCH BACKFILL (UNPAVED AREAS)	Compact full depth to 95%
ALL OTHER BACKFILL	Compact full depth to 95%

- C. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture-density relation tests.
- D. Disposal of Surface Material: Upon approval of the Engineer, haul all surplus materials not needed or acceptable for backfill off-site.

3.08 FIELD QUALITY CONTROL

- A. Soil Testing and Inspection Service: Compaction tests of all fill areas will be made by an independent testing laboratory. Such tests will be provided and paid for by the Owner, except that tests that reveal non-conformance with the specifications and all succeeding tests for the same area shall be at the expense of the Contractor until conformance with the specifications is established. The Owner will be responsible for paying for only the successful tests.

END OF SECTION

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of structures and/or site improvements.
 - 2. Abandoning in place or removing below-grade construction.
 - 3. Disconnecting, capping or sealing, and abandoning in-place or removing site utilities.
 - 4. Salvaging items for reuse by Owner.
- B. Related Sections include the following:
 - 1. Division 01 Section "Summary" for use of the premises and phasing requirements.
 - 2. Division 01 Section "Photographic Documentation" for preconstruction photographs taken before building demolition.
 - 3. Division 01 Section "Temporary Facilities and Controls" for temporary construction, protection facilities, and environmental-protection measures for building demolition operations.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- D. Salvage: Carefully detach from existing construction, in a manner to prevent damage, allow for further use, and deliver to Owner. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes the property of Contractor.
- B. Timber, steel and other merchantable goods and materials removed incidental to demolition shall remain the property of the Owner unless otherwise directed.
- C. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit, as requested, informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings and Property: Detail special measures proposed to protect adjacent buildings to remain and property.
- B. Schedule of Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- C. Demolition Plans: Drawings indicating the following:
 - 1. Locations of temporary protection.
- D. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- E. Preconstruction Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before the Work begins.

- F. Landfill Records: Provide receipt for the acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI A10.6 and NFPA 241.
- C. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demolition including, but not limited to, the following:
 - 1. Inspect and discuss condition of construction to be demolished.
 - 2. Review and finalize demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review and finalize protection requirements.
 - 4. Review procedures for noise control and dust control.
 - 5. Review procedures for protection of adjacent structures.
 - 6. Review items to be salvaged and returned to Owner.
 - 7. Review procedures for the disposal of hazardous waste.

1.7 PROJECT CONDITIONS

- A. Structures to be demolished will be vacated and their use discontinued before start of the Work.
- B. Structures immediately adjacent to the demolition area may be occupied or otherwise in operation. Conduct demolition so operations of occupied or operating structures will not be disrupted.
 - 1. Provide not less than seven (7) business days' notice of activities that will affect operations of adjacent occupied or operating structures.
 - 2. Maintain access to existing roadways, walkways, exits, and other facilities used by occupants/operators of adjacent structures.

- a. Do not close or obstruct roadways, walkways, exits, or other facilities used by occupants/operators of adjacent structures without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by the Contractor by way of a Change Order or by the Owner under a separate contract. If the removal of hazardous materials results in a delay to the Contractor's schedule an appropriate adjustment will be made to the Contract Time by way of Change Order.
- E. Hazardous Materials: Hazardous materials may be present in buildings and structures to be demolished. If a report on the presence of hazardous materials is on file for review and use, the Contractor may examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
 - 3. Owner will provide material safety data sheets for materials that are known to be present in buildings and structures to be demolished because of building operations or processes performed there.
- F. On-site storage or sale of removed items or materials is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations or the operations of adjacent occupied or operating structures.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 31 Section "Earth Moving."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner, if available. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Inventory and record the condition of items to be removed and salvaged. Provide photographs and/or video of conditions that might be misconstrued as damage caused by salvage operations. Comply with Division 01 Section "Photographic Documentation."
- A. As necessary, perform or engage a professional engineer properly licensed to practice in the state of the project site to perform an engineering survey of condition of structure to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.
- B. Retain subparagraph below if demolition includes prestressed or post-tensioned concrete slabs.
 - 1. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- C. Verify that hazardous materials have been remediated before proceeding with demolition operations.

3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.

- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off all utilities serving structures to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If removal, relocation, or abandonment of utility services will affect adjacent occupied or operating structures, then provide temporary utilities that bypass structures to be demolished and that maintain continuity of service to other structures.
 - 3. Cut off pipe or conduit a minimum of 36 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- C. Existing Utilities: Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- E. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner or indicated on Drawings.
 - 5. Protect items from damage during transport and storage.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent roadways, walkways, loading docks, structure entries, and other facilities during demolition operations. Maintain exits from existing structures.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.

- a. Provide at least seven (7) business days' notice to occupants/operators of affected structures if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as roadways, walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 01 Section "Temporary Facilities and Controls."
 1. Protect adjacent structures and facilities from damage due to demolition activities.
 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent structures and facilities to remain.
 5. Provide protection to ensure safe passage of people around demolition area and to and from occupied or operating portions of adjacent structures.
 6. Protect all adjacent improvements that are to remain and that are exposed to demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied or operating portions of adjacent structures.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.4 DEMOLITION, GENERAL

- A. General: Demolish indicated existing structures and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least two hours after flame cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on any part of the structure.
- B. During demolition, perform surveys to detect hazards that may result from demolition activities.

- C. Site Access and Temporary Controls: Conduct demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and operating facilities.
 - 1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or operating facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed areas if required by Owner or authorities having jurisdiction.
 - 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations. Do not use water when it may damage adjacent structures or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Bituminous Paved Areas: Scarify and completely remove. Resultant material may be utilized in bottom portion of areas to receive fill. No pieces shall be left exposed in the fill slopes. If material is used in any portion of the new construction, layers shall be a maximum of 8 inches and separated by minimum 6-inch layers of earth. Water and compaction requirements are specified under other sections. No compaction is required for materials used for obliteration work outside the limits of new construction.
- E. Removal of Concrete Surfaces and Structures: Concrete designated for removal, break into pieces and use for rip rap. Volume, minimum 0.5 cubic feet; 75 percent of pieces shall be between 1.5 and 2.0 cubic feet. Stockpile at designated locations.
- F. Pipe Removal: Remove pipe, exercising care to avoid breaking or damaging. Store pipe to be relaid as directed.

3.5 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural members systematically, from higher to lower level.
- B. Remove debris from elevated portions of a structure by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 1. Remove structural members and lower to ground by method suitable to minimize ground impact and dust generation.
- C. Salvage: Items to be salvaged are indicated on Drawings.
- D. Below-Grade Construction: Demolish all below-grade construction that is within the footprint of new construction and extending 5 feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.

1. Remove below-grade construction to at least 36 inches below grade, unless otherwise indicated.
- E. Existing Utilities: Abandon existing utilities and below-grade utility structures as shown on the Drawings.
1. Fill abandoned utility structures with satisfactory materials according to backfill requirements in Division 31 Section "Earth Moving."
 2. Piping: Disconnect piping at unions, flanges, valves, or fittings.
 3. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

3.6 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from demolition operations with satisfactory soil materials according to backfill requirements in Division 31 Section "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades. Eliminate areas where water may collect in depressions.

3.7 REPAIRS

- A. Promptly repair damage to adjacent improvements caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an approved landfill acceptable to authorities having jurisdiction.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

END OF SECTION 024116

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes cast in place concrete as shown on Drawings, and as specified herein. In general, this work includes cast in place concrete consisting of Portland Cement, fine and coarse aggregate, selected admixtures, mixing, transporting, placing, finishing, and curing as herein specified. This section further includes fabrication and placement of concrete reinforcement, providing formwork and shoring for this work as well as related items of quality control, testing, and evaluation of concrete strength.
- B. Related Sections:
 - 1. Division 31 Section "Earth Moving" for drainage fill under slabs-on-grade.
 - 2. Division 32 Section "Concrete Paving" for concrete pavement and walks.

1.3 REFERENCES

- A. Some products and execution are specified in this section by reference to published specifications or standards of the following with respect abbreviations used.
 - 1. American Concrete Institute: ACI
 - 2. The American Society for Testing and Materials: ASTM
 - 3. American Welding Society AWS
 - 4. U. S. Products Standards PS
- B. Standard References: The current edition of the following standard references shall apply to the work of this Section except as indicated otherwise on the Drawings or herein.
 - 1. Publications of the American Concrete Institute:
 - a. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete

- b. ACI 211.2 Standard Practice for Selecting Proportions for Structural Lightweight Concrete
 - c. ACI 212 Chemical Admixtures for Concrete
 - d. ACI 214 Guide to Evaluation of Strength Test Results of Concrete
 - e. ACI 301 Specifications for Structural Concrete.
 - f. ACI 304 Guide for Use of Volumetric-Measuring and Continuous-Mixing Concrete Equipment
 - g. ACI 305 Guide to Hot Weather Concreting
 - h. ACI 306 Guide to Cold Weather Concreting
 - i. ACI 308 Specification for Curing Concrete
 - j. ACI 309 Guide for Consolidation of Concrete
 - k. ACI 311 ACI Manual of Concrete Inspection
 - l. ACI 315 Details and Detailing of Concrete Reinforcement.
 - m. ACI 318 Building Code Requirements for Structural Concrete.
 - n. ACI 347 Guide to Formwork for Concrete.
2. Publications of the American Welding Society:
- a. AWS D1.4 Structural Welding Code-Reinforcing Steel
3. Publications of the Concrete Reinforcing Steel Institute:
- a. Manual of Standard Practice
4. Publications of the American Society for Testing and Materials:
- a. ASTM A 82 Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
 - b. ASTM A 185 Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - c. ASTM A 615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
 - d. ASTM A 996 Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

1.4 **DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.5 **SUBMITTALS**

- A. Product Data: For each type of product indicated.

- B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.
 - 1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.
- E. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Engineer.
- F. Samples: For waterstops and/or vapor retarder.
- G. Qualification Data: For Installer and Manufacturer.
- H. Welding certificates.
- I. Material Certificates: For each of the following, signed by manufacturers:
 - 1. Cementitious materials.
 - 2. Admixtures.
 - 3. Form materials and form-release agents.
 - 4. Steel reinforcement and accessories.
 - 5. Fiber reinforcement.
 - 6. Waterstops.
 - 7. Curing compounds.
 - 8. Floor and slab treatments.
 - 9. Bonding agents.
 - 10. Adhesives.
 - 11. Vapor retarders.
 - 12. Semirigid joint filler.
 - 13. Joint-filler strips.
 - 14. Repair materials.

- J. Contractor shall submit records of all concrete pours showing exact location of pour, date of pour, quantity of pour, and class of concrete poured to the Engineer each month. Temperature at time of pour should also be recorded.
- K. Contractor shall also submit to the Engineer chemical and physical analysis of all cement and fly ash delivered to the batch plant seven (7) days prior to use of the cement or fly ash.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94 requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code - Reinforcing Steel."
- E. ACI Publications: Comply with the following applicable standards unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete"
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Owner shall engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. If the average strength of the laboratory control cylinders shows the concrete to be below the specified design strength, the aggregate proportions and water content may be changed by the Engineer, who, in addition to such changes, may require core tests. Tests confirming concrete strengths on hardened concrete which was poured without testing shall be paid for by the Contractor.
- H. Prepare design mixes for each class of concrete used in accordance with ACI 311.1. The Contractor shall pay for all design mix costs. Submit written reports to the Engineer for each proposed mix for each class of concrete prior to start of

work. Do not begin concrete production until mixes have been approved by the Engineer.

- I. Strength data for establishing standard deviation and required overstrength factor will be considered suitable if the concrete production facility has certified records consisting of at least 30 consecutive tests in one group or the statistical average for two groups totaling 30 or more tests representing similar materials and project conditions. Records of these tests shall be submitted with the proposed design mix.
- J. If standard deviation exceeds 800 psi or if no suitable records are available, selected proportions to produce an average strength of at least 1200 psi greater than the required compressive strength of concrete. If standard deviations are less than 600 psi, the minimum overstrength factor required in the design mix shall be in accordance with ACI 318, Section 4.3.1.
- K. Design mixes shall be proportioned using the maximum specified slump and temperature. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by the Engineer before using in the work. Admixtures shall be used in strict accordance with the manufacturer's written instructions. Design mix shall be proportioned using the proposed admixtures at optimum recommended dosages. The manufacturer of the mixture shall prepare and submit test data used to determine the optimum dosage.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing Steel shall be delivered to the Project Site properly tagged, bundled, and ready to place. Reinforcing steel delivered to the Project Site, and not immediately placed in forms, shall be protected from mud, excessive rust producing conditions, oil, grease, or distortion. Reinforcing steel shall be stored off the ground.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials shall be high quality and standard for the industry.

- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Unless otherwise indicated, all reinforcing steel shall conform to one of the following ASTM Standards, latest edition:
 - 1. ASTM A 615, Grade 60.
 - 2. ASTM A 996, Grade 60.

- B. Epoxy-Coated Reinforcing Bars: Where indicated steel reinforcement shall be epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.
- C. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, Grade 60, deformed bars, assembled with clips.
- D. Plain-Steel Wire: ASTM A 82.
- E. Deformed-Steel Wire: ASTM A 496.
- F. Epoxy-Coated Wire: ASTM A 884, Class A, Type 1, with less than 2 percent damaged coating in each 12-inch wire length.
- G. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from steel wire into flat sheets.
- H. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.
- I. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884, Class A coated, Type 1, steel.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Epoxy-Coated Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, ASTM A 775 epoxy coated.
- C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from stainless steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement shall be fresh stock of an approved standard brand meeting the requirements of ASTM C 150, of Type II, white. Only one brand of cement shall be used except when otherwise approved by the Engineer, and the Contractor shall inform the Engineer of the brand name of the cement proposed for use. The Contractor shall submit a copy of mill test reports on all cement delivered to the job 7 days prior to use of the cement. Cube strength from mill tests shall have a tolerance of ± 600 psi. The fineness of cement used shall not have more than 10 percent retained on a no. 325 mesh screen when tested in accordance with ASTM C 430.
 2. Fly Ash shall have a high fineness and low carbon content and shall exceed the requirements of ASTM C 618, Class 7, except that the loss of ignition shall be less than 3 percent, and all fly ash shall be a classified processed material. Fly ash shall be obtained from one source for the concrete delivered to the project. Complete chemical and physical analysis of each carload of fly ash shall be submitted to the Engineer ten (10) days prior to use of each carload delivered. Concrete mixes proportioned with fly ash shall contain not less than 10 percent nor more than 20 percent by weight of cement of fly ash.
- B. Concrete Aggregates: Unless otherwise specified all aggregate shall be normal weight aggregate in accordance with ASTM C 33.
1. Aggregate for concrete shall consist of clean crushed stone or gravel having hard, strong, uncoated particles free from injurious amounts of soft, thin, elongated or laminated pieces, alkali, organic or other deleterious matter. Maximum aggregate size shall be $\frac{3}{4}$ -inch. The maximum permissible percentage of elongated particles shall not exceed 5 percent by weight. Elongated particles are those defined as having a length equal to or greater than 5 times the width. Samples of coarse aggregate shall be submitted to the testing laboratory for testing and approval prior to use. The fineness modulus of the coarse aggregate shall not vary for more than ± 0.3 percent.
 2. Where lightweight aggregate is specified, provide aggregate in accordance with ASTM C 330.
 3. Provide aggregates from a single source.
- C. Fine Aggregate shall consist of sand, stone screening, or other inert materials with similar characteristics having clean, strong, durable, uncoated grains and free from lumps, soft or flaky particles, clay, shale, alkali, organic matter or other deleterious substances with reactivity to alkali in cement. Fine aggregate shall be submitted for testing and approval to the testing laboratory. The

laboratory shall verify that fine aggregate conforms to ASTM standards by making standard colormetric, sediment, and comparative tensile tests, and by sieve analysis. The fineness modules of the sand shall not vary by more than ± 0.2 percent. Color shall be standard as determined from colormetric tests.

- D. Water shall be potable water in accordance with ASTM C 94.

2.5 ADMIXTURES

- A. When required or permitted, admixtures shall conform to the appropriate specification indicated. Do not use admixtures which have not been incorporated and tested in the accepted mixes unless otherwise authorized in writing by the Engineer.

1. Air-Entraining Admixture shall be in accordance with ASTM C 260.

- a. Air-entraining admixtures shall be used for all concrete exposed to freezing and thawing or subjected to hydraulic pressure. Entrained air shall conform to the air control limits of Table 3.4.1 of ACI 301. The water-cement ratio for all air-entrained concrete exposed to freezing and thawing shall not exceed 0.53.

- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixtures shall be hydroxolated polymer type in accordance with ASTM C 494, Type A.
2. Retarding Admixture: ASTM C 494, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.

2.6 WATERSTOPS

- A. Flexible PVC Waterstops shall be in accordance with CE CRD-C 572 for embedding in concrete to prevent passage of fluids through joints with factory-fabricate corners, intersections, and directional changes.

1. Manufacturers: Provide products by one of the following:
 - a. W. R. Meadows.
 - b. Greenstreak.
 - c. Vinylex Corp.

2. Profile: Flat, dumbbell with center bulb
 3. Dimensions: 6 inches by 3/8 inch thick; nontapered.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
- C. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

2.7 VAPOR RETARDERS

- A. Sheet Vapor Barrier shall be minimum 10 mil polyethylene film that complies with ASTM C171 and meets or exceeds test for water retention, ASTM C 156.

2.8 CRUSHED STONE FILL

- A. Crushed Stone Fill shall be uniform 1-inch stone, no fines, in conformance to ASTM C 33.

2.9 CURING MATERIALS

- A. Liquid curing material for concrete shall exceed the requirements of ASTM C 309, Type I. Products acceptable shall provide water retention not exceeding a loss of 0.020 grams per sq. cm. when tested at a coverage of 200 sq. ft. per gallon and tested in accordance with ASTM C 156. Submit test data verifying these requirements for approval.
- B. Burlap shall be free of sizing or any substance that is injurious to cement or can cause discoloration. Burlap shall be rinsed in water prior to use. Burlap shall be sufficient thickness to retain water without requiring wetting.
- C. Water: Potable.

2.10 RELATED MATERIALS

- A. Pre-molded Expansion- and Isolation-Joint-Filler Strips shall be asphalt-saturated cellulosic fiber or in accordance with ASTM D 1751.
- B. Joint Sealing Compound shall be a two-part mineral filled epoxy polyurethane, and shall be used for all exposed joints in exterior paving slabs, sidewalks, where concrete slabs abut concrete walls, and in exposed joints in slabs on grade.

- C. Surface Coating for all exposed concrete except where otherwise shown shall be "Thoroseal" as manufactured by the Standard Dry Wall Co., or an approved equal.
- D. Steel for Embedded Angles and Plate Cast in Concrete shall conform to ASTM A 36. Plates and angles shall receive a commercial sand blast and be painted with an inorganic zinc base paint equal to Carbomastic #11, or an approved equal.

2.11 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109.

2.12 CONCRETE MIXING

- A. Concrete shall be mixed at batch plants or it may be transit mixed as specified herein. Concrete batch plants must comply with the requirements of ASTM C 94 and ACI-304 with sufficient capacity of producing concrete of the quantity and quality as specified herein. All plant facilities are subject to inspection by the Engineer. Ready-mix concrete shall comply with requirements of ASTM C 94, and as specified herein, unless otherwise noted. During hot weather or

under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 will be required as follows:

1. When air temperatures are between 80 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1-1/2 hours to 1 hour
 2. When outside air temperatures are above 90 degrees F, reduce the mixing and delivery time from 1-1/2 hours to 45 minutes.
- B. Addition of water at the site for concrete mix with insufficient slumps, slumps less than the maximum specified herein, will not be permitted. Concrete delivered to the project with slump less than the minimum or greater than the maximum specified shall be rejected and discarded off site.
- C. Batch tickets for each load of concrete shall be submitted to the Engineer. The following information shall be provided on each batch ticket:
1. Design mix designation
 2. Exact time cement, water and aggregate were discharged into the mix
 3. Compressive strength of mix
 4. Amount of water added to the mix
- D. Maintain equipment in proper operating condition, with drums cleaned before charging of each batch. Schedule delivery of trucks in order to prevent delay of placing after mixing.
- E. Slump: All concrete shall be proportioned and produced to have a maximum slump of 4 inches and a minimum slump of 2 inches. A tolerance of up to, but not exceeding, 1 inch above the indicated maximum shall be allowed for individual batches in any one day's pour provided the average of the most recent ten batches within the same pour does not exceed the maximum limits. No tolerance will be permitted for individual batches when less than ten (10) batches are delivered for one day's pour.
- F. *Concrete Type and Strengths

Location	Maximum Size Aggregate	*28 Day Compressive Strength
Slabs on Grade	3/4"	4000 psi
Walls	3/4"	4000 psi
Columns	3/4"	See Notes on Plan
Beams, Supported Slabs & Joists	3/4"	4000 psi

*Twenty-eight day strength shall be as determined from concrete sampled in accordance with ASTM C 172 and 4-inch diameter x 8-inch cylinders tested in accordance with ASTM C 31 and C 39.

2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice." All reinforcing steel shall be cut and shop fabricated and delivered to the project properly tagged, bundled and ready to place.

