ROCKDALE COUNTY, GEORGIA

March 7, 2018

CONTRACT DOCUMENTS
FOR
LAKEFIELD URBAN WATERSHED RESTORATION PROJECT – DAM REHABILITATION

INVITATION TO BID (ITB)
18-06

ROCKDALE COUNTY FINANCE DEPARTMENT
PROCUREMENT OFFICE
958 MILSTEAD AVENUE
CONYERS, GA 30012
770-278-7552

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SECTION 1

INVITATION TO BID

1. INVITATION TO BID

The Rockdale County Board of Commissioners is seeking competitive sealed bids from qualified contractors for the construction of the Lakefield Urban Watershed Restoration Project – Dam Rehabilitation in Rockdale County, Georgia.

Construction Drawings for the project are included in Section 8.

Generally, the work to be performed under this contract will include, but not be limited to the following:

- Mobilization to, and demobilization from, the site;
- All field engineering and surveying;
- Installation of all temporary facilities, including design where appropriate, required to stage personnel, equipment and materials necessary to perform the Work;
- Preparation and implementation of a project-specific Erosion, Sediment and Pollution Control Plan (including adherence to NPDES requirements);
- Preparation and implementation of a project-specific Health and Safety Plan;
- Site preparatory activities, including but not limited to, acquisition of all necessary permits, construction of temporary construction access roads, clearing and grubbing, and topsoil handling;
- Lowering the lake level and maintaining the lowered level during construction;
- Identification and pre-qualification of all materials to be used in construction, including suitable borrow material for the intended construction from an off-site borrow source;
- All Work associated with the rehabilitation of the Lakefield Dam;
- Realignment of sections of the existing sanitary sewer lines, which includes but is not limited to removal of existing sections and installation of new ones, and demolition of odor control structure;
- Foundation preparation procedures;
- Construction of the spillway and discharge structures, embankment construction, and installation of the downstream seepage collection system;
- Installation of embankment monitoring instrumentation;
- Construction of treatment wetlands;
- Revegetation of all disturbed areas and restoration of the Site to pre-construction conditions; and
- Preparation of progress reports, submittals, as-built drawings and other Project Record Documents.

Each of these components is described in more detail in Sections 8 and 9.

Rockdale County (Owner) will receive sealed bids from Bidders until **2:00 P.M. local time, Thursday, April 5, 2018**, in Rockdale County Finance Department, Procurement Division, 958 Milstead Avenue, Conyers, GA 30012. Bids will be opened and read aloud publicly at this time.

Bids received after 2:00 P.M. will not be accepted.

A pre-bid conference followed by a site visit will be held at **10:00 A.M. local time, Monday, March 19, 2018** at the Rockdale County Assembly Hall, 901 Main Street, Conyers GA 30012. All interested bidders are encouraged to attend.

Bidding documents are available for purchase and viewing in the Rockdale County Finance Department, Procurement Division, 958 Milstead Avenue, Conyers, GA 30012. Applications for documents, together with a non-refundable payment of $300.00 per set, shall be filed with the Department of Finance. Payment must be a certified check, treasurer's check, or a cashier's check, issued by a responsible bank or Trust Company payable to the Rockdale County Department of Finance.

Questions regarding the bids should be submitted no later than **2:00 P.M. local time, Thursday, March 29, 2018,** to:

> Meagan Porch, Rockdale County Finance Department, Procurement Division,
> 958 Milstead Avenue, Conyers, GA 30012,
> Phone: (770) 278-7557, E-mail: meagan.porch@rockdalecountyga.gov

This project is expected to be funded by the United States Environmental Protection Agency and, as stated in the bid documents, shall comply with all applicable federal requirements as outlined in the "USEPA Supplementary General Conditions."

All Bidders are required to submit a Bid Bond or a certified check made payable to Rockdale County in the amount of five percent (5%) of the total amount bid. The Bid Bond or certified check must be enclosed in the envelope with the sealed bid. The successful bidder will be required to furnish a contract Performance and Payment Bond, each in the sum of 100% of the total amount bid and provide insurance coverage as required by the contract documents.

Bonding Company must be licensed to do business in Georgia, licensed to do business by the Georgia Secretary of State, authorized to do business in Georgia by the Georgia Insurance Department, listed in the Department of Treasury's Publication of Companies Holding Certificates of Authority as Acceptable Surety on Federal Bonds as Acceptable Reinsuring Companies and have an A.M. Best rating of A-VI or higher.

The Owner reserves the right to reject any or all Bids and to waive irregularity in Bidding. No Bidder may withdraw his Bid within sixty (60) days after the actual date of the opening thereof.

Bidder agrees to complete the Contract awarded within the specified contract time from the date of the "Notice to Proceed" and further agrees that the Owner may retain from the monies which may become due the amount of **$1,500** per day for each and every day that the final completion of the work may be delayed.

Rockdale County does not discriminate on the basis of disability in the admission or access to its programs or activities. Any request for reasonable accommodations required by individuals to fully participate in any opening meeting, program or activity of the Rockdale County government should be directed to:

> Director Toni Holmes, Talent Management Department, P.O. Box 289, Conyers, GA 30012,
> Phone: (770) 278-7575, E-mail: toni.holmes@rockdalecountyga.gov

The County will award the Contract to the lowest "qualified" bidder, subject to the Owner's right to reject any or all bids, to waive technicalities, and to make an award deemed in its best interests.

SECTION 2

INSTRUCTION TO BIDDERS

2. INSTRUCTIONS TO BIDDERS

(Source = EJCDC C-200, 2002 Edition)[1]

ARTICLE 1 - DEFINED TERMS

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

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

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

2.02 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 confer a license or grant for any other use.

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 Bidder shall complete the 'Contractor's Qualifications Statement and Questionnaire' included in Section 6. Bids submitted without this section completed will be considered nonresponsive. The successful Bidder shall demonstrate the successful completion of a minimum of two (2) projects involving the construction or rehabilitation of a Category I (High Hazard) embankment dam.

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

4.01 Subsurface and Physical Conditions

A. The Supplementary Conditions identify:

1. Those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Bidding Documents.

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of 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.

4.02 Underground Facilities

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site, if any, is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

1 EJCDC = Engineers Joint Contract Documents Committee

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer has used in preparing the Bidding Documents.

B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of 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.

4.04 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 conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. 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. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

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

A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder 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 in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;

E. obtain and carefully study (or accept consequences of 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 any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

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 and in accordance with the other terms and conditions of the Bidding Documents;

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

H. correlate 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. 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

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

4.08 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, 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 generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 - PRE-BID CONFERENCE

5.01 See Section 1 of the Contract Documents.

ARTICLE 6 - SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding 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. Easements for temporary construction facilities identified in the Bidding Documents are to be obtained and paid for by the 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 Owner in writing. Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by Addenda mailed (by post or electronic) or delivered to all parties recorded by Owner as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 - BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five (5) percent of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions and Section 1 of the Bid Documents.

8.02 The Bid security of the 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. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

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

ARTICLE 9 - CONTRACT TIMES

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

ARTICLE 10 - LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages are set forth in the Agreement.

ARTICLE 11 - SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, or those substitute or "or-equal" materials and equipment approved by Engineer and identified by Addendum. The materials and equipment described in the Bidding Documents establish a standard of required type, function and quality to be met by any proposed substitute or "or-equal" item. No item of material or equipment will be considered by Engineer as a substitute or "or-equal" unless written request for approval has been submitted by Bidder and has been received by Engineer at least 15 days prior to the date for receipt of Bids. Each such request shall conform to the requirements of Paragraph 6.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

ARTICLE 12 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 If the Supplementary Conditions require the identity 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 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 Paragraph 6.06 of the 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 is included with the Bidding Documents.

13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid 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 Bid item and unit price item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer 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 below the signature.

13.04 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 below the signature.

13.05 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 below the signature.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

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

13.10 The address and telephone number for communications regarding the Bid shall be shown.

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

ARTICLE 14 - BASIS OF BID; COMPARISON OF BIDS

14.01 Unit Price

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

B. The total of all 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 Paragraph 11.03 of the General Conditions.

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

14.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.

14.03 Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9.

ARTICLE 15 - SUBMITTAL OF BID

15.01 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED."

ARTICLE 16 - MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the 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.

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

ARTICLE 17 - OPENING OF BIDS

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

ARTICLE 18 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

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

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

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

19.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

ARTICLE 20 - CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 - SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 22 - SALES AND USE TAXES [DELETED]

ARTICLE 23 - RETAINAGE [DELETED]

ARTICLE 24 - CONTRACTS TO BE ASSIGNED [DELETED]

ARTICLE 25 – PARTNERING [DELETED]

ARTICLE 26 – MBE, WBE & EEO Compliance

26.01 The Bidder shall comply with the requirements set forth in the Supplemental General Conditions in Section 7.

ARTICLE 27 – FEDERAL, STATE, & LOCAL PERMITS

27.01 The following permits will be obtained by the Owner prior to the commencement of construction: USACE Section 404 Permit, GA EPD Stream Buffer Variance, GA EPD Safe Dams Program Permit for Construction & Operation of a Dam, and Rockdale County Land Disturbance Permit.

27.02 The successful Bidder shall be provided with copies of the permits listed in 27.01 above and shall comply with conditions of the permits.

27.03 The successful Bidder shall be responsible for acquiring other required permits including but not limited to local, state, and federal requirements for the disposal of unsuitable or excess material from the site, hauling of fill material to the site, etc.

SECTION 3

BID FORM

3. BID FORM

(Source = EJCDC C-410, 2002 Edition)[2]

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

_____
_____
_____
_____

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No. Addendum Date

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

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

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in SC-4.06.

2 EJCDC = Engineers Joint Contract Documents Committee

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.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

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.

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

5.01 Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

5.02 Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

5.03 Bidder shall set out and fully describe in the attached Unit Price Schedule, inserting the relevant clause number or reference, and price any work or obligation or anything in General Conditions of Contract, Supplementary Conditions of Contract or Technical Specifications not included by him/her in his/her rates elsewhere for which he/she considers a separate charge is required. The sums inserted in this item shall be considered fixed lump sums covering the whole of the Works and as such will not be subject to adjustment. If the Bidder does not make allowance in the space provided on the Unit Price Schedule, then the rates inserted shall be deemed to cover all his/her obligations under the terms and conditions of this Contract.

5.04 Bidder will complete the Work in accordance with the Contract Documents for the price(s) indicated in the attached Unit Price Schedule.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete within 150 calendar days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions within 180 calendar days after the date when the Contract Times commence to run.

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

Unit Price Schedule

Schedule A – Labor Rates

Schedule B – Construction Materials

Schedule C – Construction Equipment

Schedule D – List of Proposed Subcontractors, Suppliers and other Persons and Organizations Required to be identified in the Bid

Bid Bond

Performance Bond (Example)

Payment Bond (Example)

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid submitted by:

If BIDDER is:

An Individual

By_____(SEAL)
(Individual's Name)

doing business as: _____

Business address: _____

_____

Phone No.: _____

A Partnership

By_____(SEAL)
(Firm Name)

_____
(General Partner)

Business address: _____

_____

Phone No.: _____

A Corporation

By_____
(Corporation Name)

_____
(State of incorporation)

By_____
(Name of person authorized to sign)

_____
(Title)

(Corporate Seal)

Attest_____
(Secretary)

Business address: _____

_____

Phone No.: _____

A Joint Venture

By_____
(Name)

_____
(Address)

By_____
(Name)

_____
(Address)

(Each joint venture 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).

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 1 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
PRELIMINARIES AND TEMPORARY WORKS (01500)					
01500/01	Mobilization and demobilization.	1	LS		
01500/02	Temporary works.	1	LS		
01500/03	Insurance.	1	LS		
STRUCTURAL DEMOLITION (02060)					
02060/01	Demolition and disposal of structures and items as indicated on the Drawings, including but not limited to existing spillway structure, sanitary sewer lines and manholes, odor control structure, abandonment of existing 10-inch diameter metal pipe, etc.	1	LS		
CLEARING, GRUBBING AND TOPSOIL HANDLING (02110)					
02110/01	Clearing and grubbing of the existing dam and within the footprint of the proposed embankment and associated areas.	6	AC		
02110/02	Stripping and stockpiling of topsoil materials on the existing dam and within the footprint of the proposed embankment and associated areas.	6	AC		
02110/03	Topsoil placed to the specified thickness on the proposed embankment and associated areas. This item includes loading from stockpiles, screening, hauling, spreading, placing, and compacting material.	24,000	SY		
EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES (02220)					
02220/01	Mass Concrete Foundation (Lean Concrete) for backfill beneath Spillway Box Culvert, Concrete Discharge Channel, and Low-Level Outlet Pipe.	1,050	CY		
EXCAVATION, BACKFILL, FILL AND GRADING FOR PIPE (02221) ***** No separate payment applies. *****					

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 2 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
EXCAVATION (02222)					
02222/01	Excavation and offsite disposal of unsuitable material excavated from the site. This item will include excavation, loading, hauling, unloading, and all costs associated with disposal.	5,500	CY		
02222/02	Excavation and onsite disposal of unsuitable material excavated from the site. This item will include excavation, loading, hauling, unloading, and spreading the material to bring areas of Treatment Wetlands to grade, unless otherwise directed by the Engineer.	1,500	CY		
FOUNDATION PREPARATION (02224) ***** No separate payment applies. *****					
RIP RAP (02230)					
02230/01	Labor, materials and installation of GDOT Type 1 rip rap at locations specified by the engineer.	600	TN		
02230/02	Labor, materials and installation of GDOT Type 3 rip rap at locations specified by the engineer.	1,625	TN		
02230/03	Labor, materials, and installation of filter fabric placed beneath rip rap at locations specified by the engineer.	3,000	SY		
02230/04	Labor, materials, and installation of graded aggregate base placed beneath rip rap at locations specified by the engineer.	820	TN		
DRAIN AND FILTER MATERIALS (02235)					
02235/01	Supply and installation of Georgia DOT No. 10 sand for seepage collection system.	2,225	TN		
02235/02	Supply and installation of Georgia DOT No. 89 stone for seepage collection system.	80	TN		

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 3 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
02235/03	Supply and installation of Georgia DOT No. 4 stone for seepage collection system.	510	TN		
02235/04	Supply and installation of geotextile filter fabric used in construction of seepage collection system.	2,000	SY		
02235/05	Supply and installation of PVC pipe for toe drain (solid, schedule 80, 6-inch diameter), including protective markers and signage.	85	LF		
02235/06	Supply and installation of PVC pipe for toe drain (perforated, schedule 80, 6-inch diameter).	480	LF		
EARTH FILL (02266)					
02266/01	Embankment Construction – development of offsite borrow, excavation, loading, hauling, scarifying, moisture conditioning, spreading, compacting, fine grading and other incidentals necessary to construct the embankment dam.	48,000	CY		
INSTRUMENTATION (02280)					
02280/01	Standpipe piezometers, including all labor, set ups, drilling, material supply, equipment required to install the standpipe piezometers, protective covers and markers, and signage.	140	LF		
02280/02	Settlement monuments, including all equipment and labor required to install settlement monuments, protective markers, and signage.	3	EA		
02280/03	Abandonment of the existing piezometers within the embankment limits by overdrilling and backfill grouting.	110	LF		

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 4 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
EROSION, SEDIMENTATION AND POLLUTION CONTROL (02910)					
02910/01	Construction Exit - Co shall be installed as shown on the Drawings (includes installation, maintenance, and removal)	1	LS		
02910/02	Sediment Barrier Type Sensitive (SD1S/Type C silt fence) shall be installed as shown on the Drawings (includes installation, maintenance, and removal)	1,400	LF		
02910/03	Sediment Barrier Type Sensitive Double Row (SD1 S/Type C silt fence) shall include both rows of silt fence and be installed as shown on the Drawings (includes installation, maintenance, and removal)	3,900	LF		
02910/04	Rock Filter Dam - Rd shall be installed as shown on the Drawings (item includes construction, maintenance, and removal)	1	EA		
02910/05	Temporary Sediment Trap - Sd4 shall be installed as shown on the Drawings (item includes trap and rip rap outlet protection construction, maintenance, and removal)	1	EA		
02910/06	Erosion Control Matting - Ss RECP shall be installed as shown on the Drawings (includes installation and maintenance)	5,500	SY		
02910/07	Tree Protection Fence - Tr shall be installed as shown on the Drawings (includes installation, maintenance, and removal)	2,100	LF		
02910/08	Temporary Grassing (as directed by the Owner/Engineer)	3.5	AC		
02910/09	Straw Bale Check Dams - Cd Hb shall be installlled as shown on the Drawings (includes installation, maintenance, and removal)	12	EA		

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 5 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
02910/10	NPDES inspection of BMPs, sampling of outfall by GSWCC certified personnel, reporting /recordkeeping of sampling for duration of construction.	1	LS		
DIVERSION AND DEWATERING (02920) ***** No separate payment applies. *****					
GRASSING AND MULCHING (02936)					
02936/01	Labor, materials, equipment, tools and other items necessary and incidental to the completion of permanent grassing on all disturbed areas.	5.7	AC		
CAST-IN-PLACE CONCRETE STRUCTURES (03310)					
03310/01	Spillway Structure, furnishing all materials, labor, and equipment necessary for full installation of the box culvert, end sections, weirs, discharge channel, and energy dissipation structures. This item shall include costs of excavation, foundation preparation, backfill compaction, concrete, formwork, ties, curing, finishing, reinforcing steel, metal inserts, handrails, chain link fence, blockouts, and other incidentals necessary.	1	LS		
PRECAST / DRAINAGE STRUCTURES (03456)					
03456/01	Reinforced concrete valve box, including all materials, labor, and equipment for full installation including foundation preparation, subgrade material, backfilling, compacting, aluminum access door, concrete valve support, pipe blockouts, PVC drain pipe, and other incidentals necessary.	1	LS		
03456/02	Concrete headwalls at seepage collection system outlet pipes.	3	EA		
03456/03	Concrete headwall for low-level outlet pipe, including all materials, labor, and equipment for full installation of concrete headwall and aluminum trash screen.	1	LS		

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 6 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
VALVES AND APPURTENANCES (15100)					
15100/01	Butterfly valve, 24-inch diameter. This item shall include all materials, labor, and equipment for full installation of the butterfly valve on the low-level outlet pipe within the concrete valve box.	1	LS		
HDPE PIPE AND FITTINGS (15120)					
15120/01	HDPE low level outlet pipe, 24-inch diameter. This item shall include all materials, labor, and equipment for full installation of the low-level outlet pipe including concrete cradle, concrete encasement, backfilling, compaction, 6-inch diameter PVC drainline, downstream seepage filter and perforated PVC pipe and geotextile, hydrostatic testing, and other incidentals necessary.	250	LF		
SANITARY SEWER RELOCATION (15140)					
15140/01	Labor, materials, equipment, tools and other items necessary and incidental to the completion of the sanitary sewer relocation, including PVC pipe, ductile iron pipes, precast concrete manholes, clearing and grubbing, excavation, backfilling, compaction, and other incidentals necessary.	1	LS		
TREATMENT WETLAND NO. 1					
TW1/01	Labor, materials, equipment, tools and other items necessary and incidental to the completion of Treatment Wetland No. 1, including surveying, erosion and sedimentation control, clearing and grubbing, stripping, foundation preparation, demolition and construction of headwall concrete apron concrete channel, concrete pipe, rip rap, geotextile, fill placement, compaction, plantings, fine grading, and ditch construction.	1	LS		

UNIT PRICE SCHEDULE – ITB # 18-06 (PAGE 7 OF 7)

Item #	Item Description	Approx. Quantity	Unit	Unit Bid Price	Projected Bid Price
TREATMENT WETLAND NO. 2					
TW2/02	Labor, materials, equipment, tools and other items necessary and incidental to the completion of Treatment Wetland No. 1, including surveying, erosion and sedimentation control, clearing and grubbing, stripping, foundation preparation, rip rap, geotextile, fill placement, compaction, plantings, fine grading, and ditch construction.	1	LS		
OTHERS The CONTRACTOR shall set out and fully describe in the space provided, inserting the relevant clause number or reference, and price any work or obligation or anything in the General Conditions of Contract or Technical Specifications not included by him/her in his/her rates elsewhere for which he/she considers a separate charge is required. The sums inserted in this item shall be considered fixed lump sums covering the whole of the Works and as such will not be subject to adjustment. If the CONTRACTOR does not make allowance in the space provided below, then the rates inserted shall be deemed to cover all his/her obligations under the Terms and Conditions of this Contract.					
CONTINGENCY (5% OF ITEMS 02060/01 THROUGH TW2/02)					
The Contingency is to be included in the Contract Amount but shall only be used at the discretion and with prior authorization from the Owner.					