PART 3 - EXECUTION

3.1 FORMWORK DESIGN

- A. The Contractor shall be responsible for the design of all concrete formwork. Formwork shall be designed in accordance with ACI 347 unless otherwise noted. Design, erect, support, brace and maintain formwork so that it will safely support vertical and lateral loads that might be applied until such loads can be supported by the concrete structure. Carry vertical and lateral loads to ground by formwork system and in place construction that has attained adequate strength for that purpose. Construct formwork so that concrete members and structures are of correct size, shape, alignment, elevation and position indicated, within tolerance limits of ACI 117.
- B. Design forms and falsework to include assumed values of live load, dead load, weight of moving equipment operated on formwork, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressure, stresses, lateral stability, and other factors pertinent to safety of structure during construction. Provide shores and struts with positive means of adjustment capable of taking up formwork settlement during concrete placing operations, using wedges or jacks or a combination thereof. Support form facing materials by structural members spaced sufficiently close to prevent deflection. Fit forms placed in successive units for continuous surfaces to accurate alignment, free from irregularities and within allowable tolerances. Provide camber in formwork as required for anticipated deflections due to weight and pressures of fresh concrete. Provide formwork sufficiently tight to prevent leakage of cement paste during concrete placement. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.
- C. Formwork for foundation systems may be omitted when workmanship and soil conditions permit accurate excavation and the omission is approved by the Engineer. Provide temporary openings in wall forms, column forms, and other locations necessary to permit inspection and cleanout.

- D. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be a commercially manufactured type. Non-fabricated wire shall be used. Form ties shall be constructed so that the end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than two diameters or twice the minimum dimensions of the tie from the formed faces of concrete to be permanently exposed to view except that in no case shall this distance be less than $\frac{3}{4}$ -inches. When the formed face of the concrete is not to be permanently exposed to view, form ties may be cut off flush with the formed surfaces.
- E. At construction joints, contact surface of the form for sheeting for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by more than one foot. The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint and to maintain a true surface. Wood forms for wall openings shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms. Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check. Formwork shall be so anchored to shores or other supporting surfaces or members that upward or lateral movement of any parts of the formwork system during concrete placement will be prevented. Runways for moving equipment or pump lines shall be provided with struts or legs and shall be supported directly on the formwork or structural member without resting on the reinforcing steel. When mudsills are to be placed for supporting concrete forms, a reasonably level and sufficiently compacted surface will be required. Shores shall be plumb within acceptable tolerances.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
1. Install keyways, reglets, recesses, and the like, for easy removal.

2. Do not use rust-stained steel form-facing material.

3.2 FORMWORK TOLERANCES

- A. Unless otherwise specified by the Engineer, formwork shall be constructed so that the concrete surfaces will conform to the tolerance limits listed in Table 4.3.1 of ACI 301.
- B. The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used for reference purposes to check tolerances.

3.3 PREPARATION OF FORM SURFACES AND FORM COATINGS

- A. All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign materials before concrete is placed in the forms.
- B. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- C. Coat form contact surfaces with form coating compound before reinforcement is placed. Provide form coating compounds that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatment of concrete surfaces requiring bond or adhesion or impede the wetting of surfaces to be cured with water or curing compounds. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces against which fresh concrete will be placed. Apply coatings in compliance with manufacturer's instructions.

3.4 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 3. Install dovetail anchor slots in concrete structures as indicated.

3.5 REMOVING AND REUSING FORMS

- A. Formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations provided surfaces are cured and protected from cold weather as specified herein.
- B. Forms and shoring in the formwork used to support the weight of concrete in beams, slabs and other structural members, shall remain in place until the concrete has reached the minimum strength specified of 75 percent of the specified 28-day design strength. Strength of concrete must be verified by concrete test cylinders molded and cured in the field under the same conditions that the concrete represented by these cylinders are cured and/or maturity meters connected to thermo-couples embedded in the concrete. It shall be the responsibility of the concrete technician, employed by the Owner, to inform the General Contractor when the strength of concrete cured in the field has attained the minimum specified strength required for removal of the forms.
- C. Bottom forms of slabs shall not be removed in less time than is indicated below unless otherwise approved by the Engineer.

Above 60 degrees F.	50 degrees F.	40 to 50 degrees F.
8 days	10 days	18 days

- D. When temperature is below 40 degrees F., the shores shall remain in place for an additional time equal to the lower temperature.
- E. When shores and other vertical supports are so arranged that the non-load-carrying form-facing material may be removed without loosening or disturbing the shores and supports, the facing material may be removed at an earlier age as specified or permitted. Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.
- F. When repair of surface defects or finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.
- G. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- H. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Engineer.

3.6 SHORES AND RESHORES

- A. When reshoring is permitted or required, the operations shall be planned in advance and shall be subject to approval. While reshoring is under way, no live load shall be permitted on the new construction.
- B. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- C. In no case during reshoring shall concrete in beam, slabs, column or any other structural member be subjected to combined dead and construction loads in excess of the loads permitted by the Engineer for the developed concrete strength at the time of reshoring. Reshores shall be placed as soon as practicable after stripping operations are complete but in no case later than the end of the working day on which stripping occurs.
- D. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.7 VAPOR RETARDERS

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
 - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

3.8 CRUSHED STONE FILL

- A. Crushed Stone Fill, 6 inches in depth, shall be placed under all concrete floors in contact with the ground. Stone shall be compacted as thoroughly as possible by tamping and rolling.

3.9 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
- B. Bars used for concrete reinforcement shall meet the following requirements for fabrication tolerance.

Sheared Length	+1"
Overall Dimension of Stirrups	+1/2"
All Other Bends	+1"

- C. Bars shall be placed to the following tolerances:

Concrete Cover to Formed Surfaces	+1/4"
Top Bars in Slabs	+1/4"
Top Bars in Beams	+1/2"
Horizontal Tolerance from Vertical Surfaces	+1/4"
Vertical Bars in Columns	+1/4"
Vertical and Horizontal Bars in Walls	+1/2"
Lengthwise in Member	+2"
Wire Fabric	+1/2" from center of slab or location called for on drawings

- D. Bars may be moved one bar diameter as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If the bars are moved more than one bar diameter, the resulting arrangement of bars shall be subject to approval.
- E. Minimum concrete protective covering for reinforcement except for extremely corrosive atmosphere or other severe exposures shall be as follows:

Concrete deposited Against the Ground	3"
Formed Surfaces Exposed to Weather or in Contact With the Ground	2"
Interior Surfaces:	1-1/2" for Beams and Column Ties; 3/4" for Slabs and Walls; Beam and Column Bars Shall be Anchored Against the Ties.

- F. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- G. All reinforcement, at the time concrete is placed, shall be free of mud, oil, or other materials that may adversely affect or reduce the bond. Reinforcement with rust, mill scale or tooth will be accepted as being satisfactory without cleaning or brushing provided the dimensions and weights, including heights of

deformations, of a cleaned sample shall not be less than required by applicable ASTM Standards.

- H. Accurately position, support, and secure reinforcement against displacement from construction loads, the placement of concrete or other anticipated loads. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
- I. The Contractor shall securely maintain the steel reinforcement accurately in place until the concrete is placed. Any and all disturbances of reinforcing from any cause whatsoever shall be fully corrected prior to placing of concrete, and all damaged bar supports and spaces shall be repaired or removed and replaced. All bars shall be extended beyond stress points the development length of the bar or be provided with an equivalent development length with a hook.
- J. When required or approved, welding of reinforcing steel shall conform to AWS D1.4. No welding shall be done at the bend in a bar. Welding of cross bars (tack welding) shall not be permitted except as authorized or directed by the Engineer.
- K. Over formwork, metal, plastic or other approved bar chairs and spacers shall be furnished. When the concrete surface will be exposed to weather in the finished structure or where rust would impair architectural finishes, the portions of all accessories in contact with the formwork shall be stainless steel or plastic.
- L. Unless otherwise shown on the plans and details, the following accessories shall be provided for supports for all reinforcement:
 - 1. Reinforced slabs-on-grade shall have plain precast concrete blocks sufficient to support bars within prescribed tolerances, or individual high chairs with runners to rest on soil.
 - 2. Slab bars shall have continuous slab bolsters for bottom bars spaced a maximum distance of 48 inches on center, and for individual high chairs spaced 48 inches with a no.6 continuous support bar for top bars. Top bar supports shall be spaced a maximum distance apart of 48 inches and no greater than 18 inches from the overhanging ends of bars.
 - 3. Beam bottom bars shall have beam bolsters spaced a maximum distance of 72 inches. Top beam bars may be supported from beam stirrups where permitted provided beam stirrups are fabricated sufficiently accurate to permit top bars to be placed within the tolerances permitted. Individual high chairs are required where ties or other supports are not provided.
 - 4. Box out all slots, chases, recesses or openings as shown on the drawings and specifications and as required by the work of other trades. Box out for all temporary openings such as slots, pipe spaces, etc., and build forms to seal up when and as required. Inserts, anchors, ties, hangers, etc. shall be built into concrete as required to secure the work of the various

subcontractors. Collars, sleeves, thimbles, anchors, sockets, etc., shall be furnished to the General Contractor by the other subcontractors for installation in the formwork. Sleeves shall not displace the reinforcing steel from its designated location by more than one bar diameter unless approved by the Engineer. The Contractor shall be responsible for the design, engineering, construction and the coordination of the placement of items affecting each trade in the formwork.

- M. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- N. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least 1/2 mesh plus end extension of wires but not less than 6 inches. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire. Wire mesh shall be so placed as to positively secure its position 1/3 of the slab thickness below the top of the slab for slabs on grade.
- O. Splices and offsets in reinforcements at points of maximum stress shall not be made. All splices shall be approved, and shall provide sufficient lap to transfer the stress between the bars by the required development length of the bars. The character and design of each splice shall conform to the requirements of the ACI 318. Bars shall not be bent after being embedded in hardened concrete, unless otherwise noted on the drawings. Bars with kinks or bends not shown on the drawings shall not be placed. The heating of reinforcement for bending or straightening will be permitted only if the entire operation is approved by the Engineer.
- P. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.
- Q. The Engineer shall always be notified of the pouring schedule in advance and in ample time prior to placement of concrete to inspect the reinforcement. Inspection of reinforcement will be made only after each section to be poured is complete.

3.10 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Clean joint surface of laitance, coatings, loose particles, and foreign matter to expose aggregate. Prepare for bonding of fresh concrete to new concrete that has hardened; at joints between foundation systems and walls dampen, but do not saturate, the roughened and cleaned surface of set concrete immediately before placing fresh concrete. In lieu of neat cement grout, bonding grout may

be a commercial bonding agent. Apply to cleaned concrete surfaces in accordance with the printed instruction of this bonding material manufacturer.

C. Construction Joints: Install so strength and appearance of concrete will be least impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Provide keyways at least 1-1/2 inches deep in all construction joints in walls, slabs, and between walls, and foundation systems.
3. Locate joints for beams, slabs, joists, and girders near the middle of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

D. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants are indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

- F. **Doweled Joints:** Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.11 WATERSTOPS

- A. **Flexible Waterstops:** Provide PVC Waterstops in all construction joints in concrete walls and in concrete beams and slabs. PVC waterstops shall also be provided between concrete beams and slabs at all expansion joints to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- B. **Self-Expanding Strip Waterstops:** Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.12 SLABS ON GRADE:

- A. **Preparation of Subgrade:** The subgrade shall be well drained and of adequate and uniform loadbearing nature. The in-place density of the subgrade soils shall be at least the minimum required in the specifications. The bottom of an undrained granular base course shall not be lower than the adjacent finished grade. The subgrade shall be free of frost before concrete placing begins. If the temperature inside a building where concrete is to be placed is below freezing, it shall be raised and maintained above 50 degrees F. long enough to remove all frost from the subgrade. The subgrade shall be moist at the time of concreting. If necessary, it shall be dampened with water in advance of concreting, but there shall be no free water standing on the subgrade nor any muddy or soft spots when the concrete is placed.
- B. **Joints:** Joints in slabs on grade shall be located as to divide the slab in areas not in excess of 800 sq. ft. The maximum distance between joints in slabs on grade at all points of contact between slabs on grade and vertical surfaces such as foundation walls and elsewhere as indicated. At exposed joints, recess the premolded fill on a minimum of ½-inch, and fill the remaining section with a joint seal and as specified herein. All exposed construction joints in the slabs on grade shall have the edges tooled and the crack and groove formed by the edging tool filled with a polyurethane joint sealant. No Form-A-Key or similar metal form joints will be permitted.

3.13 CONCRETE PLACEMENT

- A. Before placing concrete, the formwork installation, reinforcing steel, and items to be embedded or cast-in must be complete. Notify other crafts involved in ample time to permit the installation of their work; co-operate with other trades in setting such work, as required. Notify Engineer upon completion of installation of all reinforcing and other items in ample time to permit inspection of the work. Soil bottoms at foundation systems are subject to testing laboratory as directed by the Engineer. Place concrete immediately after approval of foundation excavations.
- B. Before placing concrete, all equipment for mixing and transporting and placing concrete shall be cleaned, all debris and ice removed from spaces to be occupied by the concrete, forms thoroughly cleaned of soil, ice, or other coatings which will prevent proper bond, reinforcement shall be securely tied in place and expansion joint material, anchors, and other embedded items shall be securely positioned. Hardened concrete and foreign materials shall be removed from the conveying equipment.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Engineer.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Place concrete in compliance with the practices and recommendations of ACI 304 or as herein specified. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practical by methods which will prevent separation or loss of ingredients and in a manner which will assure that the required quality concrete is obtained. Conveying equipment shall be of size and design to insure a continuous flow of concrete at the delivery point.
- E. Concrete placed by pumping shall conform to the recommendations of ACI Publication, "Placing Concrete by Pumping Methods."
- F. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, construction joints shall be located at points as provided for in the drawings or as approved. Deposit concrete as nearly as possible to its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

3. Do not use concrete which has become non-plastic and unworkable or does not meet the required quality control limits, or which has become contaminated by foreign material. Remove rejected concrete from the project site and dispose of in an acceptable location. Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand-spading, rodding, and tamping. Vibration of forms and reinforcing steel will not be permitted.
 4. Screed concrete which is to receive other construction to the proper level to avoid excessive skimming or grouting.
- G. Do not use concrete which has become non-plastic and unworkable or does not meet the required quality control limits, or which has become contaminated by foreign material. Remove rejected concrete from the project site and dispose of in an acceptable location. Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand-spading, rodding, and tamping. Vibration of forms and reinforcing steel will not be permitted.
- H. Concrete shall not be allowed to "freefall" a distance greater than 36 inches. All concrete placed in columns and walls shall be placed through a tremie with the bottom or outlet of the tremie being held at maximum of 36 inches above the surface where concrete is being placed.
- I. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Maintain reinforcement in position on chairs during concrete placement.
 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 4. Slope surfaces uniformly to drains where required.
 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of lumps and hollows before excess bleedwater appears on the surface. Do not sprinkle water on the plastic surface. Do not further disturb slab surfaces before starting finishing operations.
- J. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. All concrete placed in temperatures 40 degrees F. or below or exposed to temperatures 40 degrees F. or below within five (5) days after the concrete is placed, shall conform to the requirements of ACI 306.

2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- K. The following protection requirements for concrete placed, protected, and cured in temperature 40 degrees F. or less shall be considered the minimum acceptable standards.
1. Slabs, Beams: Enclose the entire perimeter of the floor below with a continuous sheet of reinforced polyethylene or canvas. The enclosure shall be securely fastened to the top of the outside edge of the forms of the area being protected and to the slab or floor level immediately below the concrete being protected. The top of the concrete surface shall be covered with either insulating blankets designed specifically for this use, or sheets of polystyrene covered with polyethylene. Sufficient heaters shall be placed in the enclosure below the slabs to maintain the air temperature within all sections of the enclosure between 60 degrees F. and 70 degrees F. for a minimum period of five (5) days. Salamanders will not be permitted.
 2. Columns and Walls: Forms shall remain in place for a minimum of five days. When the outside temperature falls below 32 degrees F., an insulating blanket shall be dropped over and around the perimeter of the column or wall. These blankets shall remain in place for a minimum period of five days.
 3. Slabs on Grade: Cover top with insulating blankets. Blankets shall remain in place for a minimum period of five days.
 4. Temperature of concrete at placement shall not be less than 55 degrees F.
 5. In addition to laboratory-cured test specimens, additional concrete test specimens shall be cured under the same field conditions that the concrete in the field represented by these cylinders is cured and high thermometers shall be placed on the surface of slab to record daily temperatures during curing period.
- L. Hot-Weather Placement: Comply with ACI 305 and as follows:
1. An approved admixture designed to retard the rate of set shall be used for all concrete placed when temperatures exceed 75 degrees F. Set retarding admixtures shall conform to ASTM C 494, Type D, water reducing and retarding.
 2. Wet forms thoroughly before placing. Cool reinforcing by wetting sufficiently so that steel temperatures will be nearly equal to the ambient air temperature.

3. Provide wind breaks around the perimeter of the area where concrete is being placed.
4. Fresh concrete with temperatures 90 degrees F. or above shall be discarded off site.
5. The amount of cement used in the job is computed for the temperature indicated on the approved design mix. For higher concrete mix temperature, the weight of the cement shall be increased at the rate of 12 lbs. per cubic yard for each 10 degrees F. above the concrete mix temperature.

3.14 FINISHING FORMED SURFACES

- A. Standard Rough Form Finish: Provide a standard rough form finish to all concrete formed surfaces that are to be concealed in the finish work or other construction. **NOTE:** Interior faces of walls of water retaining structures are not considered to be concealed. Standard rough form finish shall consist of all defective areas repaired as specified and all holes or voids larger than 3/8 inch filled with cement grout.
- B. Standard Finish for Exposed Surfaces: Provide an applied surface finish of "ThoroSeal" or an approved equal to all exposed interior and exterior concrete finishes unless otherwise noted. Interior faces of walls of water retaining structures, including areas which are normally submerged, are considered to be exposed surfaces and shall receive the specified standard finish for exposed surfaces. The surface finish shall consist of chopping and/or grinding down all high spots removing grinding of all burrs and/or other projections, filling all voids 3/8 inch and larger, and cutting out all unsound concrete and patching as specified herein. Before applying the finish, wet and clean the surface of all grease, oils, efflorescence, and other foreign material. Dampen surface immediately ahead of application. Apply the finish coat with a tampico fiber brush by laying the finish coat on the wall in a thick coat of a minimum of 2 lbs. per sq. yard, and brush to a uniform level surface. Do not apply in temperatures 40 degrees F or below, or when temperatures are likely to fall below 40 degrees F within 24 hours after application. The finish coat shall be mixed in strict accordance with the manufacturer's written instructions. After the finish coat has cured, apply a finish coat of "Quick Seal" at a minimum of 12 lb. per sq. yd. The ThoroSeal shall be applied by trained technicians.
- C. Smooth Form Finish: Provide a smooth form finish for all exposed interior concrete walls inside buildings, in pipe gallery areas, or as noted on the Drawings. Standard form finish shall produce a smooth, hard, uniform texture on the concrete. The arrangement of the forms and the number of seams and joints shall be kept to a minimum. Immediately after forms are removed, cut out all unsound concrete and patch as specified herein, and fill all pinholes and other voids larger than 1/4 inch with a cement grout. Compress mortar into voids

with a firm rubber trowel or float. After mortar dries, wipe off surface with burlap.

3.15 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratched Finish: After the concrete has been placed, consolidated, struck off, and leveled to a Class C tolerance, but still plastic, the surface shall be roughened with stiff brushes or rakes before a final set. A scratched finish shall be applied to all surfaces which are to receive a bonded surface finish.
- C. Floated Finish: After the concrete has been placed, consolidated, struck off, and leveled, the concrete shall not be worked further until ready for floating. Floating shall begin when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation. During or after the first floating, planeness of surface shall be checked with a 10'-0" straight edge applied at not less than two different angles. All high spots shall be cut down and all low spots filled during this procedure to produce a surface with Class B tolerance throughout. This slab shall then be floated immediately to a uniform sandy texture. A float finish shall be applied to all slab surfaces which are to receive a waterproofing membrane.
- D. Troweled Finish: The surface shall first be float-finished as specified. It shall next be power troweled, and finally hand troweled. The first troweling after power floating shall produce a smooth surface which may still show some trowel marks. Additional troweling shall be done by hand after the surface has hardened sufficiently. The final troweling shall be done when a ringing sound is produced as the trowel is moved over the surface. The surface shall be thoroughly consolidated by the hand troweling operations. The finished surface shall be essentially free of trowel marks, uniform in texture, and appearance, and shall be planed to a Class tolerance. On surfaces intended to support floor coverings, any defects of sufficient magnitude to show through the floor covering shall be removed by grinding. A trowel finish shall be applied to all surfaces which are exposed to view or are to receive a floor covering of carpet, vinyl, asbestos, tiles, etc.
- E. Broom Finish: Immediately after the concrete has received a float finish as specified in Section B, it shall be given a coarse transverse scored texture by drawing a broom or burlap belt across the surface. A broom finish shall be applied to all parking surfaces, exterior concrete walks, and concrete paving slabs.

3.16 FINISHING TOLERANCES

- A. Finishes with a Class C tolerance shall be true planes within $\frac{1}{4}$ inch in 24 inches as determined by a 24-inch straight edge placed elsewhere on the slab in any direction. Variation from level for Class A. tolerance shall not exceed $\frac{1}{4}$ inch in 10'-0" or $\frac{1}{2}$ inch maximum in any one bay between columns. Variation from level for a Class B and Class C finish shall not exceed $\frac{1}{4}$ inch in 10'-0" or $\frac{3}{4}$ inch in any one bay between columns.

3.17 RELATED UNFORMED SURFACES

- A. As tops of walls, horizontal offsets, and similar unformed surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching the adjacent formed surfaces. Continue the final surface treatment of formed surfaces uniformly across the adjacent unformed surface unless otherwise shown.

3.18 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.19 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.
- B. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures, and maintain without drying at a relatively constant

temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.

- C. Curing for all horizontal slab surfaces, except those to receive a bonded finish material, during periods when the outside air temperature does not exceed 60 degrees F. shall be provided by applying a membrane-forming curing compound to concrete surfaces as soon as the final troweling or floating operation has been completed. Apply uniformly with a roller brush at a rate not to exceed 200 sq. ft. per gallon. Maintain the continuity of the coating and repair damage to the coat during the entire curing period. Curing for surfaces to receive a bonded finish material shall be as noted below. Curing for all horizontal surfaces during period when the outside air temperature will exceed 60 degrees F. shall be provided by covering the entire surface with burlap. The burlap shall be lapped 1/2 width in order to provide a double thickness of burlap. Immediately following the placement of the burlap, the entire surface shall be maintained continuously wet for a period of 7 days. Do not permit surfaces to dry at any period during the required curing period.
- D. Cure formed surfaces by moist curing with the forms in place for the full curing period, or until forms are removed. If forms are removed before the curing period is complete, apply a membrane-forming curing compound to damp surfaces as soon as the water film has disappeared. Apply uniformly in continuous operation by roller brushes in accordance with the manufacturer's directions.
- E. Do not use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with any other cover or finish material which shall be bonded to the concrete. These surfaces must be watercured with a full coverage of burlap kept continuously moist for a period of 7 days.
- F. During the curing period, protect concrete from damaging mechanical disturbances, including load stresses, shocks, excessive vibration and from change caused by subsequent construction operations.

3.20 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.21 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Engineer. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.
- B. Repair and patch defective areas immediately after removal of forms as directed by the Engineer. Cut out honeycombs, rock pockets, voids over ½ inch in diameter and holes left by tie rods and bolts down to solid concrete, but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surfaces. Expose reinforcing steel with at least ¾ inch clearance all around. Dampen all concrete surfaces in contact with patching concrete, and brush with a neat cement grout coating or concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials to provide concrete of the same type or class as the original adjacent concrete. Place, compact, and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- C. Fill holes extending through concrete by means of a plunger type gun or other suitable device from the least exposed face to insure complete filling. Remove stains and other discolorations that cannot be removed by cleaning for all exposed surfaces. Repair isolated random cracks and single holes not over 1 inch in diameter by the dry-pack method. Groove the top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen all cleaned concrete surfaces and brush with a neat cement grout coating. Place dry-pack, consisting of 1 part Portland cement to 2-1/2 parts fine aggregate passing a no. 16 mesh sieve using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match the existing surface.
- D. Fill in holes and openings left in concrete structures for the passage of work by other trades, unless otherwise shown or directed, after the work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide all other miscellaneous concrete filling shown or required to complete work.
- E. Correct high areas in unformed surfaces by grinding, after the concrete has cured at least 14 days. Correct low areas in unformed surfaces during, or immediately after, completion of surface finishing operations by cutting out the low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Engineer.

3.22 FIELD QUALITY CONTROL

- A. Testing and Inspecting: The Owner shall employ a concrete testing laboratory to provide all laboratory testing services on the project and a concrete technician to perform all quality control tests on concrete and materials used to batch concrete. The testing agency employed shall meet the requirement of ASTM E 329.
- B. Such tests will be provided and paid for by the Owner, except that tests which reveal non-conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established shall be at the expense of the Contractor. The Owner will be responsible for paying for only the successful tests.
- C. The Contractor shall provide and maintain adequate facilities on the project for the testing laboratory to locate the required testing equipment and for safe storage area for test cylinders. The general contractor shall provide at his own expense all casual labor needed to assist the concrete technician in obtaining samples of concrete and concrete materials and moving and transporting cylinders and materials which are being tested.
- D. The following services shall be performed by the designated testing agency:
 - 1. Review and/or check-test the Contractor's proposed materials for compliance with the specifications.
 - 2. Review and/or check-test the Contractor's proposed mix design as required by the Engineer.
 - 3. Secure production samples of materials at plants or stock piles during the course of the work and test for compliance with the specifications.
 - 4. Conduct strength tests of the concrete during construction in accordance with the following procedures:
 - a. Secure composite samples in accordance with ASTM C 172. Each sample shall be obtained from a different batch of concrete on a random basis, avoiding any selection of the test batch other than by a number selected at random before commencement of concrete placement.
 - b. Mold and cure three specimens from each sample in accordance with ASTM C 31. Any deviations from the requirements of this Standard shall be recorded in the test report.
 - c. Test specimens in accordance with ASTM C 39. Two specimens shall be tested at 28 days for acceptance and one shall be the average of the strengths of the two specimens tested at 28 days. If one specimen in a test manifests evidence of improper sampling, molding or testing, it shall be discarded and the strength of the remaining cylinder shall be considered the test result. Should both specimens in the test show any of the above defects, the entire test

shall be discarded. When high early strength concrete is used, the specimens shall be tested at the ages indicated in the Contract Documents.

- d. Make at least one strength test for each 50 cu. yd., or fraction thereof, of each mix design of concrete placed in any 1 day. When the total quantity of concrete with a given mix design is less than 50 cu. yd., the strength test may be waived by the Engineer if, in his judgment, adequate evidence of satisfactory strength is provided, such as strength test results for the same kind of concrete supplied on the same day and under comparable conditions to other work or other projects.
 5. Determine slump of the concrete sample for each strength test and whenever consistency of concrete appears to vary, in accordance with ASTM C 143.
 6. Determine air content of normal weight concrete sample for each strength test in accordance with either ASTM C 231, ASTM C 173, or ASTM C 138 as appropriate.
 7. Determine unit weight of concrete sample for each strength test.
 8. Determine temperature of concrete sample for each strength test.
 9. Determine in-place strength of concrete by curing cylinders under the same field conditions that the concrete representing these field cylinders is cured and additionally by determining the degree/hours of curing required for the concrete to develop the required strength for form removal.
 10. Inspect concrete batching, mixing and delivery operations to the extent deemed necessary by the Engineer.
 11. Review the manufacturer's report for each shipment of cement.
- E. The Contractor shall maintain an accurate log showing the following information:
1. Date of pour
 2. Area poured
 3. Temperature at time of pour
 4. Average ambient temperature during curing period
 5. Date forms scheduled for removal
 6. Date form removal completed
 7. Method of reshoring (number of floor, etc.)
 8. Test cylinder serial numbers
 9. Strength of test cylinders at 7 and 28 days.

3.23 EVALUATION AND ACCEPTANCE OF CONCRETE STRUCTURES

- A. The concrete quality control testing as specified will be evaluated by the following criteria:

1. Compressive strength tests for laboratory-cured cylinders will be considered satisfactory if the averages of all sets of three consecutive compressive strength test results equal or exceed the 28 day design compressive strength of the type of class of concrete; and, no individual strength test falls below the required compressive strength by more than 500 psi. If compressive strength tests fail to meet these requirements, the concrete represented by these tests will be considered deficient and subject to additional testing and/or removal.
2. Concrete work which does not conform to the specified requirements, including strength, tolerance and finishes, shall be corrected as directed at the Contractors expense, without extension of time therefor. The Contractor shall also be responsible for the cost of corrections to any other work affected by or resulting from correction to the concrete work. Core tests, if required, shall be evaluated in accordance with the requirements of ACI 318.
3. The testing agency shall further provide quality control inspection and testing of materials used in concrete. The following inspection and tests shall be on all equipment and materials on a random basis:
 - a. Fineness modulus and gradation of sand
 - b. Fineness modulus and gradation of coarse aggregate.
 - c. Colorimetric of sand.
 - d. Weight per cu. ft. and percent of voids on a dry rodded basis of the coarse aggregate.
 - e. Check of aggregate stock piles for contamination or intermingling of aggregates.
 - f. Check of mixing equipment and trucks for compliance with ASTM C 94.
 - g. Absorption of stone and sand.

3.24 LEAK TESTING OF WATER RETAINING STRUCTURES

- A. All concrete structures which will retain water or wastewater under normal operating conditions shall be filled with water prior to backfilling and final exterior painting and tested for leaks. Unless otherwise specified by the Engineer, the tank shall remain filled with water for a period of seven (7) days. Any leaks, damp spots, or other defects found shall be repaired and made water tight to the satisfaction of the Engineer. The first 48 hours of the test are utilized to allow the concrete to absorb water. After the first 48 hours of the test, the water level shall be noted and monitored for the remaining five (5) days. A reduction in water greater than 0.1 percent per 24 hours shall be considered excessive and shall constitute failure of the leak test. (NOTE: Rainfall and evaporation must be considered during calculation of water loss. Rainfall shall be added to and evaporation shall be deducted from the measured loss to determine net liquid loss.)

END OF SECTION 033000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Concrete masonry units.
2. Concrete building brick.
3. Decorative concrete masonry units.
4. Pre-faced concrete masonry units.
5. Concrete facing brick.
6. Face brick.
7. Building (common) brick.
8. Hollow brick.
9. Glazed brick.
10. Structural-clay facing tile.
11. Firebox brick.
12. Clay flue lining units.
13. Stone trim units.
14. Mortar and grout.
15. Steel reinforcing bars.
16. Masonry joint reinforcement.
17. Ties and anchors.
18. Embedded flashing.
19. Miscellaneous masonry accessories.
20. Masonry-cell insulation.
21. Cavity-wall insulation.

- B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete".

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).

- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: The Contractor shall submit Shop Drawings and material certifications in accordance with Section 013300 "Submittal Procedures" for all materials to be used in the project.
- C. Samples: When requested by the Engineer, samples of the masonry materials required shall be submitted to the Engineer for approval prior to construction. The Contractor shall provide samples of brick closely matching the colors of the existing brick throughout the project area for consideration by the Owner of color to be used.
- D. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - 1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 - 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- E. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- F. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. All masonry materials shall be manufactured by reputable suppliers experienced in the production of masonry materials
- B. Source Limitations: Obtain masonry units and mortar ingredients of a uniform texture, quality and color, from single source from single manufacturer for each product required.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. All construction material shall be received, stored and protected in all manner to prevent water from entering the materials.
- B. Manufactured materials shall be delivered in unbroken containers labeled with manufacturer's name and brand.
- C. Store brick and concrete masonry units on elevated platforms in a dry location in a manner that will protect them from contact with soil and weather. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- D. Store cementitious materials on elevated platforms, in a dry location and covered with a waterproof material. Cementitious materials that have become damp, hardened or partially set shall not be used.
- E. Aggregates shall be stored in clean bins, scows, or platforms using positive means to prevent inclusion of foreign matter and where grading and other required characteristics can be maintained and contamination avoided.
- F. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location.
- G. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 WARRANTY

- A. All materials shall be warranted to be free of defects for a period of one (1) year after final acceptance by Owner.

1.8 PROJECT CONDITIONS

- A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: When approved by Engineer, use liquid cleaning methods only when air temperature is 40 degrees F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

- B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide square-edged units for outside corners unless otherwise indicated.
- B. Concrete Masonry Units: ASTM C 90 with a minimum solid area of 75 percent in accordance with ASTM C 145. Unless otherwise noted, all units shall be grade N. All concrete masonry units shall be at least 21 days old when delivered to the job site. The Engineer shall be furnished an affidavit indicating compliance with the curing requirements upon his request.
1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1,800 psi.
 2. Density Classification: Normal weight unless otherwise indicated.
 3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 4. Exposed Faces: Provide color and texture matching the range represented by sample.
 5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.3 CONCRETE AND MASONRY LINTELS

- A. Concrete Lintels: Precast units matching concrete masonry units with reinforcing bars as required to support necessary loading conditions.
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 BRICK

- A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
 - 1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - 2. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
- B. Face Brick: Facing brick complying with ASTM C 216.
 - 1. Grade: SW.
 - 2. Type: FBS.
 - 3. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
 - 4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 - 5. Size (Actual Dimensions): 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long, unless otherwise approved or indicated.
 - 6. Application: Use where brick is exposed unless otherwise indicated.
 - 7. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.
 - 8. Color and Texture: As selected by Owner.
- C. Building (Common) Brick: ASTM C 62, Grade MW.
 - 1. Size: Match size of face brick.
 - 2. Application: Use where brick is indicated for concealed locations.

2.5 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I (Type II or III may be approved in hot or cold weather conditions). Provide natural color or white cement as required to produce mortar color indicated.

- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C 91, Type II.
- E. Mortar Cement: ASTM C 1329.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
- G. Aggregate for Mortar: ASTM C 144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- H. Aggregate for Grout: ASTM C 404.
- I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
- J. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent by same manufacturer.
- K. Water: Potable water, free from injurious or deleterious materials.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615 or ASTM A 996, Grade 60.
- B. Masonry Joint Reinforcement, General: ASTM A 951; Hot-dip galvanized, carbon steel for exterior walls.
 - 1. Wire Size for Side, and Cross Rods, and Veneer Ties: 0.148-inch diameter.
 - 2. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches on center.
 - 3. Provide in lengths of not less than 10 feet.

- C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.
- D. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch diameter, hot-dip galvanized, carbon steel continuous wire.

2.7 TIES AND ANCHORS

- A. Materials: Provide ties and anchors acceptable to authorities having jurisdiction that are made from materials that comply with the following unless otherwise indicated or required.
 - 1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82, with ASTM A 153/A 153M, Class B-2 coating.
 - 2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, with ASTM A 153, Class B coating.
 - 3. Steel Plates, Shapes, and Bars: ASTM A 36.

2.8 MISCELLANEOUS ANCHORS

- A. All anchors shall be as shown on the drawings and as required by authorities having jurisdiction.
- B. Unit Type Inserts in Concrete: Cast-iron or malleable-iron wedge-type inserts.
- C. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153, Class C; of dimensions indicated.
- D. Post-installed Anchors: Torque-controlled expansion anchors.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.9 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing as follows:
 - 1. Stainless Steel: ASTM A 240, Type 304, 0.016 inch thick.
 - 2. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, 16-oz./sq. ft. weight or 0.0216 inch thick or ASTM B 370, Temper H01, high-yield copper sheet, 12-oz./sq. ft. weight or 0.0162 inch thick.

3. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
 4. Metal Drip Edge: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees.
 5. Metal Sealant Stop: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 1/4 inch to form a stop for retaining sealant backer rod.
 6. Metal Expansion-Joint Strips: Fabricate from stainless steel or copper to shapes indicated.
- B. Flexible Flashing: Use one of the following unless otherwise indicated:
1. Copper-Laminated Flashing: 7-oz./sq. ft. copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 2. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.040 inch.
 - a. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
 3. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymers alloy.
 4. EPDM Flashing: Sheet flashing product made from ethylene-propylene-diene-terpolymer, complying with ASTM D 4637, 0.040 inch thick.
- C. Solder and Sealants for Sheet Metal Flashings:
1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 2. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
 3. Elastomeric Sealant: ASTM C 920, chemically curing sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- D. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use one of the following unless otherwise indicated:
 - 1. Wicking Material: Absorbent rope, made from cotton.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
 - b. Strips, not less than 1-1/2 inches thick and 10 inches high, with dimpled surface designed to catch mortar droppings and prevent weep holes from clogging with mortar.
 - c. Sheets or strips full depth of cavity and installed to full height of cavity.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.

2. Use mortar consisting of portland cement-lime or masonry cement, water, and sand.
 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type S.
 3. For mortar parge coats, use Type S or Type N.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
 5. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
1. Pigments shall not exceed 10 percent of portland cement by weight.
 2. Mix to match Engineer's sample.
- D. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476,
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.

3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. No masonry shall be erected when the temperature has dropped below 45 degrees F., unless it is rising and at no time when it has dropped below 40 degrees F., except by permission of the Engineer. When work is permitted below 40 degrees F., provisions shall be made for heating and drying the materials and the completed work shall be protected in accordance with Structural Clay Products Technical Institutes Notes, Volume I, No. 1. Masonry shall not be laid on frozen work. Any work which freezes before the mortar has set shall be removed and replaced at the Contractor's expense.
- B. Frozen sand and wet masonry units shall be installed dry and thawed. Masonry units below 20 degrees F must be heated above 20 degrees F without overheating. Normal masonry procedures should be followed when work day temperatures are above 40 degrees F.
- C. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- D. Build chases and recesses to accommodate items specified in this and other Sections.
- E. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- F. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- G. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 1. Mix units from several pallets or cubes as they are placed.

- H. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. For concrete masonry units, each course shall be bedded solidly in mortar with vertical joints breaking halfway over course below. Vertical joints shall be buttered the full height of each unit. Jamb units shall be provided in sizes required to bond with wall units. No cells shall appear in the walls.
- D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- E. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- F. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 - 1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
- G. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- H. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- I. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- J. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- K. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- L. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 - 1. Install compressible filler in joint between top of partition and underside of structure above.
 - 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch clearance between end of anchor rod and end of tube. Space anchors 48 inches on center unless otherwise indicated.
 - 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 - 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with applicable building code requirements.
- M. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow brick and CMUs as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.6 COMPOSITE MASONRY AND CAVITY WALLS

- A. Bond wythes of composite masonry and cavity walls together using methods acceptable to authorities having jurisdiction and in accordance with applicable building codes.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Provide weep holes in exterior wythe of cavity, composite and veneer walls located immediately above ledges and flashing, spaced at 24 inches on center, unless otherwise indicated.

3.7 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.
- E. Reinforce masonry openings greater than 12-inches wide with horizontal joint reinforcing placed in 2 horizontal joints approximately 8-inches apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 24-inches beyond jambs of the opening.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than 1 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches on center vertically and 36 inches on center horizontally.

3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to wall framing and concrete and masonry backup with seismic masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten seismic anchors through sheathing to wall framing and [to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners.
 - 2. Embed connector sections and continuous wire in masonry joints. Provide not less than 2 inches of air space between back of masonry veneer and face of sheathing.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 16 inches on center vertically and 24 inches on center horizontally, with not less than 1 anchor for each 2.67 sq. ft. of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 36 inches, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
 - 1. Refer to structural drawings for expansion joint locations and spacing.
 - 2. See Division 7 section for “Joint Sealants”.

3.11 LINTELS

- A. Install steel lintels where indicated.

- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. Install flashing as follows unless otherwise indicated:
 - 1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 - 2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches; with upper edge tucked under building paper or building wrap, lapping at least 4 inches.
 - 3. At lintels and shelf angles, extend flashing a minimum of 6 inches into masonry at each end. At heads and sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
 - 4. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall and adhere flexible flashing to top of metal drip edge.
- B. Install single-wythe CMU flashing system in bed joints of CMU walls where indicated to comply with manufacturer's written instructions. Install CMU cell pans with upturned edges located below face shells and webs of CMUs above and with weep spouts aligned with face of wall. Install CMU web covers so that they cover upturned edges of CMU cell pans at CMU webs and extend from face shell to face shell.
- C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
 - 1. Use specified weep/vent products or open head joints to form weep holes.
 - 2. Space weep holes 24 inches on center unless otherwise indicated.
 - 3. Cover cavity side of weep holes with plastic insect screening at cavities insulated with loose-fill insulation.
- D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

3.13 PARGING

- A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch. Form a wash at top of parging and a cove at bottom. Damp-cure parging for at least 24 hours and protect parging until cured.

3.14 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Work shall progress in as clean a manner as possible, removing excess materials and mortar droppings daily. Keep cavity of cavity wall free from mortar droppings. Mortar droppings shall be removed from connecting or adjoining work before its final set. At completion of work, holes shall be pointed up in joints of exposed masonry surfaces, completely filled with mortar and tooled properly. Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes.
 - 3. Protect all adjacent surfaces from contact with cleaner.
 - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
 - 5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
 - 6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
 - 7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.15 DAMPPROOFING

- A. Spray on waterproofing shall be applied to the exterior face of all exterior masonry and concrete block walls. All surfaces shall have been thoroughly cleaned of all foreign material. Applicator must be recognized and experienced in his field and must be approved in writing by the Engineer since extensive damage to glass surfaces may result from carelessness or lack of experience in the trade.
- B. Material will consist of a clear non staining silicone water repellent. Material is to be guaranteed against adding color to masonry, stone, or concrete units. Material will be applied in one application by a flow on method using a low pressure type sprayer to achieve a coverage of not more than 150 square feet per gallons.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 - 1. Do not dispose of masonry waste as fill within 18 inches of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or sealing, and abandoning site utilities in place.
7. Temporary erosion and sedimentation control measures.

- B. Related Sections:

1. Division 01 Section "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion and sedimentation control measures.
2. Division 01 Section "Execution" for field engineering and surveying.
3. Division 01 Section "Construction Waste Management and Disposal".
4. Division 02 Section "Demolition" for demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.

- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, as indicated on Drawings or as designated by the Engineer.
- E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, as indicated on Drawings or as designated by the Engineer.
- F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 MATERIAL OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.
- B. Timber, steel and other merchantable materials removed incidental to clearing and grubbing shall remain the property of the Owner unless otherwise directed.

1.5 SUBMITTALS

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
 - 1. Use sufficiently detailed photographs or videotape.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.6 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Work on Adjoining Property: Work on adjoining property will be not permitted without the written consent of the property owner and the Engineer. This shall include, but not limited to temporary access to the Work, storage of materials and any ground disturbing activities.

- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.
- D. Utility Locator Service: Notify appropriate utility locator services for area where Project is located a minimum of 72 hours prior to commencing site clearing activities.
- E. Do not commence site clearing operations until temporary erosion and sedimentation control and plant/tree protection measures are in place.
- F. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Division 31 Section "Earth Moving."
 - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.

- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Wrap a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.
- D. Upon the establishment of permanent vegetative covers, remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site (including root structure) to avoid injury.
- B. Enclose the trunks of trees which are to remain adjacent to the work with substantial wooden boxes of such height as may be necessary to protect them from piled material, equipment or equipment operation. Use excavating machinery and cranes of suitable type and operate the equipment with care to prevent injury to remaining tree trunks, roots, branches and limbs.
- C. Do not cut branches, limbs, and roots except by permission of the Engineer. Cut smoothly and neatly without splitting or crushing. In case of cutting or unavoidable injury to branches, limbs, and trunks of trees, neatly trim the cut or injured portions and cover with an application of grafting wax and tree healing paint as directed.
- D. Protect by suitable means all cultivated hedges, shrubs and plants that might be injured by the Contractor's operations. Promptly heel in any such trees or shrubbery necessary to be removed and replanted. Perform heeling in and

replanting under the direction of a licensed and experienced nurseryman. Replant in their original position all removed shrubbery and trees after construction operations have been substantially completed and care for until growth is reestablished.

- E. Replace cultivated hedges, shrubs, and plants injured to such a degree as to affect their growth or diminish their beauty or usefulness, by items of kind and quality at least equal to the kind and quality existing at the start of the work.

3.4 EXISTING UTILITIES

- A. Locate, identify, and disconnect utilities indicated to be removed or abandoned in place.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Engineer not less than three (3) days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Engineer's written permission.
- C. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

- A. Clearing and grubbing shall consist of the removal and satisfactory disposal of all trees, brush, stumps, logs, grass, weeds, roots, decayed vegetable matter, posts, fences, stubs, rubbish and all other objectionable matter resting on or protruding through the original ground surface and occurring within the construction limits or right of way of any excavation, borrow area, or embankment.
- B. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
 - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 3. Use only hand methods for grubbing within protection zones.
 - 4. Chip removed tree branches and stockpile in approved areas, if approved by Engineer, or dispose of off-site.

- C. The work of clearing shall only be performed within the limits established by the plans, specifications, or the Engineer.
- D. Clearing shall consist of the felling and cutting up, or the trimming of, trees and the satisfactory disposal of the trees and other vegetation together with the down timber, snags, brush and rubbish occurring within the areas to be cleared. Trees and other vegetation, except such individual trees, groups of trees, and vegetation, as may be indicated on the plans to be left standing, and all stumps, roots and brush in the areas to be cleared shall be cut off 6 inches above the original ground surface.
- E. Individual trees and groups of trees designated to be left standing within cleared areas shall be trimmed of all branches to such heights and in such manner as may be necessary to prevent interference with construction operations. All limbs and branches required to be trimmed shall be neatly cut close to the whole of the tree or to main branches, and the cuts thus made shall be painted with an approved tree wound paint. Individual trees, groups of trees, and other vegetation, to be left standing shall be thoroughly protected from damage incident to construction operations by the erection of barriers or by such other means as the circumstances require.
- F. The Engineer will designate all areas of growth or individual trees which are to be preserved due to their desirability for landscape or erosion control purposes. When the trees to be preserved are located within the construction limits, they will be shown on the plans or designated by the Engineer.
- G. Clearing operations shall be conducted so as to prevent damage by falling trees to trees left standing, to existing structures and installations, and to those under construction, and so as to provide for the safety of employees and others. When such damages occur, all damaged areas shall be repaired, removed or otherwise resolved utilizing generally accepted practices at the Contractor's expense.
- H. Grubbing shall consist of the removal and disposal of all stumps, roots and matted roots from all cleared areas, except as herein specified.
- I. In embankment areas, when the depth of embankment exceeds 42 inches in height sound stumps shall be cut off not more than 6 inches above the existing ground level and not grubbed. Unsound or decayed stumps shall be removed to a depth of approximately 2 feet below the natural ground surface.
- J. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches and compact each layer to a density equal to adjacent original ground.

- K. Clearing and grubbing operations shall be completed sufficiently in advance of grading operations as may be necessary to prevent any of the debris from the clearing and grubbing operations from interfering with the excavation or embankment operations. All work under this section shall be performed in a manner which will cause minimum soil erosion. The Contractor shall perform such erosion control work, temporary or permanent, as may be directed by the Engineer in order to satisfactorily minimize erosion resulting from clearing and grubbing operations.

3.6 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to a depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Remove subsoil and non-soil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 1. Limit height of topsoil stockpiles to 72 inches.
 - 2. Do not stockpile topsoil within protection zones.
 - 3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.
 - 4. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.7 SITE IMPROVEMENTS

- A. Remove existing above and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing, full-depth joints coincide with line of demolition, neatly saw-cut along the line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
 - 2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.
- C. If items are shown on the plans to be fully or partially removed and replaced, those existing improvements shall be carefully disassembled and/or removed

as necessary to permit construction, safely stored by the Contractor to prevent harm to the materials, then following construction, reassembled in the original location in a manner that matches the assembly prior to its removal.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Timber, steel and other merchantable goods and materials removed incidental to clearing and grubbing shall remain the property of individual property owners. unless otherwise directed.
- B. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off site.
- C. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.
- D. All combustible matter shall be deposited at locations approved by authorities having jurisdiction. Combustible matter may be burned (with written approval of authorities having jurisdiction) or may be disposed of as stated above.
- E. Debris shall not be burned unless written permission or permit is issued by the Fire Marshall or other entity having jurisdiction. The Contractor shall adhere to all limitations and conditions set forth in the permit.
- F. Burning shall be done at such time and in such a manner as to prevent fire from spreading and to prevent any damage to adjacent cover and shall further be subject to all requirements of agencies having jurisdiction pertaining to the burning. Disposal by burning shall be kept under constant attendance until all fires have burned out or have been extinguished.

END OF SECTION 311000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Preparing subgrades for buildings, structures, slabs-on-grade, walks, pavements, turf and grasses, and plants.
 - 2. Excavating and backfilling for buildings and structures.
 - 3. Drainage course for concrete slabs-on-grade.
 - 4. Subbase and base courses for concrete walks, and pavements and asphalt paving.
 - 5. Subsurface drainage backfill for walls and trenches.
 - 6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

- B. Related Sections:

- 1. Division 01 Sections "Construction Progress Documentation" and "Photographic Documentations" for recording preexcavation and earth moving progress.
 - 2. Division 01 Section "Temporary Facilities and Controls" for temporary controls, utilities, and support facilities; also for temporary site fencing if not in another Section.
 - 3. Division 03 Section "Cast-in-Place Concrete" for granular course if placed over vapor retarder and beneath the slab-on-grade.
 - 4. Divisions 21, 22, 23, 26, 27, 28, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
 - 5. Division 31 Section "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above and below-grade improvements and utilities.
 - 6. Division 32 Section "Turf and Grasses" for finish grading in turf and grass areas, including preparing and placing planting soil for turf areas.
 - 7. Division 32 Section "Plants" for finish grading in planting areas and tree and shrub pit excavation and planting.

1.3 SITE CONDITIONS

- A. Site Information: Unless otherwise indicated in the Contract Documents, no subsurface test results are available for this project. Test borings and other exploratory operations may be undertaken by the Contractor at their own expense, provided such operations are acceptable to the Owner and authorities having jurisdiction.
- B. The Contract Documents may contain a Geotechnical Report in the appendix of these documents. When that is the case, all recommendations contained in the Geotechnical Report shall be implemented by the Contractor as described in that document.
- C. Where boring logs and related information are included in the Geotechnical Report, this information depicts approximate subsurface conditions only at these specific locations and at the particular time designated on the logs. Subsurface conditions at other locations may differ from those reported at the boring locations. It is expressly understood that neither the Owner nor the Engineer will be responsible for interpretations or conclusions drawn from the boring data by the Contractor. The data are made available for the convenience of the Contractor. Additional test borings and other exploratory operations may be undertaken by the Contractor at his own expense provided such operations are acceptable to the Owner and authorities having jurisdiction.

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Cohesionless Materials: Include poorly and well graded gravels (GP and GW) and poorly and well graded sands (SP and SW). Cohesionless soils are generally regarded as free draining.
- F. Cohesive Materials: Clayey gravels (GC), clayey sands (SC), lean clays (CL), fat clays (CH), silts (ML and MH), and organic (GM) and silty sands (SM) will be

considered cohesionless only when the fines have a plastic index of 0. Otherwise they will be considered cohesive.

- G. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- H. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated for footings, foundations, pipework and other construction as shown on the Drawings.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices or changes in the Work as appropriate.
 - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
 - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be without additional compensation.
- I. Fill: Soil materials used to raise existing grades.
- J. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
 - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom; measured according to SAE J-1179.
 - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- K. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

- L. Select Backfill: Backfill and fill material that is transported to the site from outside the project limits, and which meets the soil requirements specified herein as satisfactory materials. Material excavated in conjunction with the construction of this project cannot be considered as “select backfill” for payment purposes.
- M. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- N. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- O. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- P. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.5 SUBMITTALS

- A. Product Data: For each type of the following manufactured products required:
 - 1. Geotextiles.
 - 2. Flowable Fill (Controlled low-strength material), including design mixture.
 - 3. Warning tapes.
- B. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D 2487.
 - 2. Laboratory compaction curve according to ASTM D 698.
- C. Blasting plan approved by authorities having jurisdiction.
- D. Seismic survey report from seismic survey agency.
- E. Preexcavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth moving operations. Submit before earth moving begins.

1.6 QUALITY ASSURANCE

- A. **Blasting:** Comply with applicable requirements in NFPA 495, "Explosive Materials Code," and prepare a blasting plan reporting the following:
 - 1. Types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- B. **Seismic Survey Agency:** An independent testing agency, acceptable to authorities having jurisdiction, experienced in seismic surveys and blasting procedures shall be provided and paid for by the Contractor to perform the following services:
 - 1. Report types of explosive and sizes of charge to be used in each area of rock removal, types of blasting mats, sequence of blasting operations, and procedures that will prevent damage to site improvements and structures on Project site and adjacent properties.
 - 2. Seismographic monitoring during blasting operations.
- C. **Geotechnical Testing Agency:** A geotechnical testing firm will be selected by the Owner to provide construction material testing services as required for the project.
- D. All work associated with this Section shall comply with latest edition of the North Carolina Department of Transportation, Standard Specifications for Roads and Structures where those requirements are more stringent than those specified herein.
- E. All work associated with this Section shall comply with the latest edition of the North Carolina Department of Environment and Natural Resources, Erosion and Sediment Control Planning and Design Manual.
- F. Comply with all pollution control rules, regulations, ordinances, and statutes which apply to any work performed under the Contract, including any air pollution control rules, regulations, ordinances and statutes, or any municipal regulations pertaining to air pollution.
- G. During the progress of the work, maintain the area of activity, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. If the Engineer determines that it is necessary to use calcium chloride or more effective dust control, furnish and spread the material, as directed, and without additional compensation.

1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
 - 1. Do not proceed with work on adjoining property until directed by Engineer.
- C. Utility Locator Service: Notify appropriate utility locator services for area where Project is located before beginning earth moving operations.
- D. Do not commence earth moving operations until tree and plant-protection measures are in place.
- E. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Borrow material shall be selected to meet the requirements and conditions of the particular fill for which its use is intended. Sand clay soils shall be capable

of being readily shaped and compacted to the required densities, and shall be free of roots, trash, and other deleterious material. Unless specifically provided, no borrow shall be obtained within the limits of the project site without written approval. Borrow shall meet the same requirements as other onsite materials as specified herein.

- C. The Contractor shall place only borrow material that has been specifically identified as acceptable for this section, unless otherwise directed by the Engineer.
- D. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, CL, ML, and SM according to ASTM D 2487 or Groups A-1, A-2-4, A-2-5, and A-3 according to AASHTO M 145, or a combination of these groups; free of masonry, rock or boulders larger than 4 inches in any dimension, and free of metal, gypsum, lime, debris, waste, frozen materials, vegetation, and other deleterious matter, unless otherwise specified.
 - 1. Organically contaminated soils must be removed from the area of grading operations. At the discretion of the Engineer, topsoil within the area to be stripped shall be stockpiled in a convenient area, selected by the Engineer, for later use in planting areas. All topsoil shall be graded by the Engineer as suitable and shall be stockpiled separately as directed by the Engineer in the field.
 - 2. Soft or excessively yielding material shall be removed and replaced with inert controlled fill.
 - 3. All roots, organic matter, trash, debris, and other unsuitable materials that may find their way into otherwise acceptable fill material shall be removed during the dumping and spreading operations.
 - 4. Fill material shall have a minimum laboratory dry weight, ASTM D-698, of at least 100 pounds per cubic foot unless specifically exempted from this requirement by the Engineer.
- E. Unsatisfactory Soils: Soil Classification Groups GC, SC, OL, CH, MH, OH, and PT according to ASTM D 2487 and Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7 according to AASHTO M 145, or a combination of these groups, unless otherwise specified.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- F. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- G. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least

95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

- H. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- I. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- J. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- K. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- L. Pipe Bedding: Narrowly graded washed crushed stone or crushed gravel meeting the requirements of ASTM D 448, aggregate grading size 57.
- M. Sand: ASTM C 33; fine aggregate.
- N. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

- A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
 - 1. Survivability: Class 2; AASHTO M 288.
 - 2. Grab Tensile Strength: 157 lbf; ASTM D 4632.
 - 3. Sewn Seam Strength: 142 lbf; ASTM D 4632.
 - 4. Tear Strength: 56 lbf; ASTM D 4533.
 - 5. Puncture Strength: 56 lbf; ASTM D 4833.
 - 6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
 - 7. Permittivity: 0.2 per second, minimum; ASTM D 4491.
 - 8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

- B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: Class 2; AASHTO M 288.
2. Grab Tensile Strength: 247 lbf; ASTM D 4632.
3. Sewn Seam Strength: 222 lbf; ASTM D 4632.
4. Tear Strength: 90 lbf; ASTM D 4533.
5. Puncture Strength: 90 lbf; ASTM D 4833.
6. Apparent Opening Size: No. 60 sieve, maximum; ASTM D 4751.
7. Permittivity: 0.02 per second, minimum; ASTM D 4491.
8. UV Stability: 50 percent after 500 hours' exposure; ASTM D 4355.

2.3 FLOWABLE FILL (CONTROLLED LOW-STRENGTH MATERIAL)

- A. Flowable Fill (controlled low-strength material) shall meet the requirements of NCDOT Standard Specifications for Roads and Bridges, (latest revision). Flowable fill shall have a minimum 28-day compressive strength of 125 psi and shall be mixed such that cement content is 100 to 150 pounds per cubic yard, air content is less than 35 percent and slump is between 7 and 9 inches.

2.4 ACCESSORIES

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.

5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Locate existing underground utilities in the area of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
- B. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult the Engineer immediately for directions as to procedure. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of utility companies.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- D. Do not commence earth moving operations until temporary erosion and sedimentation control measures, as shown on the plans, as specified herein or as may be required by authorities having jurisdiction are in place.
- E. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface. Shape the subgrade as indicated on the drawings by forking, furrowing, or plowing so that the first layer of new material placed thereon will be well bonded to it.
- F. After removal of all existing topsoil, debris, and other undesirable material, the areas which are to receive fill, which have been cut to the desired grade, or which are at the approximate required subgrade elevation without additional earthwork, should be proofrolled to locate any soft or yielding area. Proofrolling shall be done as described below.
- G. Any soft or excessively yielding material revealed by the proofrolling shall be removed and replaced with inert controlled fill. The Engineer shall be the sole judge of what constitutes soft or excessively yielding material.
- H. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 CUTTING CONCRETE OR ASPHALT SURFACE CONSTRUCTION

- A. All pavement cutting and repair shall be done in accordance with the requirements of authorities having jurisdiction. Cuts in concrete and asphaltic concrete shall be no larger than necessary to provide adequate working space for proper installation of pipe and appurtenances. Cutting shall be performed with a concrete saw in a manner which will provide a clean groove the complete thickness of the surface material along each side of the trench and along the perimeter of cuts for structures.
- B. Concrete and asphaltic concrete over trenches excavated for pipelines shall be removed so that a shoulder not less than 12 inches in width at any point is left between the cut edge of the surface and the top edge of the trench. Trench width at the bottom shall not be greater than at the top and no undercutting will be permitted. Cuts shall be made to and between straight or accurately marked curved lines which, unless otherwise required, shall be parallel to the center line of the trench.
- C. Pavement or other surfaces removed for connections to existing lines or structures shall not be of greater extent than necessary for the installation.
- D. Where the trench parallels the length of concrete walks and the trench location is all or partially under the walk, the entire walk shall be removed and replaced. Where the trench crosses drives, walks, curbs, or other surface construction, the surface construction shall be removed and replaced between existing joints or between saw cuts.

3.3 DEWATERING

- A. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface water and groundwater entering excavations, trenches, or other parts of the work. Each excavation shall be kept dry during subgrade preparation and continually thereafter until the structure to be built, or the pipe to be installed therein, is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.
- B. All excavations for concrete structures or trenches that extend down to or below groundwater shall be dewatered by lowering and keeping the groundwater level beneath such excavations 12 inches or more below the bottom of the excavation.
- C. The Contractor is responsible for obtaining any required permits or permissions necessary for the disposal of groundwater that is removed. Any discharged groundwater shall be clean and free of sediment.

- D. The Contractor shall be responsible for the condition of any pipe or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free of sediment.
- E. The Contractor shall take special care to prevent the siltation of streams and remove all organically contaminated sediment, saturated soil, and other undesirable material from existing watercourses.
- F. Prevent surface water and ground water from entering or accumulating in trenches and other excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area. Do not use excavated trenches as temporary drainage ditches. Divert water from these areas without causing damage to adjacent property.
- G. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

3.4 EXPLOSIVES

- A. Where blasting is permitted, it shall be done only by qualified personnel and in accordance with all requirements of authorities having jurisdiction. The Contractor shall be responsible for any damage done to adjacent structures, properties, or to persons, by reason of the blasting or other earthwork operations. The Contractor shall also be responsible for damage to other site improvements including, but not limited to embankments and cut areas, and sewer, water, gas or other underground lines which may result from blasting or earthwork operations. All such damage shall be repaired and made good by the Contractor in a timely manner.
- B. Suitable methods shall be employed to confine all materials lifted by blasting within the limits of the excavation or trench.
- C. All rock which cannot be handled and compacted as earth shall be kept separate from other excavated materials and shall not be mixed with backfill or embankment materials except as specified or directed.
- D. Perform blasting without weakening the bearing capacity of rock subgrade and with the least-practicable disturbance to rock to remain.
- E. Obtain written permission from authorities having jurisdiction before bringing explosives to Project site or using explosives on Project site.

3.5 EXCAVATION, GENERAL

- A. Perform all excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

- B. Furnish, put in place, and maintain such sheeting, bracing, etc., as may be necessary to support the sides of the excavation to comply with the requirements of governing authorities having jurisdiction.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- D. The use of mechanical equipment will not be permitted in locations where its operation would cause damage to trees, buildings, culverts, or other existing property, utilities, or structures above or below ground. In all such locations, hand excavating methods shall be used.
- E. Widening of cuts or flattening of cut slopes will not be required in rock or material which required ripping. When rock is unexpectedly encountered, any widening or flattening already begun shall be transitioned to leave the cut with a pleasing and safe appearance.
- F. Unclassified Excavation: Excavate to subgrade elevations regardless of the character, nature or composition of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
 - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs-on-grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.
- G. Classified Excavation: Excavate to subgrade elevations. Material to be excavated will be classified as earth or rock. When rock is encountered within the limits of construction, the Contractor shall notify the Engineer prior to any removal. Upon the Engineer's authorization, the Contractor shall remove the rock. The Contractor shall not be paid for rock removed without prior approval from the Engineer.
 - 1. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to

be removed; together with soil, boulders, and other materials not classified as rock or unauthorized excavation.

- a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.
2. Rock excavation includes removal and disposal of rock. Remove rock to lines and subgrade elevations indicated to permit installation of permanent construction without exceeding the following dimensions:
 - a. 24 inches outside of concrete forms other than at footings.
 - b. 12 inches outside of concrete forms at footings.
 - c. 6 inches outside of minimum required dimensions of concrete cast against grade.
 - d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
 - e. 6 inches beneath bottom of concrete slabs-on-grade.
 - f. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe or 42 inches wide.

3.6 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
 3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavations at Edges of Tree- and Plant-Protection Zones:
 1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

3.7 EXCAVATION FOR WALKS AND PAVEMENTS

- A. Excavate and shape the surface of areas under walks to indicated lines, grades, elevations, subgrades and cross sections, with the finish surface not more than 0 inches above or 1 inch below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains.
- B. Excavate and shape the surface of areas under pavement to indicated lines, grades, elevations, subgrades and cross sections, with the finish surface not more than 1/2 inch above or below the required subgrade elevation, compacted as specified, and graded to prevent ponding of water after rains. Include such operations as plowing, discing, and any moisture or aerating required to provide the optimum moisture content for compaction.
- C. Fill low areas resulting from removal of unsatisfactory soil materials, obstructions, and other deleterious materials, using satisfactory soil material.