TOTAL BID PRICE:

_____

_____

(Use words to show dollars and cents)

_____

(Use numbers to show dollars and cents)

NOTES:
1) Bidder acknowledges that quantities are approximate and are not guaranteed. Final payment will be based
on actual quantities determined as provided in the Contract Documents.

2) Quantities of Work and materials are not to be considered as limiting or extending the amount of work to be
done and materials to be supplied by the Bidder.

3) All work has been measured net as fixed in position and Bidder shall allow in bid price for wastes, overlaps, etc.

4) Some or all the following abbreviations have been used in the above schedule:

FT – feet	T/M – time and materials	AC – acre
SF – square feet	LS – lump sum	N/A – not applicable
SY – square yard	PS – provisional sum	
CY – cubic yard	TN – ton, or 2000 pounds	
LF – lineal feet	EA – each	

5) This Unit Price Schedule should be read with the corresponding Construction Drawings and Measurements
and Payments in the Technical Specifications.

6) A 5-percent contingency sum of items 02060/01 through TW2/02 (inclusive) of the Unit Price Schedule has
been included in the bid price. This contingency sum is to cover costs of potential increases in quantities of
work items. The contingency sum will also be used to pay Bidder for additional Work required by Rockdale County and authorized by an approved Change Order. Bidder will NOT be paid the contingency
amount, either in full or in part if Work is not done to warrant that payment.

SCHEDULE A

LABOR RATES

Bidder hereby certifies that the wages, hours of work and conditions of labor of all work people proposed to be employed by him/her on this project for which he/she is offering himself/herself as Contractor are fair and reasonable having due regard to the Law and Regulations on the date of this Bid and will accept responsibility for the observance of the said Laws and Regulations in the execution of the Works.

The above mentioned wages and hours of work are as listed below:

Class of Work Person	Rates of Wages (per hour)	Hours of Work (per normal working day)

Bidder shall pay _____ times the above rates of wages for normal overtime work in excess of _____ hours per work day and ____ times the above rates of wages for work on Sunday and Legal Holidays.

Dated this _____day of _____, 20_____

_____ (_____)
(Signature) (Name in Block Letters)

*being an officer of, and duly authorized to sign on behalf of

_____

_____
(Address)

*(Evidence of authority to sign must be attached).

_____
(Corporate Seal)

Witness: _____ Occupation: _____

Address: _____

_____

_____

SCHEDULE B

CONSTRUCTION MATERIALS

Bidder hereby certifies that the following Suppliers will be utilized for the major supply items of this Contract and the rates inserted are correct to the best of his/her knowledge and belief on the date of this Bid:

Material	Supplier	Rates

Dated this _____ day of _____, 20 _____

_____ (_____)
(Signature) (Name in Block Letters)

*being an officer of, and duly authorized to sign on behalf of

_____

_____
(Address)

*(Evidence of authority to sign must be attached).

_____
(Corporate Seal)

Witness: _____ Occupation: _____

Address: _____

_____

_____

SCHEDULE C

CONSTRUCTION EQUIPMENT

Bidder hereby certifies that the equipment listed, or equivalent equipment, below will be available for Work on this Contract.

Type of Equipment (Model, Year, Serial No.)	Rated Capacity	Ownership	Location as of Bid Date

Dated this _____ day of _____, 20 _____

_____ (_____)
(Signature) (Name in Block Letters)

*being an officer of, and duly authorized to sign on behalf of

_____

_____
(Address)

*(Evidence of authority to sign must be attached).

_____
(Corporate Seal)

Witness: _____ Occupation: _____

Address: _____

_____

_____

SCHEDULE D

LIST OF PROPOSED SUBCONTRACTORS

Bidder intends to use the following Subcontractors will for Work on this Contract. Any Subcontractors not listed below will not be allowed to work on site unless previously approved by the Owner.

Subcontractor (Name and Address)	Type	Portion of Work

Dated this _____ day of _____, 20 _____

_____ (_____)
(Signature) (Name in Block Letters)

*being an officer of, and duly authorized to sign on behalf of

_____

_____
(Address)

*(Evidence of authority to sign must be attached).

_____
(Corporate Seal)

Witness: _____ Occupation: _____

Address: _____

_____

_____

BID BOND

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

BIDDER (Name and Address):

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

OWNER (Name and Address):

BID
Bid Due Date:
Project (Brief Description Including Location):

BOND
Bond Number:
Date (Not later than Bid due date):
Penal Sum: _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

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

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bidder who submitted a responsive Bid as determined by Owner for the work required by the Contract Documents, provided that:

1.1. If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the penal sum set forth on the face of this Bond, and

1.2. In no event shall Bidder's and Surety's obligation hereunder exceed the penal sum set forth on the face of this Bond.

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

3. This obligation shall be null and void if:

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

3.2. All Bids are rejected by Owner, or

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

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

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

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

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

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

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

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

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

PERFORMANCE BOND

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-610 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, and the American Institute of Architects.

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

2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.

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

3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and

3.3. Owner has agreed to pay the Balance of the Contract Price to:

1. Surety in accordance with the terms of the Contract;

2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.

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

4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or

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

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

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

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

2. Deny liability in whole or in part and notify Owner citing reasons therefor.

5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and

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

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the 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 Owner or its heirs, executors, administrators, or successors.

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

9. 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 Contractor Default or within two years after Contractor ceased working or within two years after 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 period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

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

12. Definitions.

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

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker
Owner's Respresentative (engineer or other party)

PAYMENT BOND

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

CONTRACTOR (Name and Address):

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

OWNER (Name and Address):

CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Bond Number:
Date (Not earlier than Contract Date):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: _____
Signature and Title

CONTRACTOR AS PRINCIPAL
Company:

Signature: _____ (Seal)
Name and Title:

SURETY

_____ (Seal)
Surety's Name and Corporate Seal

By: _____
Signature and Title
(Attach Power of Attorney)

Attest: _____
Signature and Title:

EJCDC No. C-615 (2002 Edition)
Originally prepared through the joint efforts of the Surety Association of America, Engineers Joint Contract Documents Committee, the Associated General Contractors of America, the American Institute of Architects, the American Subcontractors Association, and the Associated Specialty Contractors.

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

2. With respect to Owner, this obligation shall be null and void if Contractor:

2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.

4. Surety shall have no obligation to Claimants under this Bond until:

4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2. Claimants who do not have a direct contract with Contractor:

1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and

2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and

3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:

6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2. Pay or arrange for payment of any undisputed amounts.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

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

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

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, 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.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and 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.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

FOR INFORMATION ONLY – Name, Address and Telephone
Surety Agency or Broker:
Owner's Representative (engineer or other party):

SECTION 4

FORM OF AGREEMENT

EJCDC
SUGGESTED FORM OF AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Rockdale County Board of Commissioners

(Owner) and _____

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, 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:

Rehabilitation of the Lakefield Dam

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

The Lakefield Urban Watershed Restoration Project

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by

Golder Associates Inc.

(Engineer), who 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 4 - CONTRACT TIMES

4.01 Time of the Essence

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

4.02 Days to Achieve Substantial Completion and Final Payment

A. The Work will be substantially completed within 150 days after the date when the Contract Times commence to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions within 180 days after the date when the Contract Times commence to run.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the 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 $1,500 for each day that expires after the time specified in Paragraph 4.02 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 $1,500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. 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 estimated quantity of that item as indicated in this paragraph 5.01.A:

As provided in Paragraph 11.03 of the General Conditions, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Engineer as provided in Paragraph 9.07 of the General Conditions. Unit prices have been computed as provided in Paragraph 11.03 of the General Conditions.

UNIT PRICE WORK

Item No.	Description	Unit	Estimated Quantity	Unit Price	Estimated

{ Unit Price Schedule to be attached }

TOTAL OF ALL ESTIMATED PRICES _____

_____
(words)

_____
(numerals)

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

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

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment to be submitted on or about the 25th day of each month during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

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 General Conditions:

a. 90 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

b. 50 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

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

ARTICLE 7 - INTEREST

Not Used.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 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 carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions.

E. Contractor has obtained and carefully studied (or assumes responsibility for 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 Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any 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 correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. 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.

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

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 6, inclusive).
2. Performance bond (pages _____ to _____, inclusive).
3. Payment bond (pages _____ to _____, inclusive).
4. General Conditions (pages 0 to 43, inclusive).
6. Supplementary Conditions (incorporated into the General Conditions).
7. USEPA Supplemental General Conditions (pages 1 to 50, inclusive).
8. Drawings consisting of 32 sheets with each sheet bearing the following general title: Lakefield Urban Watershed Restoration Project – Dam Rehabilitation.

9. Technical Specifications as listed in the table of contents of the Project Manual.

10. Addenda (numbers _____ to _____, inclusive).

11. Exhibits to this Agreement (enumerated as follows):

a. Contractor's Bid (pages _____ to _____, inclusive).

b. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive).

c. Not Used.

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 _____ to _____, inclusive).

b. Work Change Directives.

c. Change Order(s).

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

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

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

ARTICLE 10 - MISCELLANEOUS

10.01 Terms

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

10.02 Assignment of Contract

A. 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.

10.03 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.

10.04 Severability

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

10.05 Other Provisions

Not Used.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

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

OWNER:	CONTRACTOR:
_____	_____
By: _____	By: _____
Title: _____	Title: _____
[CORPORATE SEAL]	[CORPORATE SEAL]
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
_____	_____
_____	_____
_____	_____
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)	License No.: _____ (Where applicable)
	Agent for service or process: _____
	_____
	(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

SECTION 5

GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS OF CONTRACT

5. GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS OF CONTRACT

For the Contract Documents, the desired Supplementary Conditions are integrated into the General Conditions by deletions, changes, and additions. The word processing program has line out and highlighting features which accurately show deletions, changes and additions. The text for General Conditions is based on EJCDC C-700, 2002 Edition[1]. The standard text of EJCDC C-700 is clearly delineated for all changes made to incorporate the Supplementary Conditions.

Note that Section 7 contains US EPA Supplemental General Conditions. These sections in addition to this Section 5 form the General and Supplementary Conditions of the Contract. In the event of a discrepancy, Section 7 shall take precedence. Discrepancies should be immediately brought to the attention of the Owner and Engineer.

The GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS OF CONTRACT, a total of 44 pages (numbered 0 through 43), follow.

[1] EJCDC = Engineers Joint Contract Documents Committee

STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

ACEC
American Council of Engineering Companies

National Society of Professional Engineers
Professional Engineers in Private Practice

ASCE American Society of Civil Engineers

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
a practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

_____

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

AMERICAN SOCIETY OF CIVIL ENGINEERS

This document has been approved and endorsed by

The Associated General Contractors of America

Knowledge for Creating and Sustaining the Built Environment

Construction Specifications Institute

National Society of Professional Engineers
1420 King Street, Alexandria, VA 22314

American Council of Engineering Companies
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
1801 Alexander Bell Drive, Reston, VA 20191-4400

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Nos. C-520 or C-525 (2002 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 EJCDC Construction Documents, General and Instructions (No. C-001) (2002 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. C-800) (2002 Edition).

TABLE OF CONTENTS

GENERAL CONDITIONS

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 acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *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. *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.

12. *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's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys 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).

14. *Contract Times*--The number of 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.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *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.

18. *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.

19. *Engineer*--The individual or entity named as such in the Agreement.

20. *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.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *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 in connection with the Work.

23. *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.

24. *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.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *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.

27. *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.

28. *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.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *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.

32. *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.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *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.

35. *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.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *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.

39. *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.

40. *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.

41. *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.

42. *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.

43. *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.

44. *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.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the

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

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

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

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 following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following 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 requirements of and information in the Contract Documents and conformance with the design concept of the completed 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

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 which 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.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to three printed or hard copies of the Drawings and Project Manual and one set in electronic format if requested. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 14 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

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

2. a preliminary Schedule of Submittals; and

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

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress

Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

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

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

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 may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended 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 at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, 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 may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

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 any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, 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.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

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, code, or instruction (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 or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, 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 Engineer's consultants, including electronic media editions; or

2. reuse any of 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 adaption by Engineer.

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

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or 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, graphics, or other types are furnished 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. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

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. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

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 therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which 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 Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. 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 Related Entities 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. In the preparation of Drawings and Specifications, Engineer relied upon the following reports of explorations and tests of subsurface conditions at the Site:

1. Report dated November 2015, prepared by Golder Associates Inc., Atlanta, Georgia, entitled: "DESIGN MEMORANDUM: DAM REHABILITATION – LAKEFIELD URBAN WATERSHED RESTORATION, ROCKDALE, COUNTY, GEORGIA".

D. Copies of reports and drawings itemized in 4.02.C that are not included with Bidding Documents may be examined at 3730 Chamblee Tucker Road, Atlanta, Georgia during regular business hours. These reports and drawings are not part of the Contract Documents. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of Drawings and Specifications.

Contractor is also required to visit the Site to become familiar with and satisfied as to the general, local, and Site conditions that may affect cost, progress, performance, and furnishing of the Work. This is to involve an alert, heads-up, eyes-open, reasonable examination of the area and the conditions under which the Work is to be performed (see GC 4.03.C.2.b).

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site 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;

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 condition must meet any one or more of the categories described in 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, Owner and Engineer, and any of their Related Entities 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.

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 Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; 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 therefor as provided in Paragraph 10.05.

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 Supplementary Conditions 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 Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. 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 Related Entities 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.~~

A. No reports on drawings related to Hazardous Environmental Conditions are known to Owner or Engineer.

B. Not Used.

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.

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 to Contractor written notice: (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 therefor 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 therefor 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, 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, 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.

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.

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 current 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 must be accompanied by a certified copy of the agent's authority to act.

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.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, 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 full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor, and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other 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 therefrom; 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.

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, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions 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);

6. 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

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, 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. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

a. State: Statutory Benefits

b. Applicable Federal (e.g.,Longshoreman's): Statutory Benefits

c. Employer's Liability: $1,000,000 by Accident/$1,000,000 by Disease/$1,000,000 Aggregate

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor:

a. Comprehensive General Liability. Combined Bodily Injury & Property Damage Including: Personal Injury, Broad Form Property Damage, Liability and Blanket Contractual Liability: $5,000,000 each occurrence

b. Comprehensive Products & Completed Operations Liability Including: Personal Injury, Broad Form Property Damage, Liability and Blanket Contractual Liability: $5,000,000 each occurrence/$5,000,000 aggregate

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Comprehensive Automobile Liability covering all owned, non-owned, or hired vehicles: $5,000,000 each occurrence/$5,000,000 each aggregate

4. The Owner, Rockdale County, and the Engineer, Golder Associates Inc., shall be listed as additional insureds.

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. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon 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~~

Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, 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 and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all risk" or open peril or special causes of loss 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 caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

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 additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, 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 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 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 30 days prior written notice has been given to Owner and Contractor and to each other additional insured 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 Supplementary Conditions. 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. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

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 to be listed as insureds or additional insureds (and the officers, directors, 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 additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, 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 to be listed as insured or additional insured (and the officers, directors, 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.

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

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

~~2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial 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, partners, employees, agents, consultants and subcontractors of each and any of them.~~

~~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 insureds, 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 moneys 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 does not 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. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

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.

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.

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.

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.

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 specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted 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;

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

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

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

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

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

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 that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. 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 in the General Requirements and as Engineer may decide is appropriate under the circumstances.

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;

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 or not 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 or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

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

b) available engineering, sales, maintenance, repair, and replacement services;

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,

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 either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

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*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with

Owner) resulting from the acceptance of each proposed substitute.

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.

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. 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 anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys 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.

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 an additional insured 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, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, 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.

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

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. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or

copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, 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 Supplementary Conditions, 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 primary 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 therefor 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.

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, 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.

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.

E. *Interruption of Facility Operation:* The Contractor shall provide the County with written notice at least three days prior to any interruption in facility operations required by construction activity. The notice shall include the date and time of the scheduled interruption, the length of time the interruption will be in effect, the procedures to be followed, a complete identification of all those processes, equipment and operations to be affected, and all other information the County may require. The Contractor shall provide any equipment, piping, auxiliary power or other means necessary to sustain facility operations or function for interruptions which have not been identified by the Specifications, or when interruptions must exceed the time allowed by the Specifications.

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. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

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. 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. 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 , 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).