3.8 EXCAVATION FOR UTILITY TRENCHES

- A. Perform all excavation of every description and of whatever substance encountered so that the pipe can be laid to the indicated gradients, lines, depths, and elevations shown on the drawings.
- B. Except where tunneling is indicated on the drawings, is specified, or is permitted by the Engineer, all trench excavation shall be open cut from the surface.
- C. No more trenches shall be opened in advance of pipe laying than is necessary to expedite the work. One block or 400 feet (whichever is the shorter) shall be the maximum length of open trench on any line under construction.
- D. Mechanical equipment used for trench excavation shall be of a type, design, and construction and shall be controlled, such that uniform trench widths and vertical sidewalls are obtained at least from an elevation one foot above the top of the installed pipe to the bottom of the trench, and that trench alignment is such that pipe when accurately laid to specified alignment will be centered in the trench with adequate clearance between the pipe and sidewalls of the trench. Undercutting the trench sidewall to obtain clearance will not be permitted.
- E. Where pipe grades or elevations are not definitely fixed by the contract drawings, trenches shall be excavated to a depth sufficient to provide a minimum depth of backfill cover over the top of the pipe. Cover depths may be

necessary on vertical curves or to provide necessary clearance beneath existing pipes, conduits, drains, drainage structures, or other obstructions encountered at normal pipe grades. Measurement of pipe cover depth shall be made vertically from the outside top of pipe to finished ground or pavement surface elevation except where future surface elevations are indicated on the drawings.

- F. Excavate trenches to uniform widths to provide a maximum trench width no greater than the pipe outside diameter plus 24 inches (12 inches on either side of pipe). Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated. Do not widen trenches by scraping or loosening materials from the sides.
- G. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
 - 1. For pipes and conduit to be bedded in earth excavated trenches, fine grade the bottoms of such trenches to allow firm bearing for the bottom of the pipe on undisturbed earth. Where any part of the trench has been excavated below the grade of the pipe, fill the part excavated below such grade with pipe bedding material and compact at the Contractor's expense.
 - 2. For pipes and conduit to be laid in embankments or other recently filled material, first place the fill material to the finish grade or to a height of at least one foot above the top of the pipe, whichever is the lesser. Take particular care to ensure maximum consolidation of material under the pipe location. Excavate the pipe trench as though in undisturbed material.
 - 3. For trench bottoms in poor soils excavate and remove unstable or unsuitable soil to a width and depth, as directed by the Engineer, and refill with a thoroughly compacted gravel bedding.
 - 4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
- H. Trenches in Tree- and Plant-Protection Zones:
 - 1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
 - 2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
 - 3. Cut and protect roots according to requirements in Division 01 Section "Temporary Tree and Plant Protection."

- I. Where trench sheeting is left in place, such sheeting shall not be braced against the pipe, but shall be supported in a manner which will preclude concentrated loads or horizontal thrusts on the pipe. Cross braces installed above the pipe to support sheeting may be removed after pipe embedment has been completed.

3.9 SUBGRADE INSPECTION

- A. Notify Engineer when excavations have reached required subgrade.
- B. Subgrades for concrete structures and trench bottoms shall be firm, dense, and thoroughly compacted and consolidated; free from mud and muck; and sufficiently stable to remain firm and intact under the feet of the workmen.
- C. If Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- D. Subgrades for concrete structures or trench bottoms, which are otherwise solid but which become mucky on top due to construction operations, shall be reinforced with one or more layers of crushed rock or gravel. The stabilizing material shall be spread and compacted to a depth of not less than 6 inches below the bottom of the structure or pipe. Not more than ½ inch depth of mud or muck shall be allowed to remain on stabilized trench bottoms when the pipe bedding material is placed thereon. The finished elevation of stabilized subgrades for concrete structures shall not be above subgrade elevations indicated on the drawings.
- E. Proof-roll subgrade below structures, slabs, pavements and other areas as directed by Engineer. Proofrolling shall be done with at least four (4) overlapping passes of a heavy-duty flat wheel vibratory roller, at least 20 tons, or by its approved equivalent.
- F. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction (longest dimension of Project). Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer, and replace with compacted backfill or fill as directed.
- G. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer, without additional compensation.

3.10 UNAUTHORIZED EXCAVATION

- A. Unauthorized excavation consists of the removal of materials beyond indicated lines, grades, or elevations without the specific direction of the Engineer.
- B. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Additional concrete to fill unauthorized excavations shall be placed, by and at the expense of the Contractor, with concrete placed at the same time and monolithic with the concrete above.
- C. For pipe trenches and elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

3.11 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.12 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing concrete formwork.
 - 5. Removing trash and debris.
 - 6. Removing temporary shoring and bracing, and sheeting.
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.13 UTILITY TRENCH BACKFILL

- A. Unless otherwise specified or indicated on the drawings, use suitable material for backfill which was removed in the course of making the construction

excavations. Do not use frozen material for the backfill and do not place backfill on frost, snow, ice or frozen or muddy material. Remove previously frozen material before new backfill is placed. Start backfilling as soon as practicable after the pipes have been laid, or the structures have been built and are structurally adequate to support the loads, including construction loads to which they will be subjected, and proceed until its completion.

- B. With the exception mentioned below in this paragraph, do not backfill trenches at pipe joints until after that section of the pipeline has successfully passed any specified tests required. Should the Contractor wish to minimize the maintenance of lights, and barricades, and the obstruction of traffic, he may, at his own risk, backfill the entire trench as soon as practicable after installation of pipe, and the related structures have acquired a suitable degree of strength. He shall, however, be responsible for removing and later replacing such backfill, at his own expense, should he be ordered to do so in order to locate and repair or replace leaking or defective joints or pipe.
- C. Do not drop large masses of backfill material into the trench in such a manner as to endanger the pipeline. Use a timber grillage to break the fall of material dropped from a height of more than 5 feet. Exclude pieces of bituminous pavement from the backfill unless their use is expressly permitted.
- D. Zone Around Pipe: Place bedding material to the level shown on the Drawings and work material carefully around the pipe to insure that all voids are filled, particularly in bell holes. For backfill up to a level of 2 feet over the top of the pipe, use only selected materials containing no rock, clods or organic materials. Place the backfill and compact thoroughly under the pipe haunches and up to the mid line of the pipe in layers not exceeding 6 inches in depth. Place each layer and tamp carefully and uniformly so as to eliminate the possibility of lateral displacement. Place and compact the remainder of the zone around the pipe and to a height of one foot above the pipe in layers not exceeding 6 inches and compact to a maximum density of at least 100 percent as determined by ASTM D698.
- E. Backfill voids with satisfactory soil while removing shoring and bracing.
- F. Tamping: Deposit and spread backfill materials in uniform, parallel layers not exceeding 12 inches thick before compaction. Tamp each layer before the next layer is placed to obtain a thoroughly compacted mass. Furnish and use, if necessary, an adequate number of power driven tampers, each weighing at least 20 pounds for this purpose. Take care that the material close to the bank, as well as in all other portions of the trench, is thoroughly compacted. When the trench width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe, backfill may, on approval of the Engineer, be compacted by the use of suitable rollers, tractors, or similarly powered equipment instead of by tamping. For compaction by tamping (or rolling), the rate at which backfilling material is

deposited in the trench shall not exceed that permitted by the facilities for its spreading, leveling and compacting as furnished by the Contractor.

- G. Follow the measures described herein to ensure the optimum moisture content of the backfill material prior to placement in the trench. Perform no compaction by tamping (or rolling) when the material is too wet either from rain or applied water to be compacted properly.
- H. Compact backfill in pipe trenches to the maximum density as shown on the drawings, or as specified herein.
- I. Flowable Fill (Controlled Low-Strength Material): Place initial backfill of flowable fill to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.
- J. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- K. Install warning tape directly above utilities as shown on the Drawings.

3.14 SOIL FILL

- A. After a stable, non-yielding surface has been established, the surface of the area to be filled shall be scarified with a disc or harrow to a depth of 4 to 6 inches. An initial 3-inch layer of fill material shall then be spread over the scarified surface and the entire area compacted as specified below.
- B. No fill shall be placed on any area until that area has been inspected and approved by the Engineer. Fill shall not be placed mud, frost, snow or ice. Fill materials shall be spread in uniform horizontal layers not exceeding 8 inches in uncompacted thickness. Alternating layers of cohesive and granular fill soils shall not be permitted. Spreading and compacting of fill material should be started at the lowest portion of the site. All fill must be placed in horizontal layers. Sloping fill planes will not be permitted. Fill material shall be distributed over the full width of the embankment, and in no case will deep ruts be allowed to form.
- C. Keyways shall be provided at the toe of each fill slope as shown on the drawings. As each layer of fill meets the natural grade of a slope, a bench, approximately 7 to 8 feet wide, shall be cut into the existing grade with each layer of newly placed fill. If rock is encountered at the face of the natural grade, the original ground shall be cut in vertical steps of 4 to 5 feet and a horizontal bench cut into the rock at the top of each vertical increment. A horizontal plateau, approximately 15 to 20 feet wide, should be provided in the existing slope at vertical intervals of roughly 25 feet. Subsurface drains shall be installed at the toe of the slope and wherever springs or excessive seepage are encountered. Drains should be led to the outside face of the embankment and

the water picked up and carried away in such a manner as to avoid softening the embankment or its toe, or producing erosion gullies.

- D. Place and compact fill material in layers to required elevations as follows:
 - 1. Under grass and planted areas, use satisfactory soil material.
 - 2. Under walks and pavements, use satisfactory soil material.
 - 3. Under steps and ramps, use engineered fill.
 - 4. Under building slabs, use engineered fill.
 - 5. Under footings and foundations, use engineered fill.

3.15 SOIL MOISTURE CONTROL

- A. Before compaction begins, the fill shall be brought to a water content that will permit proper compaction. This may require aerating the material if it is too wet or the addition of water if it is too dry. If additional water is required, it should be uniformly distributed through the use of approved water wagons, and shall be thoroughly incorporated into the material by means of discs or other suitable mixing equipment. Care shall be taken to avoid trapping water within the fill.
- B. Where, in the opinion of the Engineer, proposed fill material is too wet to permit drying in a reasonable length of time, the Engineer may reject the material and it must be removed from the work area.
- C. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
 - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.
- D. Method "C" of the Standard Proctor test of moisture density relationship test, ASTM D 698 or AASHTO T99, shall be used to determine the maximum laboratory dry density and the optimum moisture content of the material which is to be used for fill.

3.16 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place satisfactory backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

- B. Place satisfactory backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure. Do not place backfill against or on structures until they have attained sufficient strength to support the loads (including construction loads) to which they will be subjected, without distortion, cracking, or other damage. Take care to prevent wedging action of backfill against structures.
- C. Make special leakage tests, if required, as soon as practicable after the structures are structurally adequate and other necessary work has been done. Use the best of the excavated materials in backfilling within 2 feet of the structure.
- D. When existing ground surface has a density less than that specified under the subsection entitled "COMPACTION" for the particular area classification, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- E. After compaction, all fill will be tested in accordance with Method "C" of ASTM D-698, unless specified otherwise. Except as noted otherwise for the zone around pipe, provide not less than the following percentages of maximum density of soil material compacted at optimum moisture content, for the actual density of each layer of soil material-in-place:

UNPAVED AREAS	Compact Full Depth to 92%
DRIVES AND PARKING	Top 24" - 100%
TRENCH BACKFILL (PAVED AREAS)	Compact full depth to 100%
TRENCH BACKFILL (UNPAVED AREAS)	Compact full depth to 95%
ALL OTHER BACKFILL	Compact full depth to 95%

- F. The above compaction requirements are to be satisfied for all soil and weathered or soft rock fills. Weathered or soft rocks are those that can be broken down and disintegrated under normal compaction procedures and equipment.
- G. At the close of each day's work, or where work is to be interrupted for a period of time, the surface of the site shall be shaped to drain freely, and sealed. If after a prolonged rainfall, the surface of the area to be filled or cut is too wet to work properly, the unsuitable material shall be removed to expose workable soil. The wet material removed may be dried and reused. Construction traffic shall be controlled so as to prevent rutting of graded areas and to avoid over-rolling of any section.
- H. All cut areas shall be rolled and compacted to produce a compaction equal to that of the filled area. If soft or yielding material is encountered in cuts, or fills as a result of trapping water, over-rolling or improper control of construction traffic, and cannot be satisfactorily stabilized by moisture control, compaction or other means approved by the Engineer, the unstable material shall be

excavated to the depth required by the Engineer. The excavation shall then be filled with suitable compacted material in accordance with the requirements outlined above.

3.17 GRADING

- A. Elevations shown on the plans are finished ground unless otherwise noted. Grading shall be maintained in such a manner as to provide free surface drainage away from structures and throughout the site at all times without any ponding of water.
- B. Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- C. Provide ditches and swales to the cross sections and grades shown on the drawings. Cut ditch subgrades 4 inches below the grades shown and provide 4 inches of topsoil where the plans call for seeding or sodding of the ditch. Keep ditches and swales free of accumulations of debris or washed in material until final acceptance of work by the Engineer.
- D. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
 - 2. Walks: Plus or minus 1 inch.
 - 3. Pavements: Plus or minus 1/2 inch.
- E. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.18 SUBSURFACE DRAINAGE

- A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
- B. Drainage Backfill: Place and compact filter material over subsurface drain, in width indicated, to within 12 inches of final subgrade, in compacted layers 6 inches thick. Overlay drainage backfill with one layer of subsurface drainage geotextile, overlapping sides and ends at least 6 inches.
 1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D 698 with a minimum of two passes of a plate-type vibratory compactor.
 2. Place and compact impervious fill over drainage backfill in 6-inch thick compacted layers to final subgrade.

3.19 BASE COURSES UNDER PAVEMENTS AND WALKS

- A. Place base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place base course under pavements and walks as follows:
 1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place base course material over subbase course under hot-mix asphalt pavement.
 3. Shape base course to required crown elevations and cross-slope grades.
 4. Place base course 6 inches or less in compacted thickness in a single layer.
 5. Place base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 6. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and compact simultaneously with each base layer to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.20 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.

- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
 2. Place drainage course 6 inches or less in compacted thickness in a single layer.
 3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
 4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.21 FIELD QUALITY CONTROL

- A. The services of qualified soils testing personnel may be engaged by the Owner for the making of tests to determine the moisture-density relationships, relative densities, plastic and liquid limits and suitability of materials for compaction and for inspection and control of the site preparation, selection, placing and compaction of the fill. Such tests will be provided and paid for by the Owner, except that tests which reveal non-conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established shall be at the expense of the Contractor. The Owner will be responsible for paying for only the successful tests. A copy of the testing personnel's daily field report including results of in-place density and moisture content tests should be forwarded to the Owner and the Engineer at the end of each working day.
- B. The Contractor shall cooperate fully with the testing personnel so as to permit proper inspection and control of the work without unnecessary delays.
- C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.22 PROTECTION

- A. Do not operate tractors, bulldozers or other power operated equipment on paved surfaces if the treads or wheels of the equipment are so shaped as to cut or otherwise injure the surfaces.
- B. Restore all surfaces, including lawns, grassed, and planted areas that have been injured by the Contractor's operations, to a condition at least equal to that in which they were found immediately before the work was begun. Use suitable

materials and methods for such restoration. Maintain all restored plantings by cutting, trimming, fertilizing, etc., until acceptance. Restore existing property or structures as promptly as practicable and do not leave until the end of construction period.

- C. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- D. During construction and until final acceptance, the Contractor shall construct temporary or permanent earth berms along the outer edges of the top surface of the embankment, construct temporary ditches, shape the embankment surface to provide for the drainage of surface runoff along and throughout the length of the embankments, and use any other methods necessary to maintain the work covered by this section so that the work will not contribute to excessive soil erosion. The Contractor shall construct brush dikes, or install temporary or permanent slope drains or other drainage features to assist in controlling erosion.
- E. Slides and overbreaks which occur prior to final acceptance of the project due to natural causes shall be removed and disposed of by the Contractor as directed by the Engineer.
- F. Where slides or overbreaks occur due to negligence or carelessness on the part of the Contractor, the Contractor shall remove and dispose of the material at no cost to the Owner.
- G. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- H. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.
- I. All embankments shall be brought to the grade and cross section shown on the plans or established by the Engineer, prior to final inspection and acceptance by the Engineer.

3.23 MAINTENANCE

- A. The Contractor shall be responsible during construction and until final acceptance for the maintenance of all embankments, ground covers and other surfaces made under the Contract.
- B. The Contractor shall protect and maintain erosion and sedimentation controls during earth moving operations and shall remove said measures upon completion of earth moving operations and the satisfactory establishment of permanent or temporary ground covers.

3.24 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property unless otherwise required by the plans or special provisions or unless disposal within the project area is permitted by the Engineer.
- B. Concrete that is painted must be disposed of in accordance with requirements and regulations of the North Carolina Department of Environment and Natural Resources (NCDEQ) Solid Waste Section. Prior to disposal of painted concrete, the Contractor shall submit a written certification to NCDEQ that the paint on the concrete is not lead-based. Certification that paint on concrete is not lead-based paint is required prior to management as inert debris. Lead-based paint is defined by federal statute (Title X of the Housing and Community Development Act and the Toxic Substances Control Act, by reference). Concrete that is painted with lead-based paint, or paint that has not been certified to the satisfaction of the NCDEQ Solid Waste Section to be below the federal standard to be considered lead-based paint, must be disposed of at a properly permitted construction and demolition landfill or a permitted municipal solid waste landfill.
- C. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Engineer.
- D. The Contractor shall maintain the earth surfaces of all waste areas, both during the work and until the completion of all seeding and mulching or other erosion control measures specified, in a manner which will effectively control erosion and siltation.
- E. The following requirements shall also be applicable to all waste or disposal areas other than active public waste or disposal areas:
 - 1. Rock waste shall be shaped to contours which are comparable to and blend in with the adjacent topography where practical, and shall be covered with a minimum 6 inch thick layer of earth material either from the project waste or from borrow.

2. Earth waste shall be shaped to contours which are comparable to and blend in with the adjacent topography where practicable, but in no case will slopes steeper than 2:1 be permitted.
3. Construction debris, grubbed debris and all broken pavement and masonry shall be covered with a minimum 6-inch thick layer of earth waste material from the project or borrow. The completed waste area shall be shaped as required above for disposal of earth waste.
4. Seeding and mulching shall be performed over all earth or earth covered waste areas. The work of seeding and mulching shall be performed in accordance with other sections of these Contract Documents.
5. Where the Engineer has granted permission to dispose of waste and debris within the project, the Engineer will have the authority to establish whatever additional requirements may be necessary to insure the satisfactory appearance of the completed project.

END OF SECTION 312000

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The work covered by this section consists of the construction of a base composed of an approved aggregate material hauled to the site, placed on the site, compacted, and shaped to conform to the lines, grades, depths, and typical sections shown on the plans or established by the Engineer.
- B. Related Sections:
 - 1. Division 31 Section "Earth Moving".
 - 2. Division 32 Section "Bituminous Paving".
 - 3. Division 33 Section "Water Pipe and Appurtenances".
 - 4. Division 33 Section "Sanitary Sewer Pipe and Appurtenances".
 - 5. Division 33 Section "Storm Drainage Materials".

1.3 PERFORMANCE REQUIREMENTS

- A. The work under this section consists of furnishing all materials, labor, equipment, incidentals and services required for the complete installation of aggregate base course materials in the locations shown on the drawings and as specified herein.
- B. All work in connection with installing aggregate base course materials shall comply with all current requirements of authorities having jurisdiction. The Contractor is responsible for being familiar with and adhering to these requirements.
- C. The Contractor shall inspect the locations of the proposed work associated with this Section and shall familiarize themselves with the conditions under which the work will be performed, and with all necessary details and the suitability of their equipment and methods for the work required. The omission of any installation details which may not appear within the Contract Documents shall

not relieve the Contractor of full responsibility for completing the work as necessary.

- D. Construction shall be done in such a manner that will not interfere with the operation of any street, highway, railway, or other facility nor weaken or damage any embankment or structure. Barricades and lights shall be furnished and maintained to safeguard traffic and pedestrians as required by authorities having jurisdiction until such time as the operation has been completed.

1.4 SUBMITTALS

- A. Product Data and certificates: For all aggregate base course materials.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall utilize methods of handling, hauling, and placing which will minimize segregation and contamination of the aggregate used for the base course. If segregation occurs, the Engineer may require that changes be made in the Contractor's methods and may also require remixing of the aggregate to achieve the proper mixture. No additional compensation will be made for remixing, additional equipment, or other measures necessary to provide the coarse aggregate base course specified. Aggregate which becomes contaminated with foreign materials to the extent that the base course will not serve its intended use shall be removed and replaced by the Contractor at no additional expense to the Owner. The above requirements will be applicable regardless of the type of aggregate placed and regardless of prior acceptance.

1.6 COORDINATION

- A. For all work within the Department of Transportation right-of-way, the Contractor shall notify the appropriate office of the Department of Transportation at least 72 hours prior to beginning construction.

1.7 WARRANTY

- A. All materials shall be warranted to be free from defects in workmanship and materials for one (1) year following final acceptance by the Owner.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE COURSE

- A. Aggregate base course materials shall consist of crushed stone or uncrushed gravel, or other similar material having hard, strong, durable particles free of adherent coatings meeting the requirements of the NCDOT Standard Specifications for Roads and Structures, latest edition for the project-specific use of the aggregate.
- B. The Contractor shall furnish aggregate base course material produced in accordance with the requirements indicated herein for Type A, aggregate unless otherwise specified in the special provisions.
- C. All aggregates shall be from approved sources. Sources will not be approved unless the material has satisfactory soundness and satisfactory resistance to abrasion. Satisfactory soundness will be considered to be a weighted average loss of not greater than 15 percent when subjected to five (5) alternations of the sodium sulfate soundness test in accordance with AASHTO T104. Satisfactory resistance to abrasion will be considered to be a percentage of wear of not greater than 55 percent when tested in accordance with AASHTO T96.
- D. Aggregates shall be handled in such a manner as to minimize segregation
- E. Sites for aggregate stockpiles shall be grubbed and cleaned prior to storing aggregates, and the ground surface shall be firm, smooth, and well drained. A cover of at least 3" of aggregate shall be maintained over the ground surface in order to avoid the inclusion of soil or foreign material. Stockpiles shall be built in such a manner as to minimize segregation. When it is necessary to operate trucks or other equipment on a stockpile in the process of building the stockpile, it shall be done in a manner approved by the Engineer.
- F. Stockpiles of different types or sizes of aggregates shall be spaced far enough apart, or else separated by suitable walls or partitions, to prevent the mixing of the aggregates.
- G. Any method of stockpiling aggregates which allows the stockpile to become contaminated with foreign matter or causes excessive degradation of the aggregate will not be permitted. Excessive degradation will be determined by sieve tests of samples taken from any portion of the stockpile over which equipment has been operated, and failure of such samples to meet all grading requirements for the aggregate will be considered cause for discontinuance of such stockpiling procedure.
- H. Gradation: All standard sizes of aggregates shall meet the gradation requirements when tested in accordance with AASHTO T27.

2.2 WATER

- A. Water, if used in construction, shall be potable water, free from oil and other deleterious matter.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

- A. The subgrade shall be dry and cleaned of all foreign substances prior to constructing the base course.
- B. The surface of the subgrade shall be prepared as specified in Section 312000 "Earth Moving" based on the specified use of the aggregate base course.

3.2 PLACEMENT OF STONE BASE

- A. The aggregate material shall be spread on the subgrade to a uniform loose depth and without segregation.
- B. Where the required compacted thickness of base is 10 inches or less the base material may be spread and compacted in one layer. Where the required compacted thickness of base is more than 10 inches, the base material shall be spread and compacted in two (2) or more approximately equal layers. The minimum compacted thickness of any one layer shall be approximately 4 inches.
- C. Each layer of material shall have been sampled, tested, compacted, and approved prior to placing succeeding layers of base material or pavement. Such tests will be provided and paid for by the Owner, except that tests which reveal non-conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established shall be at the expense of the Contractor. The Owner will be responsible for paying for only the successful tests. The minimum compaction for each layer shall be 100% standard proctor.
- D. No base material shall be placed on frozen subgrade or base. Hauling equipment shall not be operated on subgrade or a previously completed layer of base material soft enough to rut or weave beneath the equipment.
- E. The maximum speed of trucks hauling or traveling over any part of the subgrade or base shall be five (5) miles per hour.

3.3 QUALITY CONTROL

A. Weather and Temperature Limitations:

1. Coarse aggregate base course shall not be placed during rainy weather or on wet or frozen subgrade.
2. Stabilized aggregate base courses shall not be constructed when the atmospheric temperature is below thirty-five (35) degrees F. when measured in the shade away from artificial heat.
3. Any areas of completed base course that are damaged by elements such as rain, sleet, snow, hail, or freeze/thaw conditions shall be reconditioned, reshaped, and compacted in accordance with the Drawings and these Specifications.

B. Tolerances:

1. After final shaping and compacting the base, the Engineer will check the surface of the base for conformance to grade and typical section and will determine the base thickness.
2. The thickness of the base shall be within a tolerance of $\pm 1/2$ -inch of the base thickness required by the plans.

C. Maintenance:

1. Where the base material is placed in a trench section, the Contractor shall provide adequate drainage through the shoulders to protect the subgrade and base until such time as shoulders are completed.
2. The Contractor shall maintain the surface of the base by watering, machining, and rolling or dragging when necessary to prevent damage to the base by weather or traffic.
1. Where the base or subgrade is damaged, repair the damaged area; reshape the base to required lines, grades and typical sections; and recompact the base to the required density at no cost to the Owner.

END OF SECTION 312230

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Driveways.
- 2. Roadways.
- 3. Parking lots.
- 4. Curbs and gutters.
- 5. Walks.

- B. Related Sections:

- 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
- 2. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.
- C. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- D. Material Certificates: For the following, from manufacturer:
1. Cementitious materials.
 2. Steel reinforcement and reinforcement accessories.
 3. Fiber reinforcement.
 4. Admixtures.
 5. Curing compounds.
 6. Applied finish materials.
 7. Bonding agent or epoxy adhesive.
 8. Joint fillers.
- E. Material Test Reports: For each of the following:
1. Aggregates.
 2. Portland Cement: The Contractor shall submit a copy of mill test reports on all cement delivered to the job 7 days prior to use of the cement.
 3. Fly Ash: Complete chemical and physical analysis of each carload of fly ash shall be submitted to the Engineer ten (10) days prior to use of each carload delivered.
- F. Submit records of all concrete pours showing exact location of pour, date of pour, quantity of pour, and class of concrete poured to the Engineer each month. Temperature at time of pour should also be recorded.

1.5 QUALITY ASSURANCE

- A. All Portland cement concrete paving shall be in accordance with the appropriate sections of the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Division 7 and associated referenced sections, standards and drawings.
- B. If the average strength of the laboratory control cylinders shows the concrete to be below the specified design strength, the aggregate proportions and water content may be changed by the Engineer, who, in addition to such changes, may require core tests. Tests confirming concrete strengths on hardened concrete which was poured without testing shall be paid for by the Contractor.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for public and emergency uses, as well as other construction activities.

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-5.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Steel reinforcement utilized in all concrete paving shall be in accordance with the appropriate paragraphs of the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1070.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: All cementitious materials utilized in the Work shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition). All cementitious materials, shall be of same type, brand, and source throughout Project:
 - 1. Portland Cement: shall be fresh stock of an approved standard brand meeting the requirements of ASTM C 150, white portland cement Type II meeting the requirements of the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-1.
 - 2. Fly Ash: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-5.
 - 3. Ground Granulated Blast-Furnace Slag: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-6.
 - 4. Coarse Aggregate: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1014-2.
 - 5. Fine Aggregate: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1014-1.

- B. Water: shall be potable and in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-4.
- C. Air-Entraining Admixture: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-3.
- D. Chemical Admixtures: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1024-3.

2.4 CURING MATERIALS

- A. All curing agents for concrete paving shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1026.

2.5 RELATED MATERIALS

- A. Joint Materials: shall be appropriately selected in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1028.
- B. Adhesive and Epoxy Bonding Agents: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1081.

2.6 PAVEMENT MARKINGS

- A. Pavement-Markings: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1087.

2.7 PAVEMENT MARKERS

- A. Pavement-Markers: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1086.

2.8 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2,500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide

chamfered corners, drainage slots on underside, and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4-inch diameter, 10-inch minimum length.

2.9 PRE-FORMED TRAFFIC-CALMING DEVICES

- A. Speed Bumps, Humps, and Cushions: Solid, integrally colored, 100 percent postconsumer or commingled postconsumer and postindustrial recycled plastic; UV stabilized. Provide holes for anchoring to substrate.
 1. Size: Modular bumps 2 inches high by 10 inches wide by 72 inches long, with overall length as dimensioned on Drawings.
 2. Size: Modular assemblies 4 inches high by 14 feet in overall width, with overall length as dimensioned on Drawings.
 3. Mounting Hardware: Galvanized-steel hardware as standard with device manufacturer.
 4. Adhesive: As recommended by device manufacturer.

2.10 CONCRETE MIXTURE

- A. The concrete mix design utilized for all concrete paving shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1000-3.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding. Proof-rolling shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Sections 260-1 through 260-3.
- C. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.
- B. Before placing concrete, all equipment for mixing and transporting and placing concrete shall be cleaned, all debris and ice removed from spaces to be occupied by the concrete, forms thoroughly cleaned of soil, ice, or other coatings which will prevent proper bond, reinforcement shall be securely tied in place and expansion joint material, anchors, and other embedded items shall be securely positioned. Hardened concrete and foreign materials shall be removed from the conveying equipment.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Form Installation, Use and Removal: shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-5.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Sections 425-1 through 425-5 for fabricating, placing, and supporting reinforcement.

3.5 JOINTS

- A. General: Joint construction shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-11.
- B. Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
 - 1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
 - 2. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 - 3. Provide tie bars at sides of paving strips where indicated.

- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 INSPECTION

- A. Before placing concrete, the formwork installation and reinforcing steel must be complete. Notify Engineer upon completion of installation of all forms and reinforcing in ample time to permit inspection of the work. Subbase is subject to testing as directed by the Engineer. Place concrete immediately after approval of subbase, formwork and reinforcement.

3.7 CONCRETE PLACEMENT

- A. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- B. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-5.
- D. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practical by methods which will prevent separation or loss of ingredients and in a manner which will assure that the required quality concrete is obtained. Conveying equipment shall be of size and design to insure a continuous flow of concrete at the delivery end.

- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Batch tickets for each load of concrete shall be submitted to the Engineer. The following information shall be provided on each batch ticket:
 - 1. Design mix designation.
 - 2. Exact time cement, water and aggregate were discharged into the mix.
 - 3. Compressive strength of mix.
 - 4. Amount of water added to the mix.
- G. Concrete shall be deposited and spread in a continuous operation such that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located at points as provided for in the drawings or as approved. Placing shall be carried on at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as possible to its final location to avoid segregation due to rehandling or flowing. Do not subject concrete to any procedure which will cause segregation. Do not push or drag concrete into place or use vibrators to move concrete into place.
- H. Maintain equipment in proper operating condition, with drums cleaned before charging of each batch. Schedule delivery of trucks in order to prevent delay of placing after mixing.
- I. Concrete shall not be allowed to "freefall" a distance greater than 3 feet.
- J. Do not use concrete which has become non-plastic and unworkable or does not meet the required quality control limits, or which has become contaminated by foreign material. Remove rejected concrete from the project site and dispose of in an acceptable location.
- K. Consolidate concrete in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-6.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 degrees F within five (5) days after the concrete is placed, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 55 degrees F and not more than 80 degrees F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
 4. Cover top with insulating blankets. Blankets shall remain in place for a minimum period of five days.
 5. In addition to laboratory-cured test specimens, additional concrete test specimens shall be cured under the same field conditions that the concrete in the field represented by these cylinders is cured and high thermometers shall be placed on the surface of slab to record daily temperatures during curing period.
- M. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
1. An approved admixture designed to retard the rate of set shall be used for all concrete placed when temperatures exceed 75 degrees F. Set retarding admixtures shall conform to ASTM C-494, Type D, water reducing and retarding.
 2. Provide wind breaks around the perimeter of the area where concrete is being placed.
 3. Cool ingredients before mixing to maintain concrete temperature below 90 degrees F at time of placement. Fresh concrete with temperatures 90 degrees F. or above shall be discarded off site. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water.
 4. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 5. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.8 CONCRETE FINISHING

- A. Finish concrete surfaces in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 710-6.

3.9 JOINT SEALING

- A. General: Joint sealing shall be performed in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-12.

3.10 DETECTABLE WARNINGS

- A. Blockouts: Form blockouts in concrete for installation of approved detectable paving units.
 - 1. Tolerance for Opening Size: Plus 1/4 inch, no minus.
- B. Stamped Detectable Warnings: Install approved stamped detectable warnings as part of a continuous concrete paving placement and according to stamp-mat manufacturer's written instructions.
 - 1. Before using stamp mats, verify that the vent holes are unobstructed.
 - 2. Apply liquid release agent to the concrete surface and the stamp mat.
 - 3. Stamping: While initially finished concrete is plastic, accurately align and place stamp mats in sequence. Uniformly load, gently vibrate, and press mats into concrete to produce imprint pattern on concrete surface. Load and tamp mats directly perpendicular to the stamp-mat surface to prevent distortion in shape of domes. Press and tamp until mortar begins to come through all of the vent holes. Gently remove stamp mats.
 - 4. Trimming: After 24 hours, cut off the tips of mortar formed by the vent holes.
 - 5. Remove residual release agent according to manufacturer's written instructions, but no fewer than three days after stamping concrete. High-pressure-wash surface and joint patterns, taking care not to damage stamped concrete. Control, collect, and legally dispose of runoff.

3.11 CONCRETE PROTECTION AND CURING

- A. Concrete Protection: shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-8.
- B. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures, and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of the cement and proper hardening of the concrete.
- C. Concrete Curing: shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-9.
- D. Curing for concrete paving surfaces during periods when the outside air temperature does not exceed 60 degrees F. shall be provided by applying a membrane-forming curing compound to concrete surfaces as soon as the final troweling or floating operation has been completed. Application shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-9. Do not

use membrane curing compounds on surfaces which are to be covered with a coating material applied directly to the concrete or with any other cover or finish material which shall be bonded to the concrete.

- E. Curing for all pavement surfaces during periods when the outside air temperature will exceed 60 degrees F. shall be provided by covering the entire surface with burlap. Application shall be in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-9. Immediately following the placement of the burlap, the entire surface shall be maintained continuously wet for a period of 7 days. Do not permit surfaces to dry at any period during the required curing period.
- F. During the curing period, protect concrete from damaging mechanical disturbances, including load stresses, shocks, excessive vibration and from change caused by subsequent construction operations.

3.12 PAVING TOLERANCES

- A. Tolerances for pavement thickness shall comply with the appropriate portions of the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Sections 700-15 and 710-9.
- B. Tolerances for surface smoothness shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 710-7.

3.13 PAVEMENT MARKINGS

- A. The application of pavement markings shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1205.
- B. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Engineer.
- C. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.14 PAVEMENT MARKERS

- A. The installation of pavement markers shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 1250.
- B. Do not install pavement-markers until layout, colors, and placement have been verified with Engineer.
- C. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

3.15 WHEEL STOPS

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.
- B. Securely attach wheel stops to paving with not less than two galvanized steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

3.16 PREFORMED TRAFFIC-CALMING DEVICES

- A. Install preformed speed bumps, humps, and/or cushions in bed of adhesive applied as recommended by manufacturer for heavy traffic.
- B. Securely attach preformed speed bumps, humps, and/or cushions to paving with hardware spaced as recommended by manufacturer for heavy traffic. Recess head of hardware beneath top surface.

3.17 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections as required.

3.18 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Engineer. Make edges of cuts perpendicular to the concrete surfaces.
- B. Repair and patch defective areas immediately after removal of forms as directed by the Engineer. Dampen all concrete surfaces in contact with

patching concrete, and brush with a neat cement grout coating or concrete bonding agent. Place patching concrete before grout takes its initial set. Mix patching concrete of the same materials to provide concrete of the same type or class as the original adjacent concrete. Place, compact, and finish as required to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

- C. Drill test cores where directed by Engineer, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with approved non-shrink grout compatible with the pavement concrete.
- D. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- E. Protect concrete paving from environmental factors in accordance with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Section 700-8.
- F. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.19 TESTING AND QUALITY CONTROL

- A. The Contractor to engage a NCDOT approved independent testing lab and NCDOT certified technician to provide all laboratory testing services on the project and a concrete technician to perform all quality control tests on concrete and materials used to batch concrete. The testing agency employed shall meet the requirement of "Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction", (ASTM E-329) and NCDOT specifications.
- B. Such tests will be provided and paid for by the Owner, except that tests which reveal non-conformance with the Specifications and all succeeding tests for the same area, until conformance with the Specifications is established shall be at the expense of the Contractor. The Owner will be responsible for paying for only the successful tests.
- C. The Contractor shall provide and maintain adequate facilities on the project for the testing laboratory to locate the required testing equipment and for safe storage area for test cylinders. The general contractor shall provide at his own expense all casual labor needed to assist the concrete technician in obtaining samples of concrete and concrete materials and moving and transporting cylinders and materials which are being tested.

- D. Acceptance testing for concrete pavement shall comply with the North Carolina Department of Transportation Standard Specifications for Road and Structures (latest edition) Sections 700-15.

END OF SECTION 321313

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section covers the furnishing of all labor, equipment and materials necessary for the proper restoration of existing surfaces disturbed or damaged as a result of construction operations which are not specifically scheduled or specified for topsoil and seeding, paving, landscaping or other surfacing.
- B. In general, the types of replacement included in this section are seeding along pipelines, concrete sidewalks, driveways, roadways, ditches, lawns and landscaped areas, and curb and gutter.
- C. Any damage to existing structures shall be repaired using materials and workmanship equal to, or better than, those of the original construction.

1.3 DEFINITIONS

- A. CABC – Crushed aggregate base course.
- B. NCDOT – North Carolina Department of Transportation.
- C. PSI – Pounds per square inch.

1.4 SUBMITTALS

- A. All submittals shall be in accordance with the requirements of the pertinent specification sections referenced herein.
- B. An appropriate concrete mix design shall be submitted for all concrete sidewalks, driveways, roadways, and curb and gutter restored as part of this project.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SEEDING DISTURBED AREAS

- A. All ground surfaces disturbed by construction activity, which are not classified as lawns, landscaped areas, or pavement areas, but would be classified as open fields, shall be raked smooth and seeded in accordance with the appropriate paragraph(s) within Section 329200 entitled Turf and Grasses. Large rocks, clumps of earth and excessive spoil material shall be removed from the area prior to seeding.
- B. Shoulders of all roads shall be restored as specified for lawns and landscaped areas.
- C. Wooded areas not classified as lawns shall be restored to as near their original condition as possible.

3.2 CONCRETE SIDEWALKS

- A. Concrete walks removed in connection with, or damaged as a result of, construction operations under the Contract shall be replaced with new construction. Such walks shall be constructed of 4,000 PSI concrete on a thoroughly compacted subgrade, shall have a vertical thickness, unless otherwise noted, of not less than 4 inches or the thickness of the replaced walk where greater than 4 inches.
- B. Walks shall be float finished, edged with an edging tool, and grooved at intermediate intervals not in excess of the width of the walk, uniform throughout the length of the walk in any one direction.

3.3 DRIVEWAYS

- A. Unless otherwise noted, unpaved driveways shall be surfaced with not less than 4 inches of CABC, topped with 4 inches of stone, gravel, or other materials equal to that found in the original driveway. Driveways shall be left in a condition better than their original condition.
- B. Concrete drives shall be replaced with 4,000 PSI concrete and shall have equal thickness and reinforcing steel to that of the original drive. Prior to placing the concrete a 6-inch aggregate base course shall be placed in the drive area.
- C. Unless otherwise noted, bituminous or asphaltic concrete drives shall be restored to original base and asphalt thicknesses or a minimum of 6 inches of

aggregate base course and a 2-inch surface course, whichever is greater. Base material shall be compacted in 3-inch lifts and Type SF 9.5A or S 9.5B asphalt compacted in 2-inch lifts to match existing pavement section. All work shall be in accordance with the appropriate paragraph(s) of Section 321216 entitled Bituminous Paving.

3.4 ROADWAY REPLACEMENT

- A. Bituminous or Asphaltic pavements shall include all areas paved with blacktop, built up pavements or oil and stone, tar and stone and similar pavements constructed with a bituminous or asphalt and stone materials.
- B. Immediately upon completion of installation of underground piping and structures, the trench shall be backfilled and the roadway shall be repaired. Provide materials as specified in the Contract Drawings. If, in the opinion of the Engineer, the area adjacent to the excavation has not been damaged to the extent that the base course need to be replaced, restoration may consist of a surface course of sufficient thickness to meet the existing pavement.
- C. Unless otherwise noted, bituminous or asphaltic concrete roadways shall be restored to original base and asphalt thicknesses or a minimum of 6 inches of aggregate base course and a 2-inch surface course, whichever is greater. Base material shall be compacted in 3-inch lifts and Type SF 9.5A or S 9.5B asphalt compacted in 2-inch lifts to match existing pavement section. All work shall be in accordance with the appropriate paragraph(s) of Section 321216 entitled Bituminous Paving.
- D. Portland cement concrete roadways shall be replaced with 4,000 PSI concrete and shall have equal thickness and reinforcing steel as the original roadway. An aggregate base course with a thickness of 6 inches shall be placed prior to the placing of concrete.
- E. Differential settlement of restored pavements shall be corrected immediately.
- F. The Contractor shall repair and restripe any traffic markings that were damaged, removed or covered during construction. All work shall be done in accordance with NCDOT requirements and specifications.
- G. All existing manhole and valve covers shall be raised, as required, by the Contractor prior to paving. The cost of this work shall be included in the unit bid prices for other related work and no additional payment shall be made.

3.5 DITCHES

- A. Ditches shall be regraded to the original grade and line. The surface of all ditches shall be returned to the same condition as found before commencing work.

3.6 LAWNS AND LANDSCAPED AREAS

- A. Lawns and landscaped areas shall be regraded and replaced as follows:
 - 1. Grading shall be to the grade existing before construction of the work under this Contract.
 - 2. Lawn replacement shall be in accordance with the appropriate paragraph(s) within Section 329200 entitled Turf and Grasses. Topsoiled areas shall be replaced with topsoil of equal quality and quantity.
- B. Landscaped areas shall be replaced with shrubs, hedges, ornamental trees, flowers, or other items to original condition.

3.7 CURB AND GUTTER

- A. Curb and gutter removed with or damaged as a result of construction operations, injured or disturbed by the Contractor, his agents, or employees, shall be replaced with new construction to a condition similar and equal to that existing before damage was incurred. 4,000 PSI concrete shall be used in curb and gutter replacement.
- B. All work associated with curb and gutter replacement shall be in accordance with Section 846-3 of the NCDOT Standard Specifications for Roads and Structures (latest edition). Horizontal and vertical alignment of the curb and gutter shall match that of the existing to the greatest extent practical, unless directed otherwise by the Engineer.