D. 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).

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 acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

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:* Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

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 determined and verified:

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

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

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

d. shall also have 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.

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

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (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. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. 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.

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.

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.

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 Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees 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, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

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

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

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. Contractor shall not be required to provide professional services in violation of applicable law.

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

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

D. Pursuant to this Paragraph 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. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

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 via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. 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 that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

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, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall 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 their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

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 Supplementary Conditions:

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 Supplementary Conditions, 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. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's 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 and hold harmless Owner, Engineer, the construction coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, 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, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Engineer, Engineer's Consultants, or the construction coordinator to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, Engineer, or the construction coordinator 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, Engineer, or the construction coordinator on account of any such damage or Claim.

C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these 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 in respect of 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 in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

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 in 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 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

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.

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.

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 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, 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 Supplementary Conditions.

B. Resident Project Representative is Engineer's Agent, will act as directed and under the supervision of Engineer, and will confer with Engineer regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with Engineer and Contractor, and dealings with subcontractors shall only be through or with the full knowledge of Contractor.

The Resident Project Representative will serve as the Engineer's liaison with the Contractor, working principally through the Contractor's superintendent to assist him in understanding the intent of the Contract Documents.

The Resident Project Representative will conduct on-site observation of the Work in progress to assist the Engineer in determining if the work is proceeding in accordance with the Contract Documents and if the completed Work will conform to the Contract Documents. He/She will report to Engineer whenever he/she believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise

Engineer when he/she believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

The duties of the Resident Project Representative will include performing density tests on embankment fill and backfill to determine whether the fill satisfies the compaction requirements in the Specifications. He/She will have the authority to approve or reject such fill, in accordance with the specifications. He/She will report to Engineer whenever he/she believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise Engineer when he/she believes Work should be corrected or rejected or should be uncovered for observation, or require special testing, inspection or approval. This authority does not relieve the Contractor of the responsibility of using suitable fill material and achieving the required compaction, as defined in the Specifications.

The Resident Project Representative may make measurements of quantities of work completed and note materials delivered at the site but not incorporated in the Work.

Except upon written instruction of Engineer, Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute material or equipment.

2. Shall not exceed limitations on ENGINEER's authority as set forth in the Contract Documents.

3. Shall not undertake any of the responsibilities of CONTRACTOR, subcontractors or CONTRACTOR's superintendent, or expedite the Work.

4. Shall not issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.

5. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.

6. Shall not authorize Owner to occupy the Project in whole or in part.

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 therefor 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 thereunder. 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 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe 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 on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

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 rendered in good faith in such capacity.

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.

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

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

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 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 Resident Project Representative, if any, and assistants, if any.

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).

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 therefor 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.B.

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 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.

10.04 *Notification to Surety*

A. If notice 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) is required by the provisions of any bond to be given to a surety, 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.

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 30 days) after the start of the event giving rise thereto. 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 Time 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.

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 include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

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 at the Site. 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.

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, 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, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is 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, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 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 and 11.01.B.

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. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:~~

~~1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and~~

~~2. there is no corresponding adjustment with respect any other item of Work; and~~

~~3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.~~

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

1. if the total variance in price of the unit-priced item would result in a variance equal to or more than 10 percent of the Contract Base Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25 percent

from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

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.

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 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 Paragraph 12.01.C.2.a 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. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

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 will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. 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.

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. Rain delays shall be justified based upon the number of rain days (defined as those days where the site receives greater than 0.10 inches of rain) recorded on a monthly basis. There shall be a day-for-day adjustment to the Contract Time, for each day that the number of rain days in any month exceeds the 10-year running average for that particular month. The 10-year running average shall be based upon available historical data for Conyers, Georgia.

D. Owner, Engineer and the Related Entities of each of them 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.

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.

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. All 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, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site 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 said 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, it must, if requested by Engineer, be uncovered 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.

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 therefor 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 therefor 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, 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 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).

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.

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 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 therefor 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 therefor 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.

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 or in the event there is no schedule of values, as provided in the General Requirements:

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 General Conditions:

a. *90* percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character

and progress of the Work have been satisfactory to Owner and Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progress of the Work remain satisfactory to them, there will be no additional retainage; and

b. *50* percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

2.Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to *95* percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less *200%* percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each 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 on the Site 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to 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 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 moneys 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.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

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.

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 corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined 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.

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 make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative 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 tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. 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 definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected)

reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative 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 definitive 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 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 will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion 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 therefor. 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 complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

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.7;

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 or Owner's

property might in any way be responsible 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.

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 therefor 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 disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

5. Contractor is adjudged bankrupt or insolvent, makes a general assignment for the benefit of creditors, files a petition to take advantage of any debtor's act, attempts to reorganize under bankruptcy or applicable laws

or when a trustee or receiver is appointed over the Contractor or any of the Contractor's property.

6. Contractor repeatedly fails to make prompt payments to subcontractors or material suppliers for labor, materials or equipment.

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.

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 30 days of receipt of said notice.~~ Not Used.

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 moneys 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.~~Not used.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. ~~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 in settlement of terminated contracts with Subcontractors, Suppliers, and others; an~~Not used.~~d~~

4. reasonable expenses directly attributable to termination.

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.

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) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all

such amounts due Contractor, including interest thereon. The provisions of this Paragraph 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*

~~A. Either Owner or Contractor 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 Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association 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. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or~~

~~2. agrees with the other party to submit the Claim to another dispute resolution process, or~~

~~3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.~~

Should a dispute arise between Owner and Contractor relating to this Contract or a breach thereof, then either party may seek redress of its grievances at law or in equity in the Superior Court of Rockdale County, Georgia, or, at the sole option of Owner, any such dispute shall be settled by binding arbitration in Atlanta, Georgia, in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association. Upon written agreement, the parties may mutually decide to pursue an alternative means of dispute resolution, including mediation. Contractor agrees to continue to perform its Work despite the existence of any dispute. The existence of a dispute shall not be grounds for an nonperformance by Contractor or limit the right of Owner to proceed to remedy any default by Contractor.

In the event that the Contractor makes a claim against the Owner, at law or otherwise, and then fails to provide such claim, then the Owner shall be entitled to all costs, including attorney's fees incurred in defending the claim.

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 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 General Conditions.

SECTION 6

CONTRACTOR'S QUALIFICATION STATEMENT AND QUESTIONNAIRE

CONTRACTOR'S QUALIFICATION STATEMENT AND QUESTIONNAIRE

NAME OF PROJECT: **LAKEFIELD URBAN WATERSHED RESTORATION PROJECT – DAM REHABILITATION**

NAME OF OWNER: **ROCKDALE COUNTY**

NAME OF PROPOSED CONTRACTOR: _____

I. **INSTRUCTIONS**

A. ALL QUESTIONS ARE TO BE ANSWERED IN FULL, WITHOUT EXCEPTION. IF COPIES OF OTHER DOCUMENTS WILL ANSWER THE QUESTION COMPLETELY, THEY MAY BE ATTACHED AND CLEARLY LABELED. IF ADDITIONAL SPACE IS NEEDED, ADDITIONAL PAGES MAY BE ATTACHED AND CLEARLY LABELED.

B. THE OWNER, **ROCKDALE COUNTY**, ITS AGENTS AND REPRESENTATIVES, SHALL BE ENTITLED TO CONTACT EACH AND EVERY REFERENCE LISTED IN RESPONSE TO THIS QUESTIONNAIRE, AND EACH ENTITY REFERENCED IN ANY RESPONSE TO ANY QUESTION IN THIS QUESTIONNAIRE. THE CONTRACTOR, _____, (HEREINAFTER "CONTRACTOR"), BY COMPLETING THIS QUESTIONNAIRE, EXPRESSLY AGREES THAT ANY INFORMATION CONCERNING THE CONTRACTOR IN POSSESSION OF SAID ENTITIES AND REFERENCES MAY BE MADE AVAILABLE TO THE OWNER.

C. ONLY COMPLETE AND ACCURATE INFORMATION SHALL BE PROVIDED BY THE CONTRACTOR. THE CONTRACTOR HEREBY WARRANTS THAT, TO THE BEST OF ITS KNOWLEDGE AND BELIEF, THE RESPONSES CONTAINED HEREIN ARE TRUE, ACCURATE, AND COMPLETE. THE CONTRACTOR ALSO ACKNOWLEDGES THAT THE OWNER IS RELYING ON THE TRUTH AND ACCURACY OF THE RESPONSES CONTAINED HEREIN. IF IT IS LATER DISCOVERED THAT ANY MATERIAL INFORMATION GIVEN IN RESPONSE TO A QUESTION WAS PROVIDED BY THE CONTRACTOR, KNOWING IT WAS FALSE, IT SHALL CONSTITUTE GROUNDS FOR IMMEDIATE TERMINATION OR RESCISSION BY THE OWNER OF ANY SUBSEQUENT AGREEMENT BETWEEN THE OWNER AND THE CONTRACTOR. THE OWNER SHALL ALSO HAVE AND RETAIN ANY OTHER REMEDIES PROVIDED BY LAW.

D. IF THERE ARE ANY QUESTIONS CONCERNING THE COMPLETION OF THIS FORM, THE CONTRACTOR IS ENCOURAGED TO CONTACT MEAGAN PORCH, ROCKDALE COUNTY FINANCE DEPARTMENT, PROCUREMENT DIVISION, 958 MILSTEAD AVENUE, CONYERS, GA 30012, PHONE: (770) 278-7557, E-MAIL: MEAGAN.PORCH@ROCKDALECOUNTYGA.GOV

E. THE COMPLETED FORM IS TO BE SUBMITTED WITH THE BID.

F. THIS FORM, ITS COMPLETION BY THE CONTRACTOR, AND ITS USE BY THE CONTRACTOR, AND ITS USE BY THE OWNER, SHALL NOT GIVE RISE TO ANY LIABILITY ON THE PART OF THE OWNER TO THE CONTRACTOR OR ANY THIRD PARTY OR PERSON.

II. **GENERAL BACKGROUND**

A. CURRENT NAME AND ADDRESS OF CONTRACTOR:

_____
_____
_____
_____
_____
_____
_____

B. PREVIOUS NAME OR ADDRESS OF CONTRACTOR, IF ANY:

_____
_____
_____
_____
_____
_____
_____

C. CURRENT PRESIDENT OR CHIEF EXECUTIVE OFFICER: _____

Years in that position _____

D. NUMBER OF EMPLOYEES:
(Permanent) _____

E. NAME AND ADDRESSES OF CURRENT AFFILIATED COMPANIES (PARENT, SUBSIDIARY, DIVISIONS):

_____
_____
_____
_____
_____
_____
_____
_____

III. **FINANCIAL STATUS**

A. PLEASE ATTACH FINANCIAL STATEMENTS FOR THE PAST THREE YEARS FOR WHICH THEY ARE COMPLETE. IF SUCH STATEMENTS ARE NOT AVAILABLE, PLEASE FURNISH THE FOLLOWING INFORMATION:

1. LAST COMPLETE FISCAL YEAR:

a.	Revenues (Gross)	_____
b.	Expenditures (Gross)	_____
c.	Overhead & Admin. Cost (Gross)	_____
d.	Profit (Gross)	_____

2. YEAR PRIOR TO "A1" ABOVE:

a.	Revenues (Gross)	_____
b.	Expenditures (Gross)	_____
c.	Overhead & Admin. Cost (Gross)	_____
d.	Profit (Gross)	_____

3. YEAR PRIOR TO "A2" ABOVE:

a.	Revenues (Gross)	_____
b.	Expenditures (Gross)	_____
c.	Overhead & Admin. Cost (Gross)	_____
d.	Profit (Gross)	_____

B. BANKRUPTCIES

1. Has the Contractor, or any of its parents or subsidiaries, ever had a Bankruptcy Petition filed in its name, voluntarily or involuntarily? (If yes, specify date, circumstances, and resolution).

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

2. Has any Majority Shareholder ever had a Bankruptcy Petition filed in his/her name, voluntarily or involuntarily? (If yes, specify date, circumstances, and resolution).

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

C. LOANS

1. Is this Contractor currently in default on any loan agreement or financing agreement with any bank, financial institution or other entity? (If yes, specify details, circumstances, and prospects for resolution).

_____
_____
_____
_____
_____
_____
_____

D. BONDING

1. What is the Contractor's current bonding capacity with a contract surety company?

_____

2. Please identify the Contractor's surety company and the current line of bonding credit that company has extended to the Contractor.

_____
_____
_____
_____

3. Please give the name, address, and telephone number of your current surety agent or underwriting contact.

_____
_____
_____
_____
_____

4. Have Performance or Payment Bond claims ever been made to a surety for this Contractor on any project, past or present?

_____

5. If the answer to (4) is yes, please describe the claim, the name of the company or person making the claim, and the resolution of the claim.

_____
_____
_____
_____
_____

6. In the past five years, has any surety company refused to bond the Contractor on any project? (If answer is yes, specify the reasons given for that refusal, and the name and address of the surety company that refused to bond).

_____
_____
_____
_____
_____
_____
_____

7. In the past five years, has any surety company refused to bond the Contractor's parent, or subsidiaries, on any project? (If answer is yes, please specify the reasons given for that refusal, and the name of the surety company).

_____
_____
_____
_____
_____
_____
_____

E. MERGERS AND ACQUISITIONS

1. State whether or not the Contractor has been the subject of a corporate merger within the preceding three years. If so, please identify all parties to such merger, provide the date of same, and a brief description of the transaction.

_____
_____
_____
_____
_____

2. State whether or not the Contractor has acquired any other companies or entities in the preceding three years. If so, please identify all companies or entities acquired, provide the date of acquisition, and a brief description of the business of the company or entity acquired.

_____
_____
_____
_____

IV. **PROPOSED PROJECT PERSONNEL**

A. PROPOSED PROJECT MANAGER

1. List the name, qualifications and background of your proposed project manager for this Project. (Include the names and addresses of companies he/she has been affiliated with in the last five years).

_____
_____
_____
_____
_____

2. List at least three projects, by size, type and duration that the proposed project manager has supervised in the last five years for the Contractor, or for any other company.

_____
_____
_____
_____
_____
_____
_____

B. PROPOSED SUPERINTENDENT

1. List the qualifications and background of your proposed job superintendent (if different than the project manager) and include the names and addresses of any companies he/she has been affiliated with in the last five years.

_____
_____
_____
_____
_____
_____
_____

2. List at least three projects, by size, type, and duration that the proposed job superintendent has supervised in the last five years for the Contractor, or for any other company.

_____
_____
_____
_____
_____
_____
_____

V. **COMPANY EXPERIENCE - SIMILAR PROJECTS**

A. List all projects of reasonably similar nature, scope, and duration performed by your company in the last seven years, specifying, where possible, the name and last known address of each owner of those projects.

_____
_____
_____
_____
_____
_____

B. Of the projects listed in response to Subsection (A), identify any which was the subject of a substantial claim or lawsuit by, or against, the Contractor. Please identify in your response the nature of such claim or lawsuit, the court in which the case was filed, and the details of its resolution.

_____
_____
_____
_____
_____
_____
_____

C. List a minimum of two (2) projects completed by your company involving the construction or rehabilitation of a Category I (High Hazard) earthen embankment dam. Indicate the name and last known address of each owner of those projects.

_____
_____
_____
_____
_____
_____

VI. **LEGAL PROCEEDINGS**

A. ARBITRATION'S

List all construction arbitration demands filed by, or against, the Contractor in the last five years, and identify the nature of the claim, the amount in dispute, the parties, and the ultimate resolution of the proceeding.

_____
_____
_____
_____
_____
_____
_____

B. LAWSUITS

List all construction-related lawsuits (other than labor or personal injury litigation) filed by, or against, the Contractor in the last five years, and identify the nature of the claim, the amount in dispute, the parties, and the ultimate resolution of the lawsuit.

_____
_____
_____
_____
_____
_____
_____

C. OTHER PROCEEDINGS

1. Identify any lawsuits, administrative proceedings, or hearings initiated by the National Labor Relations Board or similar state agency in the past seven years concerning any labor practices of the Contractor. Identify the nature of any proceeding and its ultimate resolution.

_____
_____
_____
_____
_____
_____

2. Identify any lawsuits, administrative proceedings, or hearings initiated by the Occupational Safety and Health Administration concerning the project safety practices of the Contractor in the last seven years. Identify the nature of any proceeding and its ultimate resolution.

_____
_____
_____
_____
_____
_____

3. Identify any lawsuits, administrative proceedings, or hearings initiated by the Internal Revenue Service, or any state revenue department, concerning the tax liability of the Contractor (other than audits) in the last seven years. Identify the nature of any proceeding and its ultimate resolution.

_____
_____
_____
_____
_____
_____

4. Have any criminal proceedings or investigations been brought against the Contractor in the last ten years? (If the answer is yes, please attach a complete and detailed report with your responses to this Questionnaire)

_____
_____
_____
_____
_____
_____

VII. **REFERENCES**

(ALL REFERENCES MUST BE CURRENT, I.E., ENTITIES WITH WHOM YOU HAVE DONE BUSINESS IN THE PRECEDING TWELVE MONTHS.)

A. BANKS

Bank #1

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

Bank #2

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

B. MAJOR SUBCONTRACTORS

Subcontractor #1

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

Subcontractor #2

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

C. SUPPLIERS

Major Supplier #1

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

Major Supplier #2

Name: _____

Address: _____

City/State: _____

Contact: _____

Phone: _____

D. OWNERS

Project #1

Name: _____

Location: _____

Contract Price: _____

Owner: _____

Address: _____

City/State _____

Contact: _____

Phone: _____

Arch/Eng _____

Contact/Phone: _____

Project #2

Name: _____

Location: _____

Contract Price: _____

Owner: _____

Address: _____

City/State _____

Contact: _____

Phone: _____

Arch/Eng _____

Contact/Phone: _____

Project #3

Name: _____

Location: _____

Contract Price: _____

Owner: _____

Address: _____

City/State _____

Contact: _____

Phone: _____

Arch/Eng _____

Contact/Phone: _____

VIII. **COMMENTS**

Please list any additional information that you believe would assist the Owner in evaluating the possibility of using the Contractor on this Project.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

I certify to the Owner that the information and responses provided on this Questionnaire are true, accurate and complete. The Owner, or its designated representative, may contact any entity or reference listed in this Questionnaire. Each entity or reference may make any information concerning the Contractor available to the Owner or its designated representative.

Dated _____, 20__.