3.8 DAMAGE TO STRUCTURES

- A. Any damage to existing structures shall be repaired of materials and workmanship equal to those of original construction. Extensively damaged structures, where the structural stability has been affected or which cannot be repaired in a suitable fashion shall be replaced entirely. Replacement shall not commence until approval of the plan of replacement has been given by the Engineer. Replacement costs shall be responsibility of the Contractor.

END OF SECTION 322905

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including Modified General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section covers the furnishing of all labor, equipment and materials necessary for the establishment of vegetation in all areas of the site disturbed by construction operations and all earth surfaces of embankments including rough and fine grading, topsoil if required, fertilizer, lime, seeding and mulching. The Contractor shall adapt his operations to variations in weather or soil conditions as necessary for the successful establishment and growth of the grasses or legumes.
- B. Related Sections:
 - 1. Division 31 Section "Site Clearing" for topsoil stripping and stockpiling.
 - 2. Division 31 Section "Earth Moving" for excavation, filling and backfilling, and rough grading.

1.3 DEFINITIONS

- A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs,

mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

- F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.
- H. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- I. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

- A. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 1. Evidence of State certification of each seed mixture for turfgrass sod and plugs. Include identification of nursery source and name and telephone number of supplier.
- B. Product Certificates: For soil amendments and fertilizers, from manufacturer.
- C. Certificates of Inspection as required by law or governing authorities to accompany shipments.
- D. Source of mulch for approval and five (5) gallon bucketful physical sample.
- E. Proposed planting schedule, indicating dates for all work during normal seasons for such work. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- F. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of turf and grasses during a calendar year. Submit before expiration of required initial maintenance periods.

1.5 QUALITY ASSURANCE

- A. No material substitutions will be permitted without the prior written approval of the Engineer.
- B. All materials shall be applied in strict accordance with manufacturer's written instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Products shall be packed and shipped in a manner which will not damage them.
- B. Damaged products shall be rejected upon delivery and promptly removed from the site.
- C. Products which must be stored prior to installation shall be protected from damage and theft.
- D. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws, as applicable. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents, or other causes.
- E. Bulk Materials:
 - 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 - 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 - 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.

1.7 PROJECT CONDITIONS

- A. Schedule and coordinate work with all trades involved.
- B. Verify that the areas of work have been properly contoured and brought to final grade prior to beginning work.
- C. Consult record drawings and installers to determine actual underground utility and drainage system locations in the vicinity of this work. Damage to known or unrecorded utilities will be repaired at the Contractor's expense.

- D. Notify the Engineer of any unforeseen conditions which will affect plant installation or growth.
- E. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 - 1. Optimum Spring Planting: April 1 – May 1.
 - 2. Optimum Fall Planting: September 1 – October 1.
- F. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

1.8 MAINTENANCE SERVICE

- A. Initial Turf Maintenance Service: Provide full maintenance by skilled employees. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until Final Acceptance of the project by the Owner.
- B. Initial Meadow Maintenance Service: Provide full maintenance by skilled employees. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until Final Acceptance of the project by the Owner.
- C. Continuing Maintenance Requirements: Throughout the warranty period of the Work, excluding conditions of vandalism, theft, accident, acts of God and Owner's negligent maintenance, Contractor shall be responsible for making any and all necessary repairs to planted areas which may include or may result from, the lack of fully established growth of turfs and grasses and/or soil erosion from project areas. In such instances, Contractor shall be responsible for restoring these areas to originally accepted conditions as well as full establishment of turfs and grasses or other groundcovers in the area. The Contractor shall also be responsible for any damages to adjacent areas impacted by the lack of proper turf and grass establishment.

PART 2 - PRODUCTS

2.1 FERTILIZERS

- A. The quality of fertilizer and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer Law and regulations adopted by the North Carolina Board of Agriculture.

- B. For all areas to be seeded which are not classified as lawns, but would be classified as open fields, fertilizer shall be free-flowing, ready mixed 10-10-10 grade commercial fertilizer. Upon written approval of the Engineer a different grade of fertilizer may be used, provided the rate of application is adjusted to provide the same amounts of plant food.
- C. For all areas to be seeded which are classified as lawns, fertilizer shall be as follows:
 - 1. Fertilizer tablets: Agriform Planting Tablets 20-10-5 as manufactured by Scotts-Sierra Horticultural Products, or equal, may be used at installer's option.
 - 2. Encapsulated fertilizer: Osmocote 19-6-12 as manufactured by Scotts-Miracle Gro, or equal, may be used at installer's option.
- D. During handling and storing, the fertilizer shall be cared for in such a manner that it will be protected against hardening, caking, or loss of plant food values. Any hardened or caked fertilizer shall be pulverized to its original conditions before being used.

2.2 LIME

- A. Lime: The quality of lime and all operations in connection with the furnishing of this material shall comply with the requirements of ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 - 1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
 - 2. Provide lime in the form of free-flowing ground dolomitic limestone.
- B. During the handling and storing, the lime shall be cared for in such a manner that it will be protected against hardening and caking. Any hardened or caked lime shall be pulverized to its original condition before being used.

2.3 SEED

- A. Grass seed shall be fresh, clean, dry, new-crop seed complying with the requirements of the North Carolina Seed Law and regulations adopted by the North Carolina Board of Agriculture.
- B. Seed shall have been approved by the North Carolina Department of Agriculture or any agency approved by the Engineer before being sown, and no seed will be accepted with a date of test more than nine (9) months prior to the date of sowing. Such testing however, will not relieve the Contractor from responsibility for furnishing and sowing seed that meets these specifications at

the time of sowing. When a low percentage of germination causes the quality of the seed to fall below the minimum pure live seed specified, the Contractor may elect, subject to the approval of the Engineer, to increase the rate of seeding sufficiently to obtain the minimum pure live seed contents specified, provided that such an increase in seeding does not cause the quantity of noxious weed seed per square yard to exceed the quantity that would be allowable at the regular rate of seed.

- C. During handling and storing, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents, or other causes.
- D. Seed shall be entirely free from bulblets or seed of Johnson Grass, Nutgrass, Sandbur, Wild Onion, Wild Garlic, and Bermuda Grass. The specifications for restricted noxious weed seed refers to the number per pound, singly or collectively, of Blessed Thistle, Wild Radish, Canada Thistle, Corncockle, Field Bindweed, Quackgrass, Dodders, Dock, Horsenettle, Bracted Plantain, Buckhorn or Wild Mustard; but in no case shall the number of Blessed Thistle or Wild Radish exceed 27 seeds of each per pound. No tolerance on weed seed will be allowed.
- E. Seed Purity: All seed species shall consist of seed with not less than a 95 percent germination rate, not less than 85 percent pure seed, and not more than 0.5 percent weed seed:

2.4 MULCH

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, threshed straw of wheat, rye, or oats which is free of noxious weeds or other species which would grow and be detrimental to the specified grass.
- B. Wood Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic and free of plant-growth or germination inhibitors; with a maximum moisture content of 10 percent (± 2 percent); organic matter 99.4 percent (± 0.2 percent); ash content 0.6 percent (± 0.2 percent) water holding capacity of 1050 grams water/100 grams dry fiber. and a pH range of 4.5 to 6.5.

2.5 TACKIFIER

- A. Tackifier shall consist of an asphalt emulsion in accordance with ASTM D 977, Grade SS-1; shall be nontoxic and free of plant-growth or germination inhibitors.

2.6 WATER

- A. Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.

2.7 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Mats: Cellular, non-biodegradable slope-stabilization mats designed to isolate and contain small areas of soil over steeply sloped surface. Include manufacturer's recommended anchorage system for slope conditions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting performance.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 - 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

3.2 PROTECTION OF EXISTING STRUCTURES, UTILITIES, TREES AND VEGETATION

- A. Protect existing structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings indicated to remain in place against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, and smothering of trees by stockpiling construction materials or excavated materials, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide wood or metal stakes 48 inches in height, set on eight (8) to 10 foot

centers, connected by 2-inch minimum brightly colored flagging tape or fabric fencing to protect trees and vegetation to remain. Set perimeter of protection at the drip line of trees to remain unless approved otherwise by the Engineer.

- B. Provide protection for roots over 1-1/2 inch in diameter cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out and cover with earth as soon as possible.
- C. The Contractor shall not remove or damage trees and shrubs which are outside the Clearing Limits established by the Owner or those within the Clearing Limits designated to remain.
- D. Repair trees scheduled to remain and damaged by construction operations in a manner acceptable to the Engineer. Repair damaged trees promptly to prevent progressive deterioration caused by damage.
- E. Replace trees scheduled to remain and damaged beyond repair by construction operations, as determined by the Engineer, with trees of similar size and species. Repair and replacement of trees scheduled to remain and damaged by construction operations or lack of adequate protection during construction operations shall be at the Contractor's expense.
- F. Protect adjacent and adjoining areas from hydroseeding, hydromulching, and tackifier overspray.
- G. Protect grade stakes set by others until directed to remove them.

3.3 GRADING

- A. Rough grading shall be done as soon as all excavation required in the area has been backfilled. The necessary earthwork shall be accomplished to bring the existing ground to the desired finish elevations as shown on the Contract Drawings or otherwise directed.
- B. Fine grading shall consist of shaping the final contours for drainage and removing all large rock, clumps of earth, roots and waste construction materials. It shall also include thorough loosening of the soil to a depth of 6" by plowing, disking, harrowing or other approved methods until the area is acceptable as suitable for subsequent landscaping operations. The work of landscaping shall be performed on a section by section basis immediately upon completion of earthwork.
- C. Upon failure or neglect on the part of the Contractor to coordinate his grading with seeding and mulching operations and diligently pursue the control of erosion and siltation, the Engineer may suspend the Contractor's grading

operations until such time as the work is coordinated in a manner acceptable to the Engineer.

3.4 SECURING AND PLACING TOPSOIL

- A. Topsoil shall be secured from areas from which topsoil has not been previously removed, either by erosion or mechanical methods. Topsoil shall not be removed to a depth in excess of the depth approved by the Engineer.
- B. The area or areas from which topsoil is secured shall possess such uniformity of soil depth, color, texture, drainage and other characteristics as to offer assurance that, when removed the product, will be homogeneous in nature and will conform to the requirements of these specifications.
- C. All areas from which topsoil is to be secured, shall be cleaned of all sticks, boards, stones, lime, cement, ashes, cinders, slag, concrete, bitumen or its residue and any other effuse which will hinder or prevent growth.
- D. In securing topsoil from a designated pit, or elsewhere, should strata or seams of material occur which do not come under the requirements for topsoil, such material shall be removed from the topsoil or if required by the Engineer, the pit shall be abandoned.
- E. Before placing or depositing topsoil upon any areas, all improvement within the area shall be completed, unless otherwise approved by the Engineer. The areas in which topsoil is to be placed or incorporated shall be prepared before securing topsoil for use.
- F. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.5 SEEDBED PREPARATION

- A. The Contractor shall cut and satisfactorily dispose of weeds or other unacceptable growth on the areas to be seeded. Uneven and rough areas outside of the graded section, such as crop rows, farm contours, ditches and ditch spoil banks, fence line and hedgerow soil accumulations, and other minor irregularities which cannot be obliterated by normal seedbed preparation operations, shall be shaped and smoothed as directed by the Engineer to provide for more effective seeding and for ease of subsequent mowing operations.
- B. The soil shall then be scarified or otherwise loosened to a depth of not less than 6 inches except as otherwise provided below or otherwise directed by the Engineer. Clods shall be broken and the top 2 to 3 inches of soil shall be

worked into an acceptable seedbed by the use of soil pulverizers, drags, or harrows; or by other methods approved by the Engineer.

- C. On 2:1 slopes a seedbed preparation will be required that is the same depth as that required on flatter areas, although the degree of smoothness may be reduced from that required on the flatter areas if so permitted by the Engineer.
- D. On cut slopes that are steeper than 2:1, both the depth of preparation and the degree of smoothness of the seedbed may be reduced as permitted by the Engineer, but in all cases the slope surface shall be scarified, grooved, trenched, or punctured so as to provide pockets, ridges, or trenches in which the seeding materials can lodge.
- E. On cut slopes that are either 2:1 or steeper, the Engineer may permit the preparation of a partial or complete seedbed during the grading of the slope. If at the time of seeding and mulching operations such preparation is still in a condition acceptable to the Engineer, additional seedbed preparation may be reduced or eliminated.
- F. The preparation of seedbeds shall not be done when the soil is frozen, extremely wet, or when the Engineer determines that it is in an otherwise unfavorable working condition.
- G. Limestone may be applied at the rate described below as a part of the seedbed preparation, provided it is immediately worked into the soil. If not so applied, limestone and fertilizer shall be applied as described below.

3.6 APPLICATION OF LIMESTONE, FERTILIZER, SEED, AND MULCH (GENERAL)

- A. Equipment to be used for the application, covering or compaction of limestone, fertilizer, and seed shall have been approved by the Engineer before being used on the project. Approval may be revoked at any time if equipment is not maintained in satisfactory working condition, or if the equipment operation damages the seed.
- B. Limestone, fertilizer, seed and mulch shall be applied within 24 hours after completion of seedbed preparation unless otherwise permitted by the Engineer, but no limestone or fertilizer shall be distributed and no seed shall be sown when the Engineer determines that weather and soil conditions are unfavorable for such operations.

3.7 FERTILIZATION AND LIMING

- A. Following seedbed preparation, fertilizer shall be applied to all areas to be seeded so as to achieve the application rates shown below. Fertilizer shall be

spread evenly over the seedbed and shall be lightly harrowed, raked, or otherwise incorporated into the soil for a depth of ½ inch.

- B. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. The seed shall not remain in water containing fertilizer for more than 30 minutes when a hydraulic seeder is used.
- C. Agricultural limestone shall be thoroughly mixed into the soil according to the rates indicated below. The specified rate of limestone application may be reduced by the Engineer if pH tests indicate this to be desirable. It is the responsibility of the Contractor to obtain such tests and submit the results to the Engineer for adjustment in rates.
- D. In the absence of a soil test, the following rates of application of fertilizer and lime shall be to all areas to be seeded which are not classified as lawns, but would be classified as open fields:
 - 1. Lime: 4,000 pounds per acre
 - 2. Fertilizer: 1,000 pounds per acre
- E. For all areas to be seeded which are classified as lawns, fertilizer and lime shall be applied at the following rates:
 - 1. Lime: 92 pounds per 1,000 square feet
 - 2. Fertilizer: 23 pounds per 1,000 square feet
- F. When adverse seeding conditions are encountered due to steepness of slope, height of slope, or soil conditions, the Engineer may direct or permit that modifications be made in the above requirements which pertain to incorporating limestone into the seedbed; covering limestone, seed, and fertilizer; and compacting the seedbed. Such modifications may include but not be limited to the following:
 - 1. The incorporation of limestone into the seedbed may be omitted on:
 - a. Cut slopes steeper than 2:1;
 - b. On 2:1 cut slopes when a seedbed has been prepared during the excavation of the cut and is still in an acceptable condition; or
 - c. on areas of slopes where the surface of the area is too rocky to permit the incorporation of the limestone.
- G. It shall be the responsibility of the Contractor to make an additional application of maintenance fertilizer in the amount of 650 pounds per acre (15 pounds per 1,000 square feet) following the initial establishment of groundcover. This application shall occur when vegetation is three (3) inches in height or 45 days after initial seeding, whichever comes first.

3.8 **SEEDING**

- A. Seeding shall commence as soon as preparation of the seedbed has been completed. Do not broadcast or drop seed when wind velocity exceeds 5 mph or until the surface is suitable for working and is in proper condition. Seed mixtures may be sown together provided they are kept in a thoroughly mixed condition during the seeding operation.
- B. All disturbed areas shall be seeded unless specifically indicated to receive other types of plantings or groundcovers.
- C. Seed may be uniformly sown over the seedbed by a mechanical method suitable for the slopes and size of the areas to be seeded. Broadcast type seeders, windmill hand seeder or approved mechanical power drawn seed drills may be utilized.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 2. Do not seed against existing trees.
- D. For all areas to be seeded which are not classified as lawns, but would be classified as open fields, seed species and application rates shall be as follows:
 - 1. Spring/Summer (Normally April 1 to August 31):
 - a. 100 pounds of Ky-31 tall fescue per acre.
 - 2. Fall and Winter (Normally September 1 to March 31):
 - a. 85 pounds of Ky-31 tall fescue and 15 pounds of rye grain per acre.
 - 3. On cut and fill slopes having 2:1 or steeper slopes, add 15 pounds of sudangrass to the planned seeding in summer seeding or 25 pounds of rye cereal per acre in fall and winter seeding, if seeded September to February.
 - 4. These seeding rates are prescribed for all sites with less than 50 percent ground cover and for sites with more than 50 percent ground cover where complete seeding is necessary to establish effective erosion control vegetative cover. On sites having 50 to 80 percent ground cover where complete seeding is not necessary to establish vegetative cover, reduce the seeding rate at least one-half the normal rate.
- E. For all areas to be seeded which are classified as lawns, seed species and application rates shall be as follows:
 - 1. "Rebel" turf type fescue.....3 pounds per 1,000 square feet
 - 2. "Falcon" turf type fescue3 pounds per 1,000 square feet
 - Total Mix6 pounds per 1,000 square feet**

- F. Care shall be taken to adjust the seeder for seeding at the proper rate before seeding operations are started and to maintain their adjustment during seeding. Seed in hoppers shall be agitated to prevent segregation of the various seeds in the mixture.
- G. Immediately after application, harrow, drag, rake, or otherwise work seedbed so as to cover the seed with a layer of soil. The depth of covering shall be as directed by the Engineer. If two kinds of seed are to be used which require different depths of covering, they shall be sown separately.
- H. When a combination seed and fertilizer drill is used, fertilizer may be drilled in with the seed after limestone has been applied and worked into the soil. If two kinds of seed are being used which require different depths of cover, the seed requiring the lighter cover may be sown broadcast or with a special attachment to the drill, or drilled lightly following the initial drilling operation.
 - 1. The rates of application of limestone, fertilizer, and seed on slopes 2:1 or steeper or on rocky surfaces may be reduced or eliminated.
 - 2. Compaction after seeding may be reduced or eliminated on slopes 2:1 or steeper, on rocky surfaces, or on other areas where soil conditions would make compaction undesirable.
- I. Protect seeded areas with erosion-control mats where shown on Drawings; install and anchor according to manufacturer's written instructions.

3.9 MULCHING

- A. All seeded areas shall be uniformly mulched in a continuous blanket immediately after seeding. The mulch shall be applied so as to permit some sunlight to penetrate and the air to circulate and at the same time, shade the grounds, reduce erosion and conserve soil moisture. Approximately 25 percent of the ground shall be visible through the mulch blanket.
- B. To achieve the coverage described above, it will be necessary to apply straw mulch to seeded areas at a rate of approximately 4,000 pounds per acre (92 pounds per 1,000 square feet) or wood fiber mulch at a rate of 1,600 pounds per acre (37 pounds per 1,000 square feet).
- C. Mulch shall be uniformly spread by hand or by approved mechanical spreaders or blowers which will provide an acceptable application as described above.
- D. Before mulch is applied on cut or fill slopes which are 3:1 or flatter, and ditch slopes, the Contractor shall remove and dispose of all exposed stones in excess of 3 inches in diameter and all roots or other debris which will prevent proper contact of the mulch with the soil.

- E. Care shall be exercised to prevent displacement of soil or seed or other damage to the seeded area during the mulching operations.
- F. The Contractor shall take sufficient precautions to prevent mulch from entering drainage structures through displacement by wind, water, or other causes and shall promptly remove any blockage to drainage facilities which may occur.

3.10 TACKIFIER

- A. Emulsified asphalt or organic tackifier shall be sprayed uniformly on mulch as it is ejected from blower or immediately thereafter. Tackifier shall be applied evenly over area creating uniform appearance. Application rates and method of application will vary with conditions, be approved by the Engineer, and shall be applied in sufficient amount to assure that the mulch is properly held in place. Where the binding material is not applied directly with the mulch it shall be applied immediately following the mulch operation.
- B. The Contractor shall cover/protect structures, poles, fences and other appurtenances if mulch binder is applied in such a way that it may come in contact with or discolor those structures or appurtenances. Mulch and binder shall be applied by suitable blowing equipment at closely controlled application rates in a manner acceptable to the Engineer.
- C. Asphalt shall not be used in freezing weather.

3.11 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseeding applications. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 - 1. Mix slurry with fiber-mulch tackifier in accordance with manufacturer's recommendations.
 - 2. Fiber mulch shall be mixed into the slurry such that the application rate of the fiber mulch is 1,500 to 2,000 pounds per acre.
 - 3. Apply slurry uniformly to all areas to be seeded in a one-step process in accordance with the application rates described herein.
- B. When a hydraulic seeder is used for application of seed and fertilizer, the seed shall not remain in water containing fertilizer for more than 30 minutes prior to application unless otherwise permitted by the Engineer.

3.12 EROSION CONTROL MATERIALS

- A. Install all erosion control materials in accordance with manufacturer's recommendations and as shown on Drawings.