CONTRACTOR:

_____

_____

By _____
Its _____

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

Notary Public
My Commission Expires:

SECTION 7

US EPA SUPPLEMENTAL GENERAL CONDITIONS

Revised: October 2015

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

SUPPLEMENTAL GENERAL CONDITIONS

FOR

FEDERALLY ASSISTED CONSTRUCTION CONTRACTS

EPA SPECIAL CONDITIONS

The attached instructions and regulations as listed below shall be incorporated into the Specifications and comprise the EPA's Special Conditions.

EPA Special Provisions	**Attachment Number 1**
Requirements for Subagreements Awarded by Prime Contractors	**Attachment Number 2**
2 CFR 200 (Procurement)	**Attachment Number 3**
Equal Employment Opportunity (EEO) Documents:	
Notice of Requirement for Affirmative Action	**Attachment Number 4**
Contract Specifications (Executive Order 11246)	**Attachment Number 5**
EEO Goals for Region 4 Economic Areas	**Attachment Number 6**
Special Notice #1 - Check List of EEO Documentation	**Attachment Number 7**
Employer Information Report EEO-1 (SF 100)	**Attachment Number 8**
Labor Standards Provisions for Federally Assisted Construction, EPA Form 5720-4	**Attachment Number 9**
Certifications	
Debarment, Suspension and Other Responsibility Matters	**Attachment Number 10**
Anti-lobbying	**Attachment Number 11**
Region 4 Disadvantaged Business Enterprise (DBE)	**Attachment Number 12**
Negotiated Rates as of October 1, 2006	**Attachment Number 13**
Bonds and Insurance	**Attachment Number 14**

Attachment Number 1

EPA SPECIAL PROVISIONS

(a) The construction of the project shall conform to the applicable requirements for state, territorial and local laws and ordinances to the extent that such requirements do not conflict with Federal laws.

(b) The EPA shall have access to the site and the project.

(c) Any contract(s) awarded under this invitation for Bids are expected to be funded in part by a grant from the U.S. Environmental Protection Agency. Neither the United States nor any of its departments, agencies or employees are or will be a part to this Invitation for Bids or any resulting contract.

(d) The "Method of Award" is to the lowest responsible responsive bidder

(e) A statement that the bidder must make positive efforts to use Disadvantaged Business Enterprises.

(f) Davis-Bacon Act (40 U.S.C. 276a to 276-7) does not apply to grants under the U. S. Environmental Agency's State and Tribal Assistance Grants – Special Appropriations. Compliance with the Davis-Bacon Act is not required by U. S. EPA under this contract.

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Attachment Number 2

REQUIREMENTS FOR SUBAGREEMENTS AWARDED BY A PRIME CONTRACTOR

A contractor must comply with the following provisions in its award of subagreements. (This section does not apply to a supplier's procurement of materials to produce equipment, materials and catalog, off-the-shelf, or manufactured items.)

(a) 2 CFR 200.213 (Debarment and Suspension Under EPA Assistance Programs);

(b) The limitations and subagreement award in 2 CFR 200.92 and 2 CFR 200.330-332;

(c) The requirement for small, small rural, minority, women's and labor surplus area business in 2 CFR 200.321;

(d) The specifications requirements of 2 CFR 200;

(e) The Federal cost principles in 2 CFR 200.400-475;

(f) The prohibited types of subagreements in 2 CFR 200.323(d); and

(g) 2 CFR 200.450 (Anti-Lobbying under EPA Assistance Programs).

Attachment Number 3

Title 2: Grants and Agreements

Part 200 – Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards

Subpart D – Post Federal Award Requirements

Procurement Standards

§200.317 Procurements by states.

When procuring property and services under a Federal award, a state must follow the same policies and procedures it uses for procurements from its non-Federal funds. The state will comply with §200.322 Procurement of recovered materials and ensure that every purchase order or other contract includes any clauses required by section §200.326 Contract provisions. All other non-Federal entities, including subrecipients of a state, will follow §§200.318 General procurement standards through 200.326 Contract provisions.

§200.318 General procurement standards.

(a) The non-Federal entity must use its own documented procurement procedures which reflect applicable State, local, and tribal laws and regulations, provided that the procurements conform to applicable Federal law and the standards identified in this part.

(b) Non-Federal entities must maintain oversight to ensure that contractors perform in accordance with the terms, conditions, and specifications of their contracts or purchase orders.

(c)(1) The non-Federal entity must maintain written standards of conduct covering conflicts of interest and governing the actions of its employees engaged in the selection, award and administration of contracts. No employee, officer, or agent may participate in the selection, award, or administration of a contract supported by a Federal award if he or she has a real or apparent conflict of interest. Such a conflict of interest would arise when the employee, officer, or agent, any member of his or her immediate family, his or her partner, or an organization which employs or is about to employ any of the parties indicated herein, has a financial or other interest in or a tangible personal benefit from a firm considered for a contract. The officers, employees, and agents of the non-Federal entity may neither solicit nor accept gratuities, favors, or anything of monetary value from contractors or parties to subcontracts. However, non-Federal entities may set standards for situations in which the financial interest is not substantial or the gift is an unsolicited item of nominal value. The standards of conduct must provide for disciplinary actions to be applied for violations of such standards by officers, employees, or agents of the non-Federal entity.

(2) If the non-Federal entity has a parent, affiliate, or subsidiary organization that is not a state, local government, or Indian tribe, the non-Federal entity must also maintain written standards of conduct covering organizational conflicts of interest. Organizational conflicts of interest means that because of relationships with a parent company, affiliate, or subsidiary organization, the non-Federal entity is unable or appears to be unable to be impartial in conducting a procurement action involving a related organization.

(d) The non-Federal entity's procedures must avoid acquisition of unnecessary or duplicative items. Consideration should be given to consolidating or breaking out procurements to obtain a more economical purchase. Where appropriate, an analysis will be made of lease versus purchase alternatives, and any other appropriate analysis to determine the most economical approach.

(e) To foster greater economy and efficiency, and in accordance with efforts to promote cost-effective use of shared services across the Federal Government, the non-Federal entity is encouraged to enter into state and local intergovernmental agreements or inter-entity agreements where appropriate for procurement or use of common or shared goods and services.

(f) The non-Federal entity is encouraged to use Federal excess and surplus property in lieu of purchasing new equipment and property whenever such use is feasible and reduces project costs.

(g) The non-Federal entity is encouraged to use value engineering clauses in contracts for construction projects of sufficient size to offer reasonable opportunities for cost reductions. Value engineering is a systematic and creative analysis of each contract item or task to ensure that its essential function is provided at the overall lower cost.

(h) The non-Federal entity must award contracts only to responsible contractors possessing the ability to perform successfully under the terms and conditions of a proposed procurement. Consideration will be given to such matters as contractor integrity, compliance with public policy, record of past performance, and financial and technical resources. See also §200.213 Suspension and debarment.

(i) The non-Federal entity must maintain records sufficient to detail the history of procurement. These records will include, but are not necessarily limited to the following: rationale for the method of procurement, selection of contract type, contractor selection or rejection, and the basis for the contract price.

(j)(1) The non-Federal entity may use a time and materials type contract only after a determination that no other contract is suitable and if the contract includes a ceiling price that the contractor exceeds at its own risk. Time and materials type contract means a contract whose cost to a non-Federal entity is the sum of:

(i) The actual cost of materials; and

(ii) Direct labor hours charged at fixed hourly rates that reflect wages, general and administrative expenses, and profit.

(2) Since this formula generates an open-ended contract price, a time-and-materials contract provides no positive profit incentive to the contractor for cost control or labor efficiency. Therefore, each contract must set a ceiling price that the contractor exceeds at its own risk. Further, the non-Federal entity awarding such a contract must assert a high degree of oversight in order to obtain reasonable assurance that the contractor is using efficient methods and effective cost controls.

(k) The non-Federal entity alone must be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements. These issues include, but are not limited to, source evaluation, protests, disputes, and claims. These standards do not relieve the non-Federal entity of any contractual responsibilities under its contracts. The Federal awarding agency will not substitute its judgment for that of the non-Federal entity unless the matter is primarily a Federal concern. Violations of law will be referred to the local, state, or Federal authority having proper jurisdiction.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014; 80 FR 43309, July 22, 2015]

§200.319 Competition.

(a) All procurement transactions must be conducted in a manner providing full and open competition consistent with the standards of this section. In order to ensure objective contractor performance and eliminate unfair competitive advantage, contractors that develop or draft specifications, requirements, statements of work, or invitations for bids or requests for proposals must be excluded from competing for such procurements. Some of the situations considered to be restrictive of competition include but are not limited to:

(1) Placing unreasonable requirements on firms in order for them to qualify to do business;

(2) Requiring unnecessary experience and excessive bonding;

(3) Noncompetitive pricing practices between firms or between affiliated companies;

(4) Noncompetitive contracts to consultants that are on retainer contracts;

(5) Organizational conflicts of interest;

(6) Specifying only a “brand name” product instead of allowing “an equal” product to be offered and describing the performance or other relevant requirements of the procurement; and

(7) Any arbitrary action in the procurement process.

(b) The non-Federal entity must conduct procurements in a manner that prohibits the use of statutorily or administratively imposed state, local, or tribal geographical preferences in the evaluation of bids or proposals, except in those cases where applicable Federal statutes expressly mandate or encourage geographic preference. Nothing in this section preempts state licensing

laws. When contracting for architectural and engineering (A/E) services, geographic location may be a selection criterion provided its application leaves an appropriate number of qualified firms, given the nature and size of the project, to compete for the contract.

(c) The non-Federal entity must have written procedures for procurement transactions. These procedures must ensure that all solicitations:

(1) Incorporate a clear and accurate description of the technical requirements for the material, product, or service to be procured. Such description must not, in competitive procurements, contain features which unduly restrict competition. The description may include a statement of the qualitative nature of the material, product or service to be procured and, when necessary, must set forth those minimum essential characteristics and standards to which it must conform if it is to satisfy its intended use. Detailed product specifications should be avoided if at all possible. When it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a "brand name or equivalent" description may be used as a means to define the performance or other salient requirements of procurement. The specific features of the named brand which must be met by offers must be clearly stated; and

(2) Identify all requirements which the offerors must fulfill and all other factors to be used in evaluating bids or proposals.

(d) The non-Federal entity must ensure that all prequalified lists of persons, firms, or products which are used in acquiring goods and services are current and include enough qualified sources to ensure maximum open and free competition. Also, the non-Federal entity must not preclude potential bidders from qualifying during the solicitation period.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014]

§200.320 Methods of procurement to be followed.

The non-Federal entity must use one of the following methods of procurement.

(a) Procurement by micro-purchases. Procurement by micro-purchase is the acquisition of supplies or services, the aggregate dollar amount of which does not exceed the micro-purchase threshold (§200.67 Micro-purchase). To the extent practicable, the non-Federal entity must distribute micro-purchases equitably among qualified suppliers. Micro-purchases may be awarded without soliciting competitive quotations if the non-Federal entity considers the price to be reasonable.

(b) Procurement by small purchase procedures. Small purchase procedures are those relatively simple and informal procurement methods for securing services, supplies, or other property that do not cost more than the Simplified Acquisition Threshold. If small purchase procedures are used, price or rate quotations must be obtained from an adequate number of qualified sources.

(c) Procurement by sealed bids (formal advertising). Bids are publicly solicited and a firm

fixed price contract (lump sum or unit price) is awarded to the responsible bidder whose bid, conforming with all the material terms and conditions of the invitation for bids, is the lowest in price. The sealed bid method is the preferred method for procuring construction, if the conditions in paragraph (c)(1) of this section apply.

(1) In order for sealed bidding to be feasible, the following conditions should be present:

(i) A complete, adequate, and realistic specification or purchase description is available;

(ii) Two or more responsible bidders are willing and able to compete effectively for the business; and

(iii) The procurement lends itself to a firm fixed price contract and the selection of the successful bidder can be made principally on the basis of price.

(2) If sealed bids are used, the following requirements apply:

(i) Bids must be solicited from an adequate number of known suppliers, providing them sufficient response time prior to the date set for opening the bids, for local, and tribal governments, the invitation for bids must be publicly advertised;

(ii) The invitation for bids, which will include any specifications and pertinent attachments, must define the items or services in order for the bidder to properly respond;

(iii) All bids will be opened at the time and place prescribed in the invitation for bids, and for local and tribal governments, the bids must be opened publicly;

(iv) A firm fixed price contract award will be made in writing to the lowest responsive and responsible bidder. Where specified in bidding documents, factors such as discounts, transportation cost, and life cycle costs must be considered in determining which bid is lowest. Payment discounts will only be used to determine the low bid when prior experience indicates that such discounts are usually taken advantage of; and

(v) Any or all bids may be rejected if there is a sound documented reason.

(d) Procurement by competitive proposals. The technique of competitive proposals is normally conducted with more than one source submitting an offer, and either a fixed price or cost-reimbursement type contract is awarded. It is generally used when conditions are not appropriate for the use of sealed bids. If this method is used, the following requirements apply:

(1) Requests for proposals must be publicized and identify all evaluation factors and their relative importance. Any response to publicized requests for proposals must be considered to the maximum extent practical;

(2) Proposals must be solicited from an adequate number of qualified sources;

(3) The non-Federal entity must have a written method for conducting technical evaluations of the proposals received and for selecting recipients;

(4) Contracts must be awarded to the responsible firm whose proposal is most advantageous to the program, with price and other factors considered; and

(5) The non-Federal entity may use competitive proposal procedures for qualifications-based procurement of architectural/engineering (A/E) professional services whereby competitors' qualifications are evaluated and the most qualified competitor is selected, subject to negotiation of fair and reasonable compensation. The method, where price is not used as a selection factor, can only be used in procurement of A/E professional services. It cannot be used to purchase other types of services though A/E firms are a potential source to perform the proposed effort.

(e) [Reserved]

(f) Procurement by noncompetitive proposals. Procurement by noncompetitive proposals is procurement through solicitation of a proposal from only one source and may be used only when one or more of the following circumstances apply:

(1) The item is available only from a single source;

(2) The public exigency or emergency for the requirement will not permit a delay resulting from competitive solicitation;

(3) The Federal awarding agency or pass-through entity expressly authorizes noncompetitive proposals in response to a written request from the non-Federal entity; or

(4) After solicitation of a number of sources, competition is determined inadequate.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014; 80 FR 54409, Sept. 10, 2015]

§200.321 Contracting with small and minority businesses, women's business enterprises, and labor surplus area firms.

(a) The non-Federal entity must take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible.

(b) Affirmative steps must include:

(1) Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

(2) Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

(3) Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;

(4) Establishing delivery schedules, where the requirement permits, which encourage

participation by small and minority businesses, and women's business enterprises;

(5) Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce; and

(6) Requiring the prime contractor, if subcontracts are to be let, to take the affirmative steps listed in paragraphs (1) through (5) of this section.

§200.322 Procurement of recovered materials.

A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds $10,000 or the value of the quantity acquired during the preceding fiscal year exceeded $10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75885, Dec. 19, 2014]

§200.323 Contract cost and price.

(a) The non-Federal entity must perform a cost or price analysis in connection with every procurement action in excess of the Simplified Acquisition Threshold including contract modifications. The method and degree of analysis is dependent on the facts surrounding the particular procurement situation, but as a starting point, the non-Federal entity must make independent estimates before receiving bids or proposals.

(b) The non-Federal entity must negotiate profit as a separate element of the price for each contract in which there is no price competition and in all cases where cost analysis is performed. To establish a fair and reasonable profit, consideration must be given to the complexity of the work to be performed, the risk borne by the contractor, the contractor's investment, the amount of subcontracting, the quality of its record of past performance, and industry profit rates in the surrounding geographical area for similar work.

(c) Costs or prices based on estimated costs for contracts under the Federal award are allowable only to the extent that costs incurred or cost estimates included in negotiated prices would be allowable for the non-Federal entity under Subpart E—Cost Principles of this part. The non-Federal entity may reference its own cost principles that comply with the Federal cost principles.

(d) The cost plus a percentage of cost and percentage of construction cost methods of

contracting must not be used.

§200.324 Federal awarding agency or pass-through entity review.

(a) The non-Federal entity must make available, upon request of the Federal awarding agency or pass-through entity, technical specifications on proposed procurements where the Federal awarding agency or pass-through entity believes such review is needed to ensure that the item or service specified is the one being proposed for acquisition. This review generally will take place prior to the time the specification is incorporated into a solicitation document. However, if the non-Federal entity desires to have the review accomplished after a solicitation has been developed, the Federal awarding agency or pass-through entity may still review the specifications, with such review usually limited to the technical aspects of the proposed purchase.

(b) The non-Federal entity must make available upon request, for the Federal awarding agency or pass-through entity pre-procurement review, procurement documents, such as requests for proposals or invitations for bids, or independent cost estimates, when:

(1) The non-Federal entity's procurement procedures or operation fails to comply with the procurement standards in this part;

(2) The procurement is expected to exceed the Simplified Acquisition Threshold and is to be awarded without competition or only one bid or offer is received in response to a solicitation;

(3) The procurement, which is expected to exceed the Simplified Acquisition Threshold, specifies a “brand name” product;

(4) The proposed contract is more than the Simplified Acquisition Threshold and is to be awarded to other than the apparent low bidder under a sealed bid procurement; or

(5) A proposed contract modification changes the scope of a contract or increases the contract amount by more than the Simplified Acquisition Threshold.

(c) The non-Federal entity is exempt from the pre-procurement review in paragraph (b) of this section if the Federal awarding agency or pass-through entity determines that its procurement systems comply with the standards of this part.

(1) The non-Federal entity may request that its procurement system be reviewed by the Federal awarding agency or pass-through entity to determine whether its system meets these standards in order for its system to be certified. Generally, these reviews must occur where there is continuous high-dollar funding, and third party contracts are awarded on a regular basis;

(2) The non-Federal entity may self-certify its procurement system. Such self-certification must not limit the Federal awarding agency's right to survey the system. Under a self-certification procedure, the Federal awarding agency may rely on written assurances from the non-Federal entity that it is complying with these standards. The non-Federal entity must cite specific policies, procedures, regulations, or standards as being in compliance with these requirements and have its system available for review.

§200.325 Bonding requirements.

For construction or facility improvement contracts or subcontracts exceeding the Simplified Acquisition Threshold, the Federal awarding agency or pass-through entity may accept the bonding policy and requirements of the non-Federal entity provided that the Federal awarding agency or pass-through entity has made a determination that the Federal interest is adequately protected. If such a determination has not been made, the minimum requirements must be as follows:

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

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

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

§200.326 Contract provisions.

The non-Federal entity's contracts must contain the applicable provisions described in Appendix II to Part 200—Contract Provisions for non-Federal Entity Contracts Under Federal Awards.

Appendix II to Part 200 – Contract Provisions for non-Federal Entity Contracts Under Federal Awards

In addition to other provisions required by the Federal agency or non-Federal entity, all contracts made by the non-Federal entity under the Federal award must contain provisions covering the following, as applicable.

(A) Contracts for more than the simplified acquisition threshold currently set at $150,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

(B) All contracts in excess of $10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

(C) Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

(D) Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of $2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

(E) Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

(F) Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of "funding agreement" under 37 CFR §401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

(G) Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended—Contracts and subgrants of amounts in excess of $150,000 must contain a provision that requires the non-Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

(H) Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

(I) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)—Contractors that apply or bid for an award exceeding $100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

(J) See §200.322 Procurement of recovered materials.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75888, Dec. 19, 2014]

Attachment Number 4

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

The following excerpts are from 45 FR 65984 (October 3, 1980):

"The minority and female goals apply to Federal and federally assisted construction contractors and subcontractors which have covered contracts. The goals are expressed as a percentage of the total hours worked by such a covered contractor's or subcontractor's entire onsite construction workforce which is working on any construction site within a relevant area. The goal applies to each construction craft and trade in the contractor's entire workforce in the relevant area including those employees working on private nonfederally involved projects.

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of $10,000 to be performed in the respective geographic area. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or nonfederally related project, contract or subcontract.

Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4.5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the area covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply as follows:

Goals for female participation in each trade.....6.9%
Goals for minority participation in each trade.....Insert goals for each year
(see Attachment Number 6)

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or Federally assisted) performed in the covered area."

The following excerpts are from 45 FR 65977 (October 3, 1980):

"The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor

shall make a good faith effort to employ minority and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, country, and city, if any)."

Attachment Number 5

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

EEO Specifications

Following is the standard language which must be incorporated into all solicitations for offers and bids on all Federal and Federally assisted construction contracts or subcontracts in excess of $10,000 to be performed in designated geographical areas:

1. As used in these specifications:

    a. "Covered Area" means the geographical area described in the solicitation from which this contract resulted.

    (b) "Director" means Director, Office of Federal Contract Compliance Program, United States Department of Labor, or any person to whom the Director delegates authority;

    (c) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

    (d) "Minority" includes:

        (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

        (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

        (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

        (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in

excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take a good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7-a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative actions steps at least as extensively as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor=s employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligation.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7-b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, lay-off, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor=s recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to

assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative actions obligations (7 a through p). The efforts of a contractor association, joint contractor-union, contractor-community, of other similar group of which the contractor is a member and participant may be asserted as fulfilling any one or more of its obligations under 7 a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor=s minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example: even though the Contractor has achieved its goal for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables for affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of

Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

EEO Goals for Economic Areas in Region 4

Source: Appendix B-80 in 45 FR 65984 (October 3, 1980)

Alabama:

047 Mobile, AL
- SMSA Counties:
  - 5160 Mobile, AL — 26.9
    AL Baldwin; AL Mobile.
  - 6026 Pascagoula - Moss, Point MS — 16.9
    MS Jackson.
- Non-SMSA Counties — 26.4
  AL Choctaw; AL Clarke; AL Conecuh; AL Escambia; AL Monroe; AL Washington; AL Wlcox; MS George; MS Greene.

048 Montgomery, AL:
- SMSA Counties
  - 5240 Montgomery, AL — 29.9
    AL Autauga; AL Elmore; AL Montgomery.
- Non-SMSA Counties — 29.9
  AL Barbour; AL Bullock; AL Butler; AL Coffee; AL Coosa; AL Covington; AL Crenshaw; AL Dale; AL Dallas; AL Geneva; AL Henry; AL Houston.; AL Lowndes; AL Macon; AL Perry; AL Pike; AL Tallapoosa.

049 Birmingham, AL:
- SMSA Counties:
  - 0450 Anniston, AL — 14.3
    AL Calhoun
  - 1000 Birmingham, AL — 24.9
    AL Jefferson, AL St- Clair; AL Shelby; AL Walker; AL Etowah
  - 8600 Tuscaloosa, AL — 20.6
    AL Tuscaloosa.
- Non-SMSA Counties — 20.7
  AL Bibb; AL Blount AL Cherokee; AL Chilton; AL Clay; AL Cleburne; AL Cullman; AL Fayette; AL Greene; AL Hale; AL Lamar; AL Marion; AL Pickens; AL Randolph; AL Sumter: AL Talladega; AL Winston.

050 Huntsville - Florence, AL:
- SMSA Counties:
  - 2650 Florence, AL — 11.9
    AL Colbert; AL Lauderdale.
  - 3440 Huntsville, AL — 12.0
    AL Limestone; AL Madison; AL Marshall.
- Non-SMSA Counties — 11.2
  AL Franklin; AL Lawrence AL Morgan; TN Lincoln.

Georgia:

035 Augusta, GA:
- SMSA Counties:
  - 0600 Augusta, GA - SC — 27.2
    GA Columbia; GA Richmond; SC Aiken
- Non-SMSA Counties — 32.8
  GA Burke; GA Emanuel; GA Glascock; GA Jefferson; GA Jenkins; GA Lincoln; GA McDuffie; GA Taliaferro; GA Warren; GA Wilkes; SC Allendale, SC Bamberg; SC Barnwell; SC Edgefield; SC McCormick

036 Atlanta, GA
- SMSA Counties
  - 0520 Atlanta — 21.2
    GA Butts; GA Cherokee; GA Clayton; GA Cobb; GA Dekalb; GA Douglas; GA Fayette; GA Forsyth; GA Fulton; GA Gwinnett; GA Henry, GA Newton; GA Paulding; GA Rockdale; GA Walton
- Non-SMSA Counties — 19.5

GA Banks; GA Barrow; GA Bartow; GA Carroll; GA Clarke; GA Coweta; GA Dawson; GA Elbert; GA Fannin; GA Floyd; GA Franklin; GA Gilmer; GA Gordon; GA Greene; GA Habersham; GA Hall; GA Haralson; GA Hart; GA Heard; GA Jackson; GA Jasper; GA Lamar, GA Lumpkin; GA Madison, GA Morgan; GA Oconee, GA Oglethorpe; GA Pickens; GA Pike; GA Polk; GA Rabun, GA Spalding; GA Stephens; GA Towns; GA Union; GA Upson; GA White.

037 Columbus, GA:
SMSA Counties
1800 Columbus 29.6
AL Russell; GA Chattahoochee; GA Columbus.
Non-SMSA Counties 31.6
AL Chambers; AL Lee; GA Harris; GA Marion; GA Meriwether; GA Quitman; GA Schley; GA Stewart; GA Sumter; GA Talbot; GA Troup; GA Webster.

038 Macon, GA:
SMSA Counties
4660 Macon, GA 27.5
GA Bibb; GA Houston; GA Jones; GA Twiggs.
Non-SMSA Counties 31.7
GA Baldwin; GA Bleckley; GA Crawford; GA Crisp; GA Dodge; GA Dooly; GA Hancock; GA Johnson; GA Laurens; GA Macon; GA Monroe; GA Peach; GA Pulaski; GA Putnam. GA Taylor; GA Telfair; GA Treutlen; GA Washington; GA Wheeler; GA Wilcox; GA Wilkinson.

039 Savannah, GA:
SMSA Counties:
7520 Savannah, GA 30.6
GA Bryan; GA Chatham; GA Effingham
Non-SMSA Counties 29.8
GA Appling; GA Atkinson; GA Bacon; GA Bullock; GA Candler; GA Coffee; GA Evans; GA Jeff Davis; GA Liberty; GA Long; GA McIntosh; GA Montgomery; GA Screven; GA Tattinall; GA Toombs; GA Wayne; SC Beaufort; SC Hampton; SC Jasper.

040 Albany, GA
SMSA Counties
0120 Albany, GA 32.1
GA Dougherty; GA Lee.
Non-SMSA Counties 31.1
GA Baker; GA Ben Hill; GA Berrien; GA Brooks; GA Calhoun; GA Clay; GA Clinch; GA Colquitt; GA Cook; GA Decatur; GA Early; GA Echols; GA Grady; GA Irwin; GA Lanier, GA Lowndes; GA Miller; GA Mitchell; GA Randolph; GA Seminole, GA Terrell; GA Thomas; GA Tift; GA Turner; GA Worth

Florida:

041 Jacksonville, FL:
SMSA Counties
2900 Gainesville, FL 20.6
FL Alachua
3600 Jacksonville, FL 21.8
FL Baker; FIL Clay; FL Duval; FL Nassau; FL St. Johns.
Non-SMSA Counties 22.2
FL Bradford; FL Columbia; FL Dade; FL Gilchrist; FIL Hamilton; FL LaFayetle; FL Levy; FL Marion; FL Putnam; FL Suwannee; FL Union; GA Brantley; GA Camden; GA Charlton; GA Glynn; GA Pierce; GA Ware.

042 Orlando - Melbourne - Daytona Beach, FL.
SMSA Counties:
2020 Daytona Beach, FL 15.7
FL Volusia.
4900 Melbourne - Tutusville - Cocoa, FL 10.7
FL Brevard.
5960 Orlando, FL 15.5
FL Orange; FL Osceola; FL Seminole.
Non-SMSA Counties 14.9
FL Flagler; FL Lake; FL Sumter.

043 Miami - Fort Lauderdale, FL:
SMSA Counties:
2680 Fort Lauderdale - Hollywood, FL 15.5
FL. Broward.
5000 Miami, FL 39.5
FL Dade.
8960 West Palm Beach - Boca Raton, FL 22.4
FL Palm Beach.
Non-SMSA Counties 30.4
FL Glades; FL Hendry; FL Indian River, FL Martin; FL Monroe:
FL Okeechobee; FL St. Lucie.
044 Tampa - St Petersburg, FL
SMSA Counties:
1140 Bradenton, FL 15.9
FL Manatee.
2700 Fort Myers, FL 15.3
FL Lee.
3980 Lakeland - Winter Haven, FL 18.0
FL Polk
7510 Sarasota, FL 10.5
FL Sarasota.
8280 Tampa - St. Petersburg, FL 17.9
FL Hillsborough, FL Pasco; FL Pinellas
Non-SMSA Counties 17.1
FL Charlotte; FL Citrus; FL Collier, FL Desoto; FL Hardee; FL Hernando; FL Highlands.
045 Tallahassee. FL:
SMSA Counties:
8240 Tallahassee, FL 24.3
FL Leon; FL Wakulla.
Non-SMSA Counties: 29.5
FL Calhoun; FL Franklin; FL Gadsden; FIL Jackson; FL Jefferson: FL Liberty;
FIL Madison; FL Taylor.
046 Pensacola - Panama City, FL
SMSA Counties:
8615 Panama City, FL 14.1
FIL Bay.
6080 Pensacola, FL 18.3
FL Escambia; FL Santa Rosa.
Non-SMSA Counties 15.4
FL Gulf, FIL Holmes; FIL Okaloosa; FL Walton; FL Washington.

Kentucky:
056 Paducah, KY:
Non-SMSA Counties 5.2
IL Hardin; IL Massac; IL Pope; KY Ballard; KY Caldwell; KY Calloway. KY Carlisle;
KY Crittenden; KY Fulton; KY Graves; KY Hickman; KY Livingston; KY Lyon. KY
McCracken; KY Marshall.
057 Louisville, KY:
SMSA Counties:
4520 Louisville, KY-IN 11.2
IN Clark; IN Floyd; KY Bullift; KY Jefferson; KY Oldham.
Non-SMSA Counties 9.6
IN Crawford; IN Harrison; IN Jefferson; IN Orange; IN Scott; IN Washington;
KY Breckinridge; KY Grayson; KY Hardin; KY Hart; KY Henry; KY Larue; KY Marion;
KY Meade; KY Nelson; KY Shelby; KY Spencer; KY Trimble; KY Washington.

058 Lexington, KY
SMSA Counties
4280 Lexington-Fayette, KY 10.8
KY Bourbon; KY Clark; KY Fayette; KY Jessamine; KY Scott; KY Woodford.
Non-SMSA Counties 7.0
KY Adair KY Anderson; KY Bath; KY Boyle; KY Breathitt; KY Casey; KY Clay; KY Estill; KY Franklin- KY Garrard; KY Green; KY Harrison- KY Jackson; KY Knott; KY Lee; KY Leslie; KY Letcher; KY Lincoln; KY Madison; KY Magoffin; KY Menifee; KY Mercer; KY Montgomery; KY Morgan. KY Nicholas; KY Owsley; KY Perry; KY Powell; KY Pulaski; KY Rockcastle; KY Russell; KY Taylor; KY Wolfe.

Mississippi:
112 Jackson, MS:
SMSA Counties;
3560 Jackson, MS 30.3
MS Hinds; MS Rankin.
Non-SMSA Counties 32.0
MS Attala; MS Choctaw; MS Choctaw; MS Clarke; MS Copiah; MS Covington; MS Franklin; MS Holmes: MS Humphreys; MS Issaquena; MS Jasper; MS Jefferson; MS Jefferson Davis; MS Jones; MS Kemper; MS Lauderdale; MS Lawrence; MS Leake; MS Lincoln; MS Lowndes; MS Madison; MS Neshoba; MS Newton; MS Noxubee,- MS Oktibbeha; MS Scott; MS Sharkey; MS Simpson; MS Smith; MS Warren; MS Wayne; MS Winston; MS Yazoo.

North Carolina:
024 Rocky Mount - Wilson - Greenville NC:
Non-SMSA Counties 31.7
NC Beaufort; NC Carteret; NC Craven,- NC Dare; NC Edgecombe; NC Greene; NC Halifax; NC Hyde; NC Jones; NC Lenoir', NC Martin; NC Nash; NC Northampton; NC Pamlico; NC Pitt; NC Tyrrell; NC Washington; NC Wayne; NC Wilson
025 Wilmington, NC:
SMSA Counties:
9200 Wilmington, NC 20.7
NC Brunswick; NC New Hanover.
Non-SMSA counties 23.5
NC Columbus; NC Duplin; NC Onslow; NC Pender.
026 Fayetteville, NC:
SMSA Counties:
2560 Fayetteville, NC 26.2
NC Cumberland.
Non-SMSA Counties 33.5
NC Bladen; NC Hoke; NC Richmond; NC Robeson; NC Sampson; NC Scotland.
027 Raleigh - Durham, NC.
SMSA Counties:
6640 Raleigh - Durham 22.8
NG Durham; NC Orange; NC Wake.
Non-SMSA Counties 24.7
NC Chatham; NC Franklin; NC Granville; NC Harnett; NC Johnston; NC Lee; NC Person; NC Vance; NC Warren.
028 Greensboro - Winston Salem - High Point, NC:
SMSA Counties:
1300 Burlington, NC 16.2
NC Alamance.
3120 Greensboro - Winston Salem - High Point NC 16.4
NC Davidson; NC Forsyth; NC Guilford,- NC Randolf; NC Stokes; NC Yadkin.
Non-SMSA Counties 15.5
NC Alleghany; NG Ashe; NC Caswell; NC Davie; NC Montgomery; NC Moore; NC Rockingham; NC Surry; NC Watauga; NC Wilkes.

029 Charlotte, NC:
SMSA Counties:
1520 Charlotte - Gastonia, NC 18.5
NC Gaston; NC Mecklenburg; NC Union.
Non-SMSA Counties 15.7
NC Alexander; NC Anson; NC Burke; NG Cabarrus; NC Caldwell; NC Catawba; NC Cleveland; NC Iredell; NC Lincoln; NC Rowan; NC Rutherford; NC Stanley; SC Chester; SC Lancaster SC York.
030 Asheville, NC
Non-SMSA Counties:
0480 Asheville, NC 8.5
NC Buncombe; NC Madison.
Non-SMSA Counties 6.3
NC Avery,- NC Cherokee; NC Clay; NC Graham; HC Heywood, NC Henderson; NC Jackson; NC McDowell; NC Macon; NC Mitchell; NC Swain; NC Transylvania; NC Yancey.

South Carolina:
031 Greenville -Spartanburg, SC:
SMSA Counties:
316bGreenville -Spartanburg, SC 16.0
SC Greenville; SC Pickens; SC Spartanburg.
Non-SMSA Counties 17.8
SC Polk; SC Abbeville; SC Anderson; SC Cherokee', SC Greenwood; SC Laurens; SC Oconee; SC Union.
.032 Columbia, SC
SMSA Counties:
1760 Columbia, SC 23.4
SC Lexington; SC Richland.
No'n-SMSA Counties 32.0
SC Calhoun SC Clarendon; SC Fairfield; SC Kershaw; SC Lee; SC Newberry; SC Orangeburg; SC Saluda; SC Sumter
033 Florence, SC
Non-SMSA Counties 33.0
SC Chesterfield; SC Darlington; SC Dillon; SC Florence; SC Georgetown; SC Horry; SC Marion; SC Marlboro; SC Williamsburg.
034 Charleston - North Charleston, SC
SMSA Counties
1440 Charleston - North Charleston, SC 30.0
SC Berkeley; SC Charleston; SC Dorchester.
Non-SMSA Counties 30.7
SC Collection

Tennessee:
051 Chattanooga, TN:
SMSA Counties
1560 Chattanooga, TN - GA 12.6
GA Catoosa; GA Dade; GA Walker; TN Hamilton;TN Marion; TN Sequatchie.
Non-SMSA Counties 8.6
AL De Kalb; AL Jackson; GA Chattooga; GA Murray; GA Whitfield; TN Bledsoe; TN Bradley; TN Grundy; TN McMinn; TN Meigs; TN Monroe; TN Polk; TN Rhea.
052 Johnson City - Kingsport - Bristol, TN-VA:
SMSA Counties'.
3660 Johnson City - Kingsport - Bristol. TN - VA 2.6
TN Carter; TN Hawkins- TN Sullivan; TN Unicoi; TN Washington; VA Scott; VA Washington; VA Bristol.
Non-SMSA Counties 3.2
TN Greene; TN Hancock; TN Johnson; VA Buchanan; VA Dickenson; VA Lee; VA Russell; VA Smyth; VA Tazewell; VA Wise; VA Norton; WV McDowell, WV Mercer.
053 Knoxville, TN

SMSA Counties:
3840 Knoxville, TN 6.6
TN Anderson; TN Blount; TN Knox; TN Union.
Non-SMSA Counties 4.5
KY Bell; KY Harlan; KY Knox; KY Laurel; KY McCreary; KY Wayne; KY Whitley; TN Campbell; TN Claiborne; TN Cocke; TN Cumberland; TN Fentress; TN Grainger, TN Hamblen; TN Jefferson; TN Loudon; TN Morgan; TN Roane; TN Scott; TN Sevier.

054 Nashville, TN:
SMSA Counties:
1660 Clarksville - Hopkinsville, TN - KY 18.2
KY Christian; TN Montgomery.
5360 Nashville - Davidson, TN 15.8
TN Cheatham, TN Davidson; TN Dickson; TN Robertson; TN Rutherford; TN Sumner; TN Williamson; TN Wilson.
Non-SMSA Counties 12.0
KY Allen; KY Barren; KY Butler; KY Clinton; KY Cumberland; KY Edmonson; KY Logan; KY Metcalfe; KY Monroe; KY Simpson; KY Todd; KY Trigg; KY Warren; TN Bedford; TN Cannon; TN Clay; TN Coffee; TN DeKalb; TN Franklin; TN Giles; TN Hickman; TN Houston; TN Humphreys; TN Jackson; TN Lawrence; TN Lewis; TN Macon; TN Marshall; TN Maury; TN Moore; TN Overton; TN Perry; TN Pickett; TN Putnam; TN Smith,, TN Stewart; TN Trouslale; TN Van Buren; TN Warren; TN Wayne; TN White.

055 Memphis, TN:
SMSA Counties:
4920 Memphis, TN-AR-MS 32.3
AR Critteriden; MS Do Soto; TN Shelby; TN Tipton.
Non-SMSA Counties 26.5
AR Clay; AR Craighead; AR Cross; AR Greene; AR Lawrence; AR Lee; AR Mississippi; AR Phillips- AR. Poinsett; AR Randolph; AR St. Francis; MS Alcorn, MS Benton; MS Bolivar; MSCalhoun; MS Carroll; MS Chickasaw, MS Clay; MS Coahoma; MS Grenada; MS Itawamba; MS Lafayette; MS Lee; MS Leflore; MS Marshall; MS Monroe; MS Montgomery; MS Panola; MS Pontotoc; MS Prentiss; MS Quitman; MS Sunflower; MS Tallahatchie; MS Tate; MS Tippah; MS Tishomingo; MS Union; MS Washington; MS Webster. MS Yalobusha; MO Dunklin; MO New Madrid; MO Perniscot; TN Benton; TN Carroll; TN Chester; TN Crockett; TN Decatur; TN Dyer; TN Fayette; TN Gibson; TN Hardeman; TN Hardin; TN Haywood; TN Henderson- TN Henry; TN Lake; TN Lauderdale; TN McNairy; TN Madison; TN Obion; TN Weakley.

Attachment Number 7

CHECK LIST OF EEO DOCUMENTATION FOR BIDDERS ON EPA ASSISTED CONSTRUCTION

(Required by Executive Order 11246 as amended)

The low, responsive responsible bidder must forward the following items, in duplicate, to the owner (grantee) no later than ten (10) days after bid opening. The owner (grantee) shall have one (1) copy available for inspection by the Office of Federal Contracts Compliance within 14 days after the bid opening. The web site for the OFCC is http://www.dol.gov/esa/ofcp_org.htm.

1. EPA Project Number. Project Location. Type of Construction.

2. Proof of registration with the Joint Reporting Commission. (See Attachment Number 8.)

3. Copy of Affirmative Action Plan of contractor. Indicate company official responsible for EEO.

4. List of current construction contracts, with dollar amount. List contracting Federal Agency, if applicable.

5. Statistics concerning company percent workforce, permanent and temporary, by sex, race, trade, handicapped, and age. 40 CFR Part 7.

6. List of employment sources for project in question. If union sources are utilized, indicate percentage of minority membership within the union crafts.

7. Anticipated employment needs for this project, by sex, race and trade, with estimate of minority participation in specific trades.

8. List of subcontractors (name, address and telephone) with dollar amount and duration of subcontract. Subcontractor contracts over $10,000 must submit items 1- 8.

9. List of any subcontract work yet to be committed with estimate of dollar amount and duration of contract.

10. Contract Price. Duration of prime contract.

11. DBE Documents - See special instructions regarding use of Minority, and Women Owned, and Small Businesses.

Attachment Number 8

Employer Information Report EEO-1

Under the direction of the US Equal Employment Opportunity Commission, the Joint Reporting Committee is responsible for the full-length, multi-phase processing of employment statistics collected on the Employer Information Report EEO-1. This report, also termed Standard Form 100, details the sex and race/ethnic composition of an employer's work force by job category.

The Employer Information EEO-1 survey is conducted annually under the authority of Public Law 88-352, Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972. All employers with 15 or more employees are covered by Public Law 88-352 and are required to keep employment records as specified by Commission regulations. Based on the number of employees and federal contract activities, certain large employers are required to file an EEO-1 Report on an annual basis.

The EEO-1 Report must be filed by:

(A) All private employers who are: (1) subject to Title VII of the Civil Rights Act of 1964 (as amended by the Equal Employment Opportunity Act of 1972) with 100 or more employees EXCLUDING State and local governments, primary and secondary school systems, institutions of higher education, Indian tribes and tax-exempt private memberships clubs other than labor organizations; OR (2)subject to Title VII who have fewer than 100 employees if the company is owned or affiliated with another company, or there is centralized ownership, control or management (such as central control of personnel policies and labor relations) so that the group legally constitutes a single enterprise and the entire enterprise employs a total of 100 or more employees.

(**B) All federal contractors (private employers)**, who:(1) are not exempt as provided for by 41 CFR 60-1.5, (2) have 50 or more employees, **and** (a) are prime contractors or first-tier subcontractors, and have a contract, subcontract, or purchase order amounting to $50,000 or more; or (b) serve as depository of Government funds in any amount, or (c) is a financial institution which is an issuing an paying agent for U.S. Savings Bonds and Notes.

Only those establishments located in the District of Columbia and the 50 states are required to submit the EEO-1 Report. No Reports should be filed for establishments in Puerto Rico, the Virgin Islands or other American Protectorates.

When filing for the EEO-1 Report for the first time, go to the web site at: http://www.mimdms.com/jrc.html and select AFiling for the first time@ from the box labeled INFORMATION. File out the electronic questionnaire to enter your company into Joint Reporting Committee (JRC) system. One you have completed the registration process, you will be contacted on how to proceed with the EEO-1 Report. **If you have previously registered with the JRC**, follow their instructions to update your information.

Labor Standards Provisions For Federally Assisted Construction

Labor standards provisions applicable to contracts covering federally financed and assisted construction (29 CFR 5.5, Contract Provisions and Related Matters) that apply to EPA Special Appropriations Projects grants are:

(a)(4)(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

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

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

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

(b) Contractor Work Hours and Safety Standards Act. The Administrator, EPA shall cause or require the contracting officer to insert the following clauses set forth in paragraph (b)(1),(2),(3), and (4) of this section in full in any contract subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by *Section 5.5(a) of this title. As used in this paragraph, the terms Alaborers@ and Amechanics@ include watchmen and guards.

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

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

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

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

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in section 5.1, the Administrator of EPA shall cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly worked, deductions made, and actual wages paid. Further, the Administrator of EPA shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the U.S. Environmental Protection Agency and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job. (Approved by the Office of Management and Budget under OMB control numbers 1215-0140 and 1215-0017.)

CERTIFICATIONS

Debarred Firms

All prime Construction Contractors shall certify that Subcontractors have not and will not be awarded to any firm that is currently on the EPA Master List of Debarred, Suspended and Voluntarily Excluded Persons in accordance with the provisions of 40 CFR 32.500(c). Debarment action is taken against a firm for noncompliance with Federal Law.

All bidders shall complete the attached certification (Attachment Number 10) in duplicate and submit both copies to the owner with the bid proposal. The owner (grantee) shall transmit one copy to EPA within 14 days after bid opening.

Anti-lobbying Certification

All prime Construction Contractors must certify (Attachment Number 11) that no appropriated funds were or will be expended for the purpose of lobbying the Executive or Legislative Branches of the Federal Government or Federal Agency concerning this contract (contract in excess of $100,000). If the Contractor has made or agreed to make payment to influence any member of Congress in regard to award of this contract, a Disclosure Form must be completed and submitted to the owner (grantee) with the bid proposal. The owner must transmit one copy to the EPA Grants Management Office.

All prime Contractors must require all Subcontractors to submit the certification which must also be submitted to the owner (grantee).

CERTIFICATION REGARDING DEBARMENT, SUSPENSION AND OTHER RESPONSIBILITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its 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 government entity (Federal. State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State, or local) terminated for cause or default.

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

___ I am unable to certify to the above statements. My explanation is attached.

Instructions for Certification Regarding Debarments

Under Executive Order 12549, an individual or organization debarred or excluded from participation in Federal assistance or benefit programs may not receive any assistance award under a Federal program, or a subagreement thereunder for $25,000 or more.

Accordingly, each prospective recipient of an EPA grant, loan, or cooperative agreement and any contract or subagreement participant thereunder must complete the attached certification or provide an explanation why they cannot. For further details, see 40 CFR 32.510, Participants' responsibilities, in the attached regulation.

Where To Submit:

The prospective EPA grant, loan, or cooperative agreement recipient must return the signed certification or explanation with its application to the appropriate EPA Headquarters or Regional office, as required in the application instructions.

A prospective prime contractor must submit a completed certification or explanation to the individual or organization awarding the contract.

Each prospective subcontractor must submit a completed certification or explanation to the prime contractor for the project.

How To Obtain Forms:

EPA includes the certification form, instructions, and a copy of its implementing regulation (40 CFR Part 32) in each application kit. Applicants may reproduce these materials as needed and provide them to their prospective prime contractor, who, in turn, may reproduce and provide them to prospective subcontractors.

Additional copies/assistance may be requested from:

Compliance Branch
Grants Administration Division (PM-216F)
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460
(Telephone: 202/475-8025)

EPA Form 5700-49 (11-88)

Attachment Number 11

CERTIFICATION REGARDING LOBBYING
Certification for Contracts, Grants, Loans, and Cooperative Agreements

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

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

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

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

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

_____

TYPED NAME & TITLE OF AUTHORIZED REPRESENTATIVE

_____

SIGNATURE OF AUTHORIZED REPRESENTATIVE DATE

____ I am unable to certify to the above statements. My explanation is attached.

Attachment Number 12

EPA DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

EPA's Disadvantaged Business Enterprise Program rule applies to contract procurement actions funded in part by EPA assistance agreements awarded after May 27, 2008. The rule is found at Federal regulation Title 40, Part 33. Specific responsibilities are highlighted below. The EPA EPA form 6100-2, 6100-3, and 6100-4 are not required to be submitted to EPA; because they are out of date. However the information is still required to be sent to EPA and the forms can be used.

Grant recipient responsibilities:

- Conduct an Availability Analysis and negotiate fair share objectives with EPA (§ 33.411), or adopt the fair share objectives of the oversight state agency revolving loan fund for comparable infrastructure. (§ 33.405(b)(3)).

- Include the Appendix A term and condition in each contract with a primary contractor (§ 3.106). The term and condition is included in the EPA Region 4 contract specifications insert *FEDERAL REQUIREMENTS AND CONTRACT PROVISIONS FOR SPECIAL APPROPRIATION ACT PROJECTS US ENVIRONMENTAL PROTECTION AGENCY, Region III, June 2008.*

- Employ the six Good Faith Efforts during prime contractor procurement (§ 33.301).

- Require prime contractor to comply with the following prime contractor requirements of Title 40 Part 33:

    - To employ the six Good Faith Efforts steps in paragraphs (a) through (e) of § 33.301 if the prime contractor awards subcontracts (§ 33.301(f)).

    - To provide EPA form 6100-2 – *DBE Subcontractor Participation Form* to all DBE subcontractors (§ 33.302(e)).

    - To submit EPA forms 6100-3 – *DBE Program Subcontractor Performance Form* and 6100-4 – *DBE Program Subcontractor Utilization Form* with bid package or proposal. (§ 33.302 (f) and (g)).

    - To pay its subcontractor for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the recipient (§ 33.302(a)).

    - To notify recipient in writing by its prime contractor prior to any termination of a DBE subcontractor for convenience by the prime contractor (§ 33.302(b)).

- To employ the six good faith efforts described in § 33.301 if soliciting a replacement subcontractor after a DBE subcontractor fails to complete work under the subcontract for any reason. (§ 33.302(c)).

- To employ the six good faith efforts described in § 33.301 even if the prime contractor has achieved its fair share objectives under subpart D of Part 33. (§33.302(d)).

- Semiannually complete and submit to Charles Hayes, EPA Region 4 DBE Coordinator EPA form 5700-52A summarizing DBE participation achieved during the previous six months (§ 33.502).

- Maintain records documenting its compliance with the requirements of Title 40 Part 33, including documentation of its, and its prime contractors', good faith efforts (§ 33.501(a)).

Prime Contractor Responsibilities:

- Employ the six Good Faith Efforts steps in paragraphs (a) through (e) of § 33.301 if the prime contractor awards subcontracts (§ 33.301(f)).

- Provide EPA form number 6100-2 – *DBE Program Subcontractor Participation Form* and form number 6100-3 – *DBE Program Subcontractor Performance Form* to each DBE subcontractor prior to opening of the contractor's bid or proposal (§ 33.302(e) and (f)).

- Complete EPA form number 6100-4 – *DBE Program Subcontractor Utilization Form* (§ 33.302(g).

- Submit to recipient with it bid package or proposal the completed EPA form number 6100-4, plus an EPA form number 6100-3 for each DBE subcontractor used in the contractor's bid or proposal (§ 33.302(f) and (g)).

- Pay subcontractors for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the recipient (§ 33.302(a)).

- Notify the recipient in writing prior to prime contractor termination of a DBE subcontractor for convenience (§ 33.302(b)).

- Employ the six good faith efforts described in § 33.301 if soliciting a replacement subcontractor after a DBE subcontractor fails to complete work under the subcontract for any reason. (§ 33.302(c)).

- Employ the six good faith efforts described in § 33.301 even if the prime contractor has achieved its fair share objectives under subpart D of Part 33. (§33.302(d)).

- Semiannually inform recipient of DBE participation achieved (§ 33.502).

- Maintain records documenting its compliance with the requirements of Title 40 Part 33, including documentation of its, and its prime contractors', good faith efforts (§ 33.501(a)).

Subcontractor Responsibilities:

- May submit EPA form 6100-2 – *DBE Subcontractor Participation Form* to Charles Hayes, EPA Region 4 DBE Coordinator (§ 33.302(e)).

- Must complete EPA form 6100-3 – *DBE Program Subcontractor Performance Form*, and submit it to the prime contractor soliciting services from the subcontractor prior to the opening of bids for the prime contract.

Form	Requirement	Provided By:	Completed By:	Submitted To:
EPA Form 6100-2	Grant Recipients required to have prime contractors provide form to Subcontractors	Prime Contractors	DBE Subcontractors	EPA Region 4 DBE Coordinator Charles Hayes
EPA Form 6100-3	Grant Recipients required to have prime contractors provide form to Subcontractors	Prime Contractors	DBE Subcontractors	Grant Recipients as part of a bid or proposal package
EPA Form 6100-4	Grant Recipients required to have prime contractors complete the form	Grant Recipients	Prime Contractors	Grant Recipients as part of a bid or proposal package

OMB Control No: 2090-0030
Approved: 05/01/2008
Approval Expires: 01/31/2011

Environmental Protection Agency

Disadvantaged Business Enterprise Program
DBE Subcontractor Participation Form

NAME OF SUBCONTRACTOR[1]	PROJECT NAME
ADDRESS	CONTRACT NO.
TELEPHONE NO.	EMAIL ADDRESS
PRIME CONTRACTOR NAME	

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

_____
_____
_____
_____
_____

CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES RECEIVED FROM THE PRIME CONTRACTOR	AMOUNT SUBCONTRACTOR WAS PAID BY PRIME CONTRACTOR

_____ _____
Subcontractor Signature Title/Date

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

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

Disadvantaged Business Enterprise Program DBE Subcontractor Participation Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed EPA DBE Subcontractor Participation Form to this address.

EPA FORM 6100-2 (DBE Subcontractor Participation Form)

OMB Control No: 2090-0030
Approved: 05/01/2008
Approval Expires: 01/31/2011

Environmental Protection Agency

Disadvantaged Business Enterprise Program
DBE Subcontractor Performance Form

NAME OF SUBCONTRACTOR[1]	PROJECT NAME
ADDRESS	BID/PROPOSAL NO.
TELEPHONE NO.	E-MAIL ADDRESS
PRIME CONTRACTOR NAME	

CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES BID TO PRIME	PRICE OF WORK SUBMITTED TO PRIME CONTRACTOR

Currently certified as an MBE or WBE under EPA's DBE Program? _____ Yes _____ No Signature of Prime Contractor Date Print Name Title _____

_____ Signature of Subcontractor Date

_____ _____ Print Name Title

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

EPA FORM 6100-3 (DBE Subcontractor Performance Form)

OMB Control No: 2090-0030
Approved: 05/01/2008
Approval Expires: 01/31/2011

Environmental
Protection Agency

Disadvantaged Business Enterprise Program
DBE Subcontractor Performance Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed EPA DBE Subcontractor Performance Form to this address.

EPA FORM 6100-3 (DBE Subcontractor Performance Form)

OMB Control No: 2090-0030
Approved: 05/01/2008
Approval Expires: 01/31/2011

Environmental Protection Agency

Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Form

BID/PROPOSAL NO.	PROJECT NAME
NAME OF PRIME BIDDER/PROPOSER	E-MAIL ADDRESS
ADDRESS	
TELEPHONE NO.	FAX NO.

The following subcontractors[1] will be used on this project:

COMPANY NAME, ADDRESS, PHONE NUMBER, AND E-MAIL ADDRESS	TYPE OF WORK TO BE PERFORMED	ESTIMATED DOLLAR AMOUNT	CURRENTLY CERTIFIED AS AN MBE OR WBE?

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

_____ _____
Signature of Prime Contractor Date

_____ _____
Print Name Title

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

EPA FORM 6100-4 (DBE Subcontractor Utilization Form)

OMB Control No: 2090-0030
Approved: 05/01/2008
Approval Expires: 01/31/2011

Environmental
Protection Agency

Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed EPA DBE Subcontractor Utilization Form to this address.

EPA FORM 6100-4 (DBE Subcontractor Utilization Form)

Attachment Number 13

Fair Share Goals Set October 1, 2006			
Region 4			
Recipient		MBE %	WBE %
Kentucky	Construction	0.70%	7.60%
	Supplies	3.70%	4.60%
	Services	1.20%	16.30%
	Goods/Equipment	1.20%	1.10%
	Combined		
Florida DEP	Construction	9.00%	3.00%
	Supplies		
	Services		
	Goods/Equipment		
	Combined		
Florida - Hillsborough County	Construction	20.00%	20.00%
	Supplies	10.00%	10.00%
	Services	10.00%	10.00%
	Goods/Equipment	10.00%	10.00%
	Combined		
South Carolina	Construction	3.60%	2.40%
	Supplies	9.00%	9.00%
	Services	11.00%	11.00%
	Goods/Equipment	10.00%	10.00%
	Combined		
Tennessee	Construction	2.60%	2.60%
	Supplies	5.20%	5.20%
	Services	5.20%	5.20%
	Goods/Equipment	5.20%	5.20%
	Combined		
Mississippi – Non-SRF Programs	Construction		
	Supplies	7.70%	3.40%
	Services	1.10%	2.20%
	Goods/Equipment	6.80%	5.10%
	Combined		

Recipient		MBE%	WBE%
Georgia	Construction	13.70%	7.00%
	Supplies	13.70%	7.00%
	Services	13.70%	7.00%
	Goods/Equipment	13.70%	7.00%
	Combined		
North Carolina	Construction	8.00%	5.00%
	Supplies	7.00%	9.00%
	Supplies	7.00%	9.00%
	Goods/Equipment	7.00%	9.00%
	Combined	4.00%	10.00%
Alabama	Construction	5.00%	17.00%
	Supplies	4.00%	11.00%
	Supplies	8.00%	30.00%
	Goods/Equipment	5.00%	20.00%
	Combined		

Attachment Number 14

BONDS AND INSURANCE

The minimum requirements shall be as follows:

Bonding requirements for contracts of $100,000 or less are contained in 2 CFR 200.325.

Bond requirements for contracts in excess of $100,000 are:

- Bid guarantee equivalent to five percent of the bid price. The bid guarantee shall consist of a firm commitment such as a certified check or bid bond submitted with the bid;

- Performance bond equal to 100 percent of the contract price, and

- Payment bond equal to 100 percent of the contract price. Bonds must be obtained from companies holding Certificates of Authority as acceptable sureties, issued by the U.S. Treasury.

Insurance requirements are contained in the General Conditions of the contract. In addition to the other required insurance, the owner or the contractor, as appropriate, must acquire any flood insurance made available by the Federal Emergency Management Agency as required by 44 CFR Parts 59-79, if construction will take place in a flood hazard area identified by the Federal Emergency Management Agency. The owner's requirements on Flood Insurance are contained in the Special Conditions Section of the Contracts Documents.

SECTION 8

CONSTRUCTION DRAWINGS

Drawing Package Containing 32
Sheets Provided Separately

SECTION 9

TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS

LAKEFIELD URBAN WATERSHED RESTORATION
DAM REHABILITATION

ROCKDALE COUNTY, GEORGIA

Prepared for:

Rockdale County Planning and Development
Stormwater Division
958 Milstead Avenue
Conyers, Georgia 30012

Prepared by:

Golder Associates Inc.
3730 Chamblee Tucker Road
Atlanta, Georgia 30341

July 2017 053-3884.004

TECHNICAL SPECIFICATIONS

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TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL REQUIREMENTS

TECHNICAL SPECIFICATION

SECTION 01010 – SUMMARY OF WORK

PART 1: GENERAL

1.1 SUMMARY

A. This Contract includes the provision and furnishing of all personnel, supervision, services, materials, bonds, insurance, taxes, and all other incidentals necessary for the successful execution of the Lakefield Urban Watershed Dam Restoration Project, located in Rockdale County, Georgia, which includes, but is not limited to, the following:

1. Mobilization to, and demobilization from, the site;
2. All field engineering and surveying;
3. Installation of all temporary facilities, including design where appropriate, required to stage personnel, equipment and materials necessary to perform the Work;
4. Preparation and implementation of a project-specific Erosion, Sediment and Pollution Control Plan;
5. Preparation and implementation of a project-specific Health and Safety Plan;
6. Site preparatory activities, including but not limited to, acquisition of all necessary permits, construction of temporary construction access roads, and clearing and grubbing;
7. Identification and pre-qualification of all materials to be used in construction;
8. All Work associated with the restoration of the Lakefield Urban Watershed Dam;
9. Realignment of sections of the existing sanitary sewer lines, which includes but is not limited to removal of existing sections and installation of new ones.
10. Construction of the Spillway and discharge structures, install embankment and downstream seepage collection system.
11. Construction of surface water management systems;
12. Revegetation of all disturbed areas and restoration of the Site to pre-construction conditions;
13. Preparation of progress reports, submittals, as-built drawings and other Project Record Documents.

B. Work shall conform to the Contract Drawings titled Rockdale County Lakefield Urban Watershed Restoration, Dam Rehabilitation and dated May 2008 which form a part of these Contract Documents.

C. Omissions from the Drawings or Technical Specifications or the misdescription of details of Work which are necessary to carry out the intent of the Drawings and Technical Specifications or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the Work but they shall be performed as if fully and correctly set forth and described in the Drawings and Technical Specifications.

1.2 CONTRACT TIME

A. The Contractor shall commence Work in accordance with the Contract Documents. The time stated for final completion and substantial completion shall be in accordance with the Contract Time specified in the Construction Contract. Time is of the essence in this Contract.

B. Contractor shall, at all times, monitor water level in the existing lake and schedule the Work accordingly to minimize the durations needed to lower the existing lake surface. In general, the downstream seepage collection system shall be installed concurrently with the installation of the spillway construction.

C. Contractor shall make appropriate provisions in his Bid Price and in sequencing construction activities including, but not limited to, the following:

1. Appropriate time for preparation, review and implementation of Execution, Erosion and Sedimentation Control, and Health and Safety Plans prior to the commencement of construction;
2. Appropriate time for any required permit application preparation and review;
3. Appropriate time for preparation and review of necessary submittals and shop drawings (including associated procurement time for material items).

D. Contractor shall meet the following required intermediate and final project milestones.

1. All work activities within the Lakefield Urban Watershed Dam Rehabilitation - one hundred and eighty (180) days following issuance of Notice to Proceed. Work activities shall include, but not limited to; installation of sewer line, ditches, embankment construction/earthworks, seepage control system.
2. Project Substantial Completion – 150 days following issuance of Notice to Proceed.
3. Project Final Completion - 30 days following issuance of Certificate of Substantial Completion.

1.3 CONTRACTOR USE OF WORKSITE

A. Confine worksite operations to areas permitted by law, ordinances, permits, and the Contract Documents. The Contractor shall ensure that all persons under his control (including Subcontractors, their workers and agents) are kept within the boundaries of the Site and shall be responsible for any acts of trespass or damage to property by persons who are under his control. Consider the safety of the Work, and that of people and property on and adjacent to worksite, when determining amount, location, movement, and use of materials and equipment on worksite.

B. Contractor shall be responsible for protecting private and public property including pavements, drainage culverts, electricity, highway, telephone and similar property and making good of, or paying for, all damage caused thereto. Ingress and egress to and from the site via public roadway will be required. Contractor shall be responsible for maintaining the access ways in a safe manner. This includes the control of Contractor and, as necessary, public traffic, implementing dust control measures, and keeping public roadways free of tracked soil from the site.

C. Control of erosion throughout the project is of prime importance and is the responsibility of the Contractor. Provide and maintain all necessary measures to control erosion during progress of the Work to the satisfaction of the Engineer, in accordance with the approved Erosion, Sediment and Pollution Control Plan, the requirements of these technical specifications and all applicable Laws and Regulations and remove such measures and debris upon completion of the project. All provisions for erosion and sedimentation control apply equally to all areas of the Work.

1.4 PRESERVATION OF SCIENTIFIC INFORMATION

A. Federal and State legislation provides for the protection, preservation, and collection of data having scientific, prehistoric, historical, or archaeological value (including relics and specimens) which might otherwise be lost due to alteration of the terrain as a result of any construction work.

B. If evidence of such information is discovered during the course of the Work, the Contractor shall notify the Engineer immediately, giving the location and nature of the findings. Written confirmation shall be forwarded within two (2) working days. The Contractor shall exercise care so as not to damage artifacts uncovered during excavation operations, and shall provide such cooperation and assistance as may be necessary to preserve the findings for removal or other disposition by the County's representative or Government agency.

C. Where appropriate, by reason of a discovery, the County may order delays in the time of performance, or changes in the Work, or both. If such delays, or changes, or both,

are ordered, the time of performance and contract price shall be adjusted in accordance with the applicable clauses of the Contract.

1.5 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01019 – CONTRACT CONSIDERATIONS

PART 1: GENERAL

1.1 NOT USED

1.2 SCHEDULE OF VALUES

A. Submit typed schedule on Engineers' Joint Contract Documents Committee (EJCDC) Form 1910-8-E - Application for Payment sheet. Contractor's standard form or electronic media printout will be considered.

B. Submit Schedule of Values in duplicate within ten (10) days after Notice to Proceed is received by the Contractor.

C. Format: Utilize the Unit Price Schedule in the Bid Documents and Construction Contract as the basis for the Schedule of Values. Prepare Schedule of Values in accordance with the requirements of Section 36 of the General and Supplementary Conditions of the Contract.

D. Revise schedule to list approved Change Orders, with each Application for Payment.

1.3 APPLICATIONS FOR PAYMENT

A. Prepare and submit in accordance with Section 36 of the General and Supplementary Conditions and Section 01027 of the Technical Specifications.

1.4 CHANGE PROCEDURES

A. Prepare and submit in accordance with Sections 9 and 34 of the General Conditions and the Supplementary Conditions.

1.5 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

TECHNICAL SPECIFICATION

SECTION 01019 – CONTRACT CONSIDERATIONS

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01025 – MEASUREMENT AND PAYMENT

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Measurement and payment criteria applicable to portions of the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.2 AUTHORITY

A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the individual specification section shall govern.

B. Take all measurements and compute quantities. The Engineer will verify measurements and quantities.

C. Assist by providing necessary equipment, workers, and survey personnel as required.

1.3 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements indicated in the Unit Price Schedule are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Engineer shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

1.4 MEASUREMENT OF QUANTITIES

A. Measurement Devices:

1. Weigh Scales: Inspected, tested and certified for use in the State of Georgia by the applicable state Weights and Measures department within the past year.
2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
3. Metering Devices: Inspected, tested and certified by the applicable State of Georgia Weights and Measures department within the past year.

B. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

C. Measurement of quantities expressed as volume shall be based upon a neat plan line projection to the work limits as determined by survey record drawings for each item with no additional allowances for shrinkage, swelling or creep.

1. In computing volumes of excavation and fill, the average end area method or other methods, acceptable to the Engineer, will be used.

D. Measurement of quantities expressed as area shall be based upon a horizontal, planimetric projection to the work limits as determined by survey record drawings for each item with no additional allowances for slopes.

E. Measurement of linear items such as piping will be for quantities actually field installed to the specified work limits, based upon surveyed stations recorded along the straight or curved centerline of each respective item.

F. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

1.5 PAYMENT

A. Payment for each lump sum and unit price stated in the itemized bid shall constitute full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work required to complete all work specified under that particular item including cleanup, and all costs for doing related work as set forth in these Specifications and /or the on the Contract Drawings or implied in carrying out their intent.

1. The price bid for each lump sum and unit price stated in the itemized bid shall be deemed to include an allowance for overhead and profit.
2. Relevant specification section references are provided to facilitate pricing. However, Contractor shall, using his own judgment, determine which sections are relevant to each pay item prior to submitting a comprehensive price that covers all Work identified in the Contract Documents.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

C. Requests for payment shall be in accordance with the General and Supplementary Conditions, Sections 36 and 39 and with Section 01027 of the Technical Specifications - Applications for Payment.

D. Payment will be made to the limits as specified in the Contract Documents. If the constructed limits are less that the specified limit, payment will be made to the actual limits of construction as shown on the Record Drawings. Payment for quantities that exceed the specified contract limits will only be made with the approval of the Engineer. The payment for quantities that exceed the contract quantities can only be obtained through an approved change order before contract quantities are exceeded.

E. No partial payments shall be made for the installation of items that have not been tested and approved.

F. Partial payment will be made for material delivered to the site, and adequately stored and protected until installation. Materials will be paid for at direct cost plus shipping, upon presentation of a valid receipt or bill with the payment request. All such requests must have material quantities verified by the Engineer prior to payment.

1.

G. Upon installation, the unit cost for the item will be paid less any prior payments for stored material. Upon installation, an adjustment will be made in payment to account for the quantity of materials actually installed in the work. The County will not pay for material in excess of what is actually installed in the work.

H. Payment for unit price items (all items except Lump Sum items) will be made monthly until completion of each unit price item based on quantity estimated by Contractor, and verified by Engineer. Final payment will be based on quantity calculated from Record Drawings.

1.6 VARIATIONS IN ESTIMATED QUANTITIES

A. The quantities given in the Contract Documents are approximate only, and are given as a basis for the uniform comparison of bids, and County does not expressly or by implication agree that the actual amount of work will correspond therewith.

B. The Contractor must provide, for Unit Price Work, a proposed contract price determined on the basis of estimated quantities required for each item. The estimated quantities of items are not guaranteed and are solely for the purpose of comparing bids. Each such unit price will be deemed to include an amount for overhead, profit and indirect costs for each separately defined item.

C. An increase or decrease in the quantity for any unit price item shall not be regarded as sufficient grounds for an increase or decrease in the price of the items except as provided herein.

D. If the quantity of a unit-priced item in this contract is an estimated quantity and the actual quantity of the unit-priced item varies more than 25 percent above or below the estimated quantity or above or below 25 percent of the sum of quantities for unit price work where two sub-items are listed and the total variance in price of the unit-priced item would result in a variance equal to or more than ten percent (10%) of the contract base price, an equitable adjustment in the contract price shall be made upon demand of either party. The equitable adjustment shall be based upon any increase or decrease in costs due solely to the variations below 75 percent of the estimated quantity or above 125 percent of the estimated quantity or sum of quantities for unit price work where two sub-items are listed. If the quantity variation is such as to cause an increase in the time necessary for completion, the Contractor may request, in writing, an extension of time, to be received by the Engineer and County within 10 days from the beginning of the delay, or within such further period as may be granted by the Engineer and County within 10 days from the beginning of the delay, or within such further period as may be granted by the Engineer and County before the date of final settlement of the contract. Upon the receipt of a written request for an extension, the Engineer and County shall ascertain the facts and make an adjustment for extending the completion date as, in the judgment of the Engineer and County, is justified.

1.7 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer.
2. The defective Work will be partially repaired to the instructions of the Engineer, and the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer.

C. The individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the Engineer to assess the defect and identify payment adjustment, is final.

1.8 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling and disposing of rejected Products.

1.9 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01027 – APPLICATIONS FOR PAYMENT

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Procedures for preparation and submittal of Applications for Payment.

1.2 RELATED SECTIONS

A. Section 3 – The Contract Documents for Lakefield Urban Watershed Restoration Project Dam Rehabilitation: Bid Form

B. Section 5 – The Contract Documents for Lakefield Urban Watershed Restoration Project Dam Rehabilitation: General Conditions and Supplementary Conditions of Contract

C. Section 01019 - Contract Considerations: Cash Allowances, Schedule of Values.

D. Section 01300 - Submittals: Submittal procedures.

E. Section 01700 - Contract Closeout: Final Payment.

1.3 FORMAT

A. Engineers' Joint Contract Documents Committee (EJCDC) 1910-8-E - Application for Payment including continuation sheets when required.

B. The Contractor may submit to the Engineer for approval an alternate request for payment format. All such submittals must be prior to the Contractor's first payment request.

C. For each item, provide a column for listing: Item Number; Description of work; Scheduled Value, Previous Applications: Work in Place and Stored Materials under this Application: Authorized Change Orders; Total Completed and Stored to Date of Application; Percentage of Completion; Balance to Finish; and Retainage.

1.4 PREPARATION OF APPLICATIONS

A. Prepare Application in accordance with the requirements of Article 36 of the General and Supplementary Conditions.

B. Present required information on electronic media printout.

C. Execute certification by signature of authorized officer.

D. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.

E. List each authorized Change Order as an extension on a continuation sheet, listing Change Order number and dollar amount as for an original item of Work.

F. Prepare Application for Final Payment as specified in Section 01700.

1.5 SUBMITTAL PROCEDURES

A. Submit one (1) original and two (2) copies of each Application for Payment. The individual documents shall be so marked so as to distinguish the original and the copy.

B. Submit an updated construction schedule with each Application for Payment.

C. Payment Period: Submit at intervals stipulated in the Construction Contract.

D. Submit under transmittal letter specified in Section 01300.

E. Submit lien waivers.

F. Applications for payment will not be processed until project record documents are up-to-date and complete.

1.6 SUBSTANTIATING DATA

A. When Engineer requires substantiating information, submit data justifying dollar amounts in question.

B. Provide one copy of data with cover letter for each copy of submittal. Show Application number and date, and line item by number and description.

1.7 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01039 – COORDINATION AND MEETINGS

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Coordination.

B. Field engineering.

C. Alteration project procedures

D. Cutting and patching

E. Preconstruction conference.

F. Site mobilization conference.

G. Progress meetings.

H. Pre-installation conferences.

1.2 RELATED SECTIONS

A. Section 01500 – Preliminaries and Temporary Works

B. Section 01700 - Contract Close-out

1.3 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion and for portions of Work designated for Owners occupancy.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.4 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of Georgia and acceptable to Engineer.

B. Contractor to locate and protect survey control and reference points.

C. Control datum for survey is that shown on Drawings.

D. Provide field-engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

E. Submit the specified number of copies of registered site drawings and certificate signed by the Land Surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.5 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in product Sections; match existing products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

C. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to [original] [specified] condition.

D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.

E. Where new work abuts or aligns with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.

F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.

G. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition for Engineer review.

H. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.

I. Finish surfaces as specified in individual product Sections.

1.6 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affects

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of County or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and non-conforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods, which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

E. Cut rigid materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly refinish entire unit.

J. Identify any hazardous substance or condition exposed during the Work to the Engineer for decision or remedy.

TECHNICAL SPECIFICATION

SECTION 01039 – COORDINATION AND MEETINGS

1.7 PRECONSTRUCTION CONFERENCE

A. Engineer will schedule a conference after Notice of Award.

B. Attendance Required: County, Engineer, Engineer's Consultants and Contractor.

C. Agenda:

1. Submission of executed bonds and insurance certificates (if not previously submitted).
2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, list of products, Schedule of Values, and progress schedule.
4. Designation of personnel representing the parties in Contract, and the Engineer.
5. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.
6. Scheduling.
7. Scheduling activities of geotechnical Engineer.

1.8 SITE MOBILIZATION CONFERENCE

A. Engineer will schedule a conference at the Project site prior to Contractor occupancy.

B. Attendance Required: County, Engineer, Contractor, Contractor's Superintendent, and major Subcontractors.

C. Agenda:

1. Use of premises by Owner and Contractor.
2. County's requirements and partial occupancy.
3. Construction facilities and controls provided by County.
4. Temporary utilities provided by County.
5. Survey and project layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for start-up of equipment.
11. Inspection and acceptance of equipment put into service during construction period.
12. Health and Safety requirements unique to the project or required by County.

1.9 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within three days to Contractor, County, participants, and those affected by decisions made.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, County, Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.

1.10 PREINSTALLATION CONFERENCES

A. When required in individual specification Section, convene a preinstallation conference at work site prior to commencing work of the Section.

B. Require attendance of parties directly affecting, or affected by, work of the specific Section.

C. Notify Engineer four days in advance of meeting date.

D. Prepare agenda, preside at conference, record minutes, and distribute copies within three days after conference to participants, with two copies to Engineer.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.11 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01050 - FIELD ENGINEERING

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section consists of the performance of all necessary survey work associated with the project. This includes, but is not limited to, staking out limits of designed features, establishment of lines, elevations, grades and slopes as required, in accordance with the Contract Documents and as indicated by the Engineer

B. The Work also includes provision of all survey work (field and office) required for accurate measurement of in-place and excavated quantities for use in payment calculations. Work includes all effort required in the preparation of the project "as-built" record drawings.

C. The Work also includes all effort required in the preparation of the project "as-built" record drawings.

1.2 QUALITY CONTROL

A. The Contractor's Surveyor shall be a Land Surveyor registered in the State of Georgia and shall be pre-approved by the Engineer.

B. Preserve field books and stakeout data until one year after final acceptance of Work.

C. Submit evidence of Surveyor's E&O insurance coverage in the form of an Insurance Certificate.

1.3 SUBMITTALS

A. Submit to the Engineer the name, address, and telephone number of Surveyor before starting survey work.

B. On request, submit documentation verifying accuracy of survey work performed by the Surveyor.

C. Submit a copy of registered site drawing and certificate signed by the Surveyor, that the elevations and locations of the Work are in conformance with Contract Documents. **Site drawing shall include detailed survey along the proposed toe of the dam following rehabilitation for verification of dam height according to the Georgia Safe Dams Program**.

1.4 PROJECT RECORD DOCUMENTS

A. Maintain a complete and accurate log of control and survey work as it progresses.

B. On completion of the Work, the Contractor shall prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction and site work.

C. Submit Record Documents under provisions of Section 01700. Submit 1 reproducible and 3 prints for each record drawing required. Submit electronic copy of each record drawing in Auto CADD format at time of submission. Consult with Engineer for version of software at time of submittal. Final as-built drawings shall be submitted in both reproducible and electronic format

D. Record drawings shall be prepared by the Contractor at a scale of 1 inch = 100 feet with a 2 foot contour interval, unless otherwise directed by the Engineer. All record drawings shall be signed and sealed by a Surveyor licensed in the State of Georgia.

1.5 EXAMINATION

A. Verify locations of survey control points prior to starting work.

B. Promptly notify the Engineer of any discrepancies discovered.

1.6 SURVEY REFERENCE POINTS

A. The Contractor shall establish primary reference points and be responsible for all other survey and layout work. Maintenance of the reference points established by the Owner shall be the responsibility of the Contractor in accordance with the General Conditions.

B. Control datum for Survey is as indicated on the Drawings.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.7 SURVEY REQUIREMENTS

A. All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings or as directed by the Engineer. Evaluation of existing ground, structures and appurtenances are believed to be reasonably correct but are not guaranteed to be absolute, and, therefore, are represented only as approximations. Any error or apparent discrepancy in the data shown, or omissions of data required for accurately accomplishing the stakeout survey shall be referred immediately to the Engineer for interpretation or correction.

Other general requirements include:

1. Provide field surveying services. Utilize industry standard engineering survey practices.

2. Contractor shall furnish for the survey work and stakeout competent and qualified personnel acceptable to the Owner.

3. Work shall proceed immediately upon issuance of the Notice to Proceed and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Owner. The Contractor shall keep the Owner fully informed as to the progress of the survey.

4. It shall be the responsibility of Contractor to maintain the survey and stakeout stakes in their proper position and location at all times.

5. Any existing stakes or markers defining property lines and survey monuments which may be disturbed during construction shall be properly tied in to fixed reference points and accurately reset in their proper position upon completion of the Work.

B. Contractor shall verify in the field that the topographic map provided in the Drawings of the work area is accurate. Discrepancies in the topographic mapping or field verification identified by the Contractor are to be immediately brought to the attention of the Engineer and the Owner.

C. The exact position of all Work shall be established from points that are shown on the Drawings or as modified by the Engineer.

D. Any error, apparent discrepancy or absence in or of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or for furnishing when such observation is required.

E. Contractor shall be responsible for the accuracy of his work and shall maintain all reference point stakes, etc., throughout the life of the Contract. Damaged or destroyed points, bench marks, or stakes, or any reference points made inaccessible by the progress of the construction shall be replaced or transferred by the Contractor. Existing or new control points that will be destroyed during construction shall be reestablished before they are damaged or destroyed and all reference ties recorded therefore shall be furnished to the Engineer.

F. All stakeout Survey work shall be referenced to the lines shown on the plans or as directed by the Engineer.

G. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be neatly made, shall be made available to the Engineer

upon request, and shall become the property of the Owner and delivered to the Engineer prior to final acceptance of the project

H. Owner and the Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor. Any necessary correction to the Work shall be made immediately by the Contractor. Such checking by the Owner or the Engineer shall not relieve the Contractor of any responsibilities for the accuracy or completeness of his work.

I. Contractor shall place offset stakes or references as required for construction and at such points as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly marked with the offset and cut or fill so as to permit the establishment of the exact location and elevation during construction. If markings become faded or blurred for any reason they shall be restored by the Contractor at the request of the Engineer. The Contractor shall locate and place all cut, fill, slope, grade or other stakes and points as the Engineer may direct for the proper progress of the Work. All control points shall be properly guarded and flagged for easy identification.

J. Structures shall be staked out by the Contractor at the locations and elevations shown on the Drawings or directed by the Engineer.

K. Permanent survey marker locations shall be established and referenced by the Contractor.

1.8 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No 01500/02 – Temporary Works.

PART 2: PRODUCTS

(NOT USED)

PART 3: EXECUTION

(NOT USED)

*****END OF SECTION*****

TECHNICAL SPECIFICATION

SECTION 01090 – REFERENCE STANDARDS

PART 1: GENERAL

1.1 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or federal standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents.

C. Obtain copies of standards when required by Contract Documents.

D. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.

E. In the event that specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

F. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

G. The Engineer reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the County or the County's representative.

1.2 SCHEDULE OF REFERENCES

AASHTO American Association of State Highway
and Transportation Officials
444 North Capitol Street, N.W.
Washington, DC 20001

ACI American Concrete Institute
Box 19150
Reford Station
Detroit, MI 48219

AGC Associated General Contractors of America
1957 E Street, N.W.
Washington, DC 20006

TECHNICAL SPECIFICATION

SECTION 01090 – REFERENCE STANDARDS

AISC	American Institute of Steel Construction 400 North Michigan Avenue Eighth Floor Chicago, IL 60611
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASTM	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWS	American Welding Society 550 LeJeune Road, N.W. Miami, FL 33135
AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Road Schaumburg, IL 60195
EJCDC	Engineers' Joint Contract Documents Committee American Consulting Engineers Council 1015 15th Street, N.W. Washington, DC 20005
GRI	Geosynthetics Research Institute Drexel University West Wing - Rush Building, #10 Philadelphia, PA 19104

GDOT Georgia Department of Transportation
Standard Specifications for Road and Bridge Construction
Atlanta, Georgia

IEEE Institute of Electrical and Electronics
Engineers
345 East 47th Street
New York, NY 10017

1.3 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01300 – SUBMITTALS

PART 1: GENERAL

1.1 SUBMITTAL PROCEDURES

A. Contractor shall prepare a complete listing of all submittals required for the project noting the number of each submittal and the date each submittal is to be submitted. Contractor shall identify submittals that are time critical to completion of the project. The listing shall be submitted within seven (7) days from the date of receipt of the Notice to Proceed and shall be a prerequisite to the first partial payment.

1. Consult with Engineer for preparation of submittal register.

B. Transmit each submittal with Engineer accepted form.

C. Sequentially number the transmittal forms. Resubmittals to have original number with an alphabetic suffix.

D. Identify Project, Contractor, Subcontractor or supplier; pertinent Drawing sheet and detail number(s), and specification Section number, as appropriate.

E. Apply Contractor's stamp, signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

F. Schedule submittals to expedite the Project, and deliver to business address provided by County. Coordinate submission of related items.

G. Identify variations from Contract Documents and Product or system limitations which may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Engineer review stamps.

I. Revise and resubmit submittals as required, identify all changes made since previous submittal.

J. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

1.2 HEALTH AND SAFETY PLAN

A. Contractor shall, within ten (10) days of Execution of Contract Agreement, develop and submit a Site-Specific Health and Safety Plan for review and approval by the Engineer. The Plan shall include Health and Safety procedures normally implemented by the Contractor as well as any procedures developed specifically for the project.

B. The Plan shall comply with laws and regulations of all Federal, State and Local governing Agencies.

C. In accordance with the requirements of Article 30 of the General and Supplementary Conditions, the site specific Health and Safety Plan shall identify by name and experience the Contractor's proposed safety representative.

1.3 EROSION, SEDIMENT AND POLLUTION CONTROL PLAN

A. Contractor shall, within ten (10) days of the date of receipt of the Notice to Proceed, develop and submit a Site-Specific Erosion, Sediment, and Pollution Control Plan for review and approval by the Engineer. The Plan shall include Erosion, Sediment, and Pollution Control procedures normally implemented by the Contractor as well as any procedures developed specifically for the project.

B. The Plan shall comply with the laws and regulations of all Federal, State and Local governing agencies.

1.4 CONSTRUCTION PROGRESS SCHEDULE AND WRITTEN EXECUTION PLANS

A. Submit initial progress schedule in triplicate within fifteen (15) days of the date of receipt of the Notice to Proceed for Engineer review in accordance with the requirements of Section 01310 of the Technical Specifications. In conjunction with the initial contract schedule, submit written execution plans for the lake rehabilitation. Plans should specify the general procedures (labor, specific equipment and materials, sequences etc.) to be implemented in respective stages and should complement the schedule submittal.

B. Revise schedule and plans and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

D. The format of Construction Schedule submittals shall be in accordance with the requirements of Section 01310 of the Specifications.

1.5 PROPOSED PRODUCTS LIST

A. With submission of the Bid, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 SHOP DRAWINGS

A. Shop drawings shall consist of those detail drawings which may be required for prosecution of the Work, but which are not included in the Contract Drawings. Shop drawings shall include shop details, bending diagrams for reinforcing steel, piping layouts, electrical layouts, and all other drawings as may be required by the Specifications, and as may be necessary for the successful completion of the Work. Review by the Engineer must be obtained before Work involving shop drawings may be performed. The contract price shall include the cost of furnishing all shop drawings, and the Contractor shall be allowed no extra compensation for furnishing such drawings.

B. Submit the number of reproductions that Contractor requires, plus three copies that will be retained by Engineer.

C. After review, distribute in accordance with Article 1.1 of this Section.

1.7 PRODUCT DATA

A. Submit the number of copies that the Contractor requires, plus three copies that will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

C. After review, distribute in accordance with Articles 1.1 of this Section.

1.8 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Include identification on each sample, with full Project information.

C. Submit the number or samples specified in individual Specification Sections; one of which will be retained by Engineer.

D. Reviewed samples which may be used in the Work are indicated in individual Specification Sections.

1.9 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, adjusting, quality control, finishing, or other required information in quantities specified for Product Data.

B. Identify conflicts between manufacturers' instructions and Contract Documents.

C. Operations and Maintenance Manuals

D. Separate O&M Manuals shall be provided for all pieces of equipment which require periodic maintenance and/or instruction for operation. These items include, the valves.

E. The manuals shall provide plans of the equipment and instructions for periodic maintenance and replacement of parts. Each manual shall have a title page which lists the following:

1. Supplier(s)
2. Contact information for spare parts (Address, Telephone #)
3. Project Name and Date
4. Subject of the Manual

F. Each manual shall contain a table of contents.

G. Submit three (3) copies for review and approval. After acceptance of the manuals, make the corrections indicated and submit four (4) final copies. The final manuals shall be bound in binders with the title of the manual on the spine and cover. In addition, the cover shall include the information on the title page.

H. Final acceptance of the Work will not be granted and the retainage will not be released or due payable until the Contractor has furnished the approved Operations and Maintenance Manuals required in a condition acceptable to the Engineer.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual Specification Sections, submit manufacturers' certificate to Engineer for review, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Engineer.

1.11 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01310 – CPM SCHEDULING PROCEDURES

PART 1: GENERAL

1.1 GENERAL

A. Contractor shall prepare and maintain a detailed progress schedule as described below. This schedule shall be the Contractor's working schedule and shall be used to plan, organize and execute the work, record and report actual performance and progress, and show how Contractor plans to complete all remaining work as of the end of each progress report period. The schedule shall be in the form of an activity on arrow (i-j format) oriented network diagram (Critical Path Method) and the principles and definition of the term used herein shall be as set forth in the Associated General Contractors of America (AGC) publication *The Use of CPM in Construction,* copyright 1976. In the event of discrepancies, this section shall govern the development and utilization of the CPM schedule.

1. Contractor may submit the detailed progress schedule in activity on node format (Critical Path Method) upon approval by the Engineer and County.

B. The Detailed Project Schedule shall provide sufficient detail and clarity of form and technique so that Contractor can plan, schedule, monitor, control and report on the progress of his work. In addition, it shall provide the Engineer with a tool to monitor and follow the progress for all phases of the work.

1.2 INITIAL TIMETABLE

A. The Contractor shall promptly prepare a Detailed Project Schedule in the form of a network diagram and shall submit the same for approval by County within fifteen (15) calendar days after notice of award. Limited technical assistance is available to Contractor upon written request and prior to any formal review and/or finalization of the initial schedule. Pre-submittal reviews are also available to facilitate coordination of the contractor's schedule with other preceding, parallel and succeeding contracts.

1.3 NETWORK DETAILS

A. The Detailed Project Schedule for this contract shall be constructed to show the order in which Contractor proposes to carry out the work. Contractor shall indicate on the Detailed Project Schedule any restrictions caused by limited access and available work areas and the availability and use of manpower, material and equipment. The Contractor shall utilize the Detailed Project Schedule to plan, schedule and coordinate the work under this contract (including all activities of subcontractors, equipment vendors and suppliers). The following criteria shall form the basis for assembly of the logic:

1. What activity *must* be completed before a subsequent activity can be started?
2. What activities *can* be done concurrently?
3. What activity *must* be started immediately following a completed activity?
4. What *major* economic facility or *specific* manpower or equipment restrictions are required for sequencing these activities?

B. The Detailed Project Schedule shall comply with any restrictions imposed by the scope of work and by any contractually specified intermediate milestone and/or completion dates included in the contract. The degree of detail shall be to the satisfaction of County, but the following factors shall have a bearing on the required depth of activity detail:

1. The physical and structural breakdown of the project;
2. The contract milestones and/or completion dates;
3. The type of work to be performed and the labor trades involved;
4. All purchase, manufacture and delivery activities for all major materials and/or equipment;
5. Deliveries of County-furnished equipment and/or materials;
6. Preparation, submittal and approval of shop and/or working drawings and material samples;
7. Approvals required by regulatory agencies and/or other third parties;
8. Plans for all subcontract work;
9. Assignment of responsibility for performing specific activities;
10. Access to and availability of work areas;
11. Identification of interfaces and dependencies with preceding, concurrent and follow-on contractors;
12. Actual tests, submission of test reports and approval of test results:
13. Planning for phased or total acceptance by County;
14. Identification of any manpower, material and/or equipment restrictions.

C. The activities included in the Detailed Project Schedule shall be analyzed in detail to determine activity time durations in units of project working days. Durations shall be based on the labor (crafts), equipment and materials required to perform each activity on a normal work-day basis. Activity durations over 15 working days are not permitted except in the case of nonconstruction activities such as procurement of materials, delivery of equipment and concrete curing. All durations shall be the result of definitive manpower and resource planning by Contractor to perform the work in consideration of contractually defined on-site work conditions. The manpower to be assigned, by craft definition, shall be shown on each construction activity of the network. No more than five (5) crafts may be assigned to a specific activity. If more crafts are required, then the activity in question must be broken down into additional activities.

D. The Contractor may use manpower or equipment constraints, separately noted, to optimize and level manpower and equipment requirements. The individual activities involved may be sequenced within the limits of the available total float. However, when this leveling technique is used in establishing the initial schedule, it shall be reflected in the logic with constraints identified as "constraint—for manpower or equipment leveling purposes only." Critical or near-critical paths resulting from the use of manpower constraints shall be kept to a minimum. Near-critical paths shall be defined as those paths having 14 days or less of total float at the time of initial submission.

E. A unique event numbering system shall be required to code or identify activities by bid items, work items, areas, procurement, etc. No two activities shall have the same two event numbers for identification.

F. The estimated cost to perform each work activity shall be noted graphically on each activity included in the network. The sum of the costs assigned to all activities shall equal the contract value. No activity costs shall be assigned to manufacture or delivery activities.

G. The networks shall be prepared on (E) size sheets and shall have a title block in the lower right-hand corner. Exceptions to the size of the network sheets and the use of computer graphics to generate the networks shall be subject to the approval of the Engineer.

H. The networks shall clearly indicate all contract milestones and completion dates. All networks shall be drafted to show a continuous flow of information from left to right with no arrows from right to left. The primary path(s) of criticality shall be clearly and graphically identified on the network(s). Each