3.13 TURF RENOVATION

- A. Renovate existing turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 - 1. Reestablish turf where settlement or washouts occur or where minor regrading is required.
 - 2. Install new planting soil as required.
- B. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
- C. Remove topsoil containing foreign materials such as oil drippings, fuel spills, stones, gravel, and other construction materials resulting from Contractor's operations, and replace with new planting soil.
- D. Mow, dethatch, core aerate, and rake existing turf.
- E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- G. Till stripped, bare, and compacted areas thoroughly to a soil depth of 6 inches.
- H. Apply soil amendments and initial fertilizers required for establishing new turf and mix thoroughly into top 4 inches of existing soil. Install new planting soil to fill low spots and meet finish grades.
- I. Apply seed and protect with straw mulch as required for new turf.
- J. Water newly planted areas and keep moist until new turf is established.

3.14 TURF MAINTENANCE

- A. The Contractor shall keep all seeded areas in good condition, reseeding and mowing if and when necessary as directed by the Engineer, until a good lawn is established over the entire area seeded and shall maintain these areas in an approved condition until final acceptance of the Contract.

- B. Grassed areas will be accepted when a 95 percent cover by permanent grasses is obtained and weeds are not dominant. On slopes, the Contractor shall provide against washouts by an approved method. Any washouts which occur shall be regraded and reseeded until a good sod is established.
- C. Areas of damage or failure due to any cause shall be corrected by repair or by being completely redone as may be directed by the Engineer. Areas of damage or failure resulting either from negligence on the part of the Contractor in performing subsequent construction operations or from not taking adequate precautions to control erosion and siltation as required throughout the various sections of the specifications shall be repaired by the Contractor as directed by the Engineer at no cost to the Owner.

3.15 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- C. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION 329200

PART 1 - GENERAL**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section covers the furnishing of all labor, equipment and materials necessary for the installation of all trees, shrubs, ground covers, herbaceous plants and bulbs. Also included is the sodding of lawn areas.
- B. Section Includes:
 - 1. Plants.
 - 2. Planting soils.
 - 3. Tree stabilization.
 - 4. Landscape edgings.
 - 5. Tree grates.
- C. Related Sections:
 - 1. Division 01 Section "Temporary Tree and Plant Protection" for protecting, trimming, pruning, repairing, and replacing existing trees to remain that interfere with, or are affected by, execution of the Work.
 - 2. Division 31 Section "Site Clearing" for protection of existing trees and plantings, topsoil stripping and stockpiling, and site clearing.
 - 3. Division 31 Section "Earth Moving" for excavation, filling, and rough grading and for subsurface aggregate drainage and drainage backfill materials.
 - 4. Division 32 Section "Turf and Grasses" for turf planting, hydroseeding, and erosion-control materials.

1.3 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with ball size not less than sizes indicated; wrapped

with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.

- C. Balled and Potted Stock: Plants dug with firm, natural balls of earth in which they are grown and placed, unbroken, in a container. Ball size is not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required.
- D. Bare-Root Stock: Plants with a well-branched, fibrous-root system developed by transplanting or root pruning, with soil or growing medium removed, and with not less than minimum root spread according to ANSI Z60.1 for type and size of plant required.
- E. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
- F. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
- G. Fabric Bag-Grown Stock: Healthy, vigorous, well-rooted plants established and grown in-ground in a porous fabric bag with well-established root system reaching sides of fabric bag. Fabric bag size is not less than diameter, depth, and volume required by ANSI Z60.1 for type and size of plant.
- H. Finish Grade: Elevation of finished surface of planting soil.
- I. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- J. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- K. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- L. Planting Area: Areas to be planted.
- M. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified

with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

- N. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
- O. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
- P. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
- Q. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
- R. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- S. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated, including soils.
 - 1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
 - 2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the Project.
- B. Samples for Verification: For each of the following:
 - 1. Source of mulch for approval and five (5) gallon bucketful physical sample.
- C. Qualification Data: For qualified landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include project names, addresses, and year completed, and include names and addresses of owners' contact persons.
- D. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
 - 1. Certificates of Inspection as required by law or governing authorities to accompany shipments.

2. Vendor certified analysis for soil amendments, fertilizer materials, and grass seed.
 3. Evidence of State certification for sod.
 4. Certificates indicating nursery source of each plant.
- E. Material Test Reports: Soil analysis report for existing soil and proposed supply of soil, if needed. Also indicate location of source.
- F. Proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- G. Maintenance Instructions: Written instructions for the Owner's maintenance of landscaping. Include initial, 12-month, and long-term maintenance recommendations. Submit prior to acceptance of landscaping.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: In addition to the requirements in Division 01 Section "Quality Requirements", the landscape installer shall have at least five (5) years of satisfactory experience in successful establishment of plants including at least two (2) completed jobs of dollar value and scope similar to this work.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
 2. Installer's Field Supervision: Installer to shall maintain an experienced full-time supervisor on Project site when work is in progress.
 3. Chemical Applicator: Applicator must be properly trained to use all chemicals and must be licensed to purchase and use restricted chemicals, if any.
- B. Soil-Testing Laboratory Qualifications: An independent or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content of the soil.
1. Testing methods and written recommendations shall comply with USDA's Handbook No. 60.
 2. The soil-testing laboratory shall oversee soil sampling; with depth, location, and number of samples to be taken per instructions from Engineer. A minimum of three (3) representative samples shall be taken

from varied locations for each soil to be used or amended for planting purposes.

3. Report suitability of tested soil for plant growth.
 - a. Based upon the test results, state recommendations for soil treatments and soil amendments to be incorporated. State recommendations in weight per 1,000 sq. ft. or volume per cu. yd. for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
 - b. Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action.
- D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1. Tagging of plants prior to digging at the nursery is recommended.
- E. Substitutions will be permitted only with the prior written approval of the Engineer and may be granted if the installer can demonstrate that plants of a specific type, size or quality are not available within a 200-mile radius of the site.
- F. The landscape installer should be familiar with the quality of materials available from suppliers in order to minimize the likelihood that unacceptable products will be rejected.
- G. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
 1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
 2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
- H. Plant Material Observation: Engineer may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Engineer retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject

unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1. Notify Engineer of sources of planting materials seven (7) days in advance of delivery to site.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. All products shall be packed and shipped in a manner which will not damage them.
- B. Damaged products shall be rejected upon delivery and promptly removed from the site.
- C. Products which must be stored prior to installation shall be protected from damage and theft.
- D. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of conformance with state and federal laws if applicable.
- E. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk fertilizers, lime, and soil amendments with appropriate certificates.
- F. Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.
- G. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.
- H. Handle planting stock by root ball.
- I. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees F until planting.

- J. Time delivery of sod so that it will be placed within 36 hours after harvesting. Protect sod against drying and breaking of rolled strips.
- K. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
 - 1. Heel-in bare-root stock. Soak roots that are in dry condition in water for two hours. Reject dried-out plants.
 - 2. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 3. Do not remove container-grown stock from containers before time of planting.
 - 4. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly-wet condition.

1.7 PROJECT CONDITIONS

- A. Schedule and coordinate work with all trades involved.
- B. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.
- C. Consult Record Drawings and installers to determine actual underground utility and drainage system locations in the vicinity of this work. Damage to known or unrecorded utilities will be repaired at the Contractor's expense.
- D. Interruption of Existing Services or Utilities: Do not interrupt services or utilities to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary services or utilities according to requirements indicated:
 - 1. Notify Engineer no fewer than three (3) days in advance of proposed interruption of each service or utility.
 - 2. Do not proceed with interruption of services or utilities without Engineer's written permission.
- E. Notify the Engineer immediately of any unforeseen conditions which will affect plant installation or growth.
- F. Test internal drainage of soils at representative planting locations by digging a hole 12 inches deep and approximately 12 inches in diameter, then filling the

hole with water. If the water drains away within 24 hours, the drainage should be adequate.

- G. The results of the soil tests may indicate recommendations which will affect the type and analysis of soil amendments.
- H. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.
- I. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
 - 1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.8 WARRANTY

- A. Following the date of acceptance by the Owner, plants shall be warranted for one (1) year excluding conditions of vandalism, theft, accident, acts of God and Owner's negligent maintenance.
- B. Replace each unacceptable plant as soon as season requirements permit.
- C. Only one (1) replacement per plant will be required, except for losses due to failure to comply with specifications.
- D. Provide extended warranty for period equal to original warranty period, for replaced plant material.

1.9 MAINTENANCE SERVICE

- A. Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until Final Acceptance of the project by the Owner.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

- A. General: Furnish only nursery-grown plants under climatic conditions similar to the location of this project, for at least one growing season prior to this work which are true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1 and any more stringent requirements which may be stated herein or on the Drawings.
- B. Furnish only plants with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
 - 1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between two branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4 inch in diameter; or with stem girdling roots will be rejected.
 - 2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.
 - 3. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Engineer, with a proportionate increase in size of roots or balls, but use of such plants shall not increase the contract price.
- C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting.
- D. Labeling: Label at least 10 percent of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant as shown on Drawings.
- E. If formal arrangements or consecutive order of plants is shown on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.
- F. Bulbs: Bulb quality will be approved by the Engineer prior to planting. Bulb quality will be judged by the following characteristics:
 - 1. Firm and free from deep blemishes, cuts or soft spots.
 - 2. Heavy for their size.

3. Have a solid and firm basal plate.
- G. Annuals, Biennials, and Perennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.
- H. Plant Quantity: The greater quantity shall take precedence if discrepancies occur between the quantities designated on the materials list and those indicated on the drawings.
- I. Nomenclature shall conform to "Hortus III".

2.2 INORGANIC SOIL AMENDMENTS

- A. Lime: The quality of lime and all operations in connection with the furnishing of this material shall comply with the requirements of ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
 1. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through No. 60 sieve.
 2. Provide lime in the form of free-flowing ground dolomitic limestone.
- B. During the handling and storing, the lime shall be cared for in such a manner that it will be protected against hardening and caking. Any hardened or caked lime shall be pulverized to its original condition before being used.

2.3 ORGANIC SOIL AMENDMENTS

- A. Sawdust: Well-rotted sawdust, free of chips, stones, sticks, soil or toxic substances and with 7.5 lbs. nitrogen uniformly mixed into each cubic yard.
- B. Manure: Well-rotted, unleached, stable or cattle manure not less than 8 months or more than 2 years old, containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.
- C. Commercial Bagged Manure Such as "Black Cow", "Baa Baa Doo", or equal.

2.4 FERTILIZERS

- A. The quality of fertilizer and all operations in connection with the furnishing of this material shall comply with the requirements of the North Carolina Fertilizer Law and regulations adopted by the North Carolina Board of Agriculture.

- B. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.
 - 1. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.
 - 2. Manufacturer: Agriform Planting Tablets as manufactured by Scotts-Sierra Horticultural Products, or equal, may be used at installer's option.
- C. Encapsulated Fertilizers: Fertilizer made up of nutrient granules embedded in a synthetic resin which dissolves slowly, releasing the nutrients over an extended period of time. It is also called a slow-release fertilizer.
 - 1. Nutrient Composition: 19 percent nitrogen, 6 percent phosphorous, and 12 percent potassium, by weight plus micronutrients.
 - 2. Manufacturer: Osmocote as manufactured by Scotts-Miracle Gro, or equal, may be used at installer's option.
- D. During handling and storing, the fertilizer shall be cared for in such a manner that it will be protected against hardening, caking, or loss of plant food values. Any hardened or caked fertilizer shall be pulverized to its original conditions before being used.

2.5 PLANTING SOILS

- A. Planting Soil: Existing, native surface topsoil formed under natural conditions with the duff layer retained during excavation process and stockpiled on-site. Verify suitability of native surface topsoil to produce viable planting soil. Clean soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - 1. Supplement with another specified planting soil when quantities are insufficient.
 - 2. Mix existing, native surface topsoil with soil amendments of the type and quantity directed by the Engineer to produce planting soil:
- B. Planting Soil: Existing, in-place surface soil. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with soil amendments of the type and quantity directed by the Engineer to produce planting soil:
- C. Planting Soil: Imported topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites

where topsoil occurs at least 4 inches deep; do not obtain from bogs, or marshes.

1. Additional Properties of Imported Topsoil or Manufactured Topsoil: Screened and free of stones 1 inch or larger in any dimension; free of roots, plants, sod, clods, clay lumps, pockets of coarse sand, paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials harmful to plant growth; free of obnoxious weeds and invasive plants including quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and brome grass; not infested with nematodes; grubs; or other pests, pest eggs, or other undesirable organisms and disease-causing plant pathogens; friable and with sufficient structure to give good tilth and aeration. Continuous, air-filled pore space content on a volume/volume basis shall be at least 15 percent when moisture is present at field capacity. Soil shall have a field capacity of at least 15 percent on a dry weight basis.
2. Top soil shall not be delivered in a muddy or frozen condition.

2.6 MULCHES

A. Mulch Materials for Plants

1. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:
 - a. Type: Shredded hardwood.
 - b. Size Range: 3 inches maximum, 1/2 inch minimum.
 - c. Color: Natural.

2.7 WATER

- ### **A. Water shall be clean, clear water free from any objectionable or harmful chemical qualities or organisms and shall be furnished by the Contractor.**

2.8 WEED-CONTROL BARRIERS

- ### **A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally-encountered chemicals, alkalis, and acids.**

- B. Composite Fabric: Woven, needle-punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz./sq. yd.

2.9 PESTICIDES

- A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.
- B. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.
- C. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

2.10 TREE STABILIZATION MATERIALS

- A. Stakes and Guys:
 - 1. Upright and Guy Stakes: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by 8'-0" length, pointed at one end.
 - 2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes or compression springs.
 - 3. Guys and Tie Wires: ASTM A 641, Class 1, galvanized-steel wire, two-strand, twisted, 12-gauge minimum.
 - 4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.
 - 5. Guy Cables: Five-strand, 3/16-inch-diameter, galvanized-steel cable, with zinc-coated compression springs, a minimum of 3 inches long, with two 3/8-inch galvanized eyebolts.
 - 6. Flags: Standard surveyor's plastic flagging tape, white, 6 inches long.
- B. Root-Ball Stabilization Materials:
 - 1. Upright Stakes and Horizontal Hold-Down: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by lengths necessary for proper support; stakes pointed at one end.
 - 2. Wood Screws: ASME B18.6.1.
 - 3. Battens or Blocks and Struts: Rough-sawn, sound, new lumber, free of knots, holes, cross grain, and other defects, 2-by-4-inch nominal by lengths necessary for proper support.

4. Straps: Adjustable steel or plastic package banding straps.
5. Padding: Burlap.

2.11 MISCELLANEOUS PRODUCTS

- A. Wood Pressure-Preservative Treatment: AWWA C2, with waterborne preservative for soil and freshwater use, acceptable to authorities having jurisdiction, and containing no arsenic; including ammoniacal copper arsenate, ammoniacal copper zinc arsenate, and chromated copper arsenate.
- B. Root Barrier: Black, molded, modular panels manufactured with 50 percent recycled polyethylene plastic with ultraviolet inhibitors, 85 mils thick, with vertical root deflecting ribs protruding 3/4 inch out from panel, and each panel **24 inches** wide.
- C. Antidesiccant: Water-insoluble emulsion, permeable moisture retarder, film forming, for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer's written instructions.
- D. Burlap: Non-synthetic, biodegradable.
- E. Planter Drainage Gravel: Washed, sound crushed stone or gravel complying with ASTM D 448 for Size No. 8.
- F. Planter Filter Fabric Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive plants for compliance with requirements and conditions affecting installation and performance.
 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 2. Do not mix or place soils and soil amendments in frozen, wet, or muddy conditions.
 3. Suspend soil spreading, grading, and tilling operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.

4. Uniformly moisten excessively dry soil that is not workable and which is too dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
- B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Lay out individual tree and shrub locations with stakes or flags. Flag outlines of planting beds and secure landscape architect's approval prior to beginning soil preparation. Make adjustments as directed.
- D. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again two weeks after planting.
- E. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

3.3 PLANTING AREA ESTABLISHMENT

- A. Loosen and excavate subgrade of all planting areas to a minimum depth of 24 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 1. Apply **superphosphate** fertilizer directly to subgrade before loosening.
 2. Spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.

- a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
 - b. Mix lime with dry soil before mixing fertilizer.
- 3. Spread planting soil to a depth required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately one-half the thickness of planting soil over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
- B. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
- C. Before planting, obtain Engineer's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 **EXCAVATION FOR TREES AND SHRUBS**

- A. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter for **balled and burlapped** stock.
 - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
 - 3. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
 - 4. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
 - 5. Maintain required angles of repose of adjacent materials as shown on the Drawings. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
 - 6. Maintain supervision of excavations during working hours.
 - 7. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
 - 8. If drain tile is shown on Drawings or required under planting areas, excavate to top of porous backfill over tile.
- B. Subsoil and topsoil removed from excavations may be used as planting soil.

- C. Obstructions: Notify Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
 - 1. Hardpan Layer: Drill 6-inch-diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.
- D. Drainage: Notify Engineer if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.
- E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

- A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.
- B. Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.
- C. Set balled and burlapped stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Use planting soil for backfill.
 - 2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 - 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 - 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- D. Set balled and potted stock plumb and in center of planting pit or trench with root flare 1 inch above adjacent finish grades.
 - 1. Use planting soil for backfill.

2. Carefully remove root ball from container without damaging root ball or plant.
 3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
 4. Place planting tablets in each planting pit when pit is approximately one-half filled; in amounts recommended in soil reports from soil-testing laboratory. Place tablets beside the root ball about 1 inch from root tips; do not place tablets in bottom of the hole.
 5. Continue backfilling process. Water again after placing and tamping final layer of soil.
- E. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE SPADE PLANTING

- A. Trees shall be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than the manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.
- B. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.
- C. Cut exposed roots cleanly during transplanting operations.
- D. Use the same tree spade to excavate the planting hole as was used to extract and transport the tree.
- E. Plant trees as shown on Drawings, following procedures in "Tree, Shrub, and Vine Planting" Article.
- F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees, shrubs, and vines as directed by Engineer.

- C. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Engineer, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs; and prune to retain natural character.
- D. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

- A. 14 feet in height and more than 3 inches in caliper unless otherwise indicated. Securely attach no fewer than three guys to stakes 30 inches long, driven to grade.
 - 1. Site-Fabricated Staking-and-Guying Method:
 - a. For trees more than 6 inches in caliper, anchor guys to wood deadmen buried at least 36 inches below grade. Provide compression spring for each guy wire and tighten securely.
 - b. Support trees with bands of flexible ties at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
 - c. Support trees with strands of cable or multiple strands of tie wire, connected to the brass grommets of tree-tie webbing at contact points with tree trunk and reaching to compression spring. Allow enough slack to avoid rigid restraint of tree.
 - d. Attach flags to each guy wire, 30 inches above finish grade.
 - e. Paint compression springs with luminescent white paint.
 - 2. Proprietary Staking and Guying Device: Install staking and guying system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.
- B. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.
 - 1. Wood Hold-Down Method: Place vertical stakes against side of root ball and drive them into subsoil; place horizontal wood hold-down stake across top of root ball and screw at each end to one of the vertical stakes.
 - a. Install stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation. Saw stakes off at horizontal stake.
 - b. Install screws through horizontal hold-down and penetrating at least 1 inch into stakes. Pre-drill holes if necessary to prevent splitting wood.
 - c. Install second set of stakes on other side of root trunk for larger trees as indicated.

2. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.
- C. Palm Bracing: Install bracing system at three or more places equally spaced around perimeter of trunk to secure each palm until established unless otherwise indicated.
1. Site-Fabricated Palm-Bracing Method:
 - a. Place battens over padding and secure battens in place around trunk perimeter with at least two straps, tightened to prevent displacement. Ensure that straps do not contact trunk.
 - b. Place diagonal braces and cut to length. Secure upper ends of diagonal braces with galvanized nails into battens or into nail-attached blocks on battens. Do not drive nails, screws, or other securing devices into palm trunk; do not penetrate palm trunk in any fashion. Secure lower ends of diagonal braces with stakes driven into ground to prevent outward slippage of braces.
 2. Proprietary Palm-Bracing Device: Install palm-bracing system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 GROUND COVER AND PLANT PLANTING

- A. Dig holes large enough to allow spreading of roots.
- B. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.
- C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.10 PLANTING AREA MULCHING

- A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 12 inches and secure seams with galvanized pins.

- B. Mulch backfilled surfaces of planting areas and other areas indicated.
 - 1. Trees **and Tree-like Shrubs** in Turf Areas: Apply **organic** mulch ring of **3-inch** average thickness, with 36 inch radius around trunks or stems. Do not place mulch within 6 inches of trunks or stems.
 - 2. Organic Mulch in Planting Areas: Apply 3 inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 6 inches of trunks or stems.

3.11 PLANT MAINTENANCE

- A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
- C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.12 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
 - 1. Use herbicides to eradicate vegetation before tilling plant seed and sod beds.
 - 2. Use herbicides to control emerging weeds in shrub and ground cover beds and around trees.
- B. Pre-Emergent Herbicides (Selective and Non-Selective): Apply to tree, shrub, and ground-cover areas in accordance with manufacturer's written recommendations. Do not apply to seeded areas.
- C. Post-Emergent Herbicides (Selective and Non-Selective):

1. Apply only as necessary to treat already-germinated weeds and in accordance with manufacturer's written recommendations.
2. In buffer planting areas apply a minimum of three (3) applications of approved herbicide at two (2) week intervals.
3. Protect adjacent property and vegetation to remain.

3.13 CLEANUP AND PROTECTION

- A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.
- B. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- C. After installation and before Final Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.

3.14 DISPOSAL

- A. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 329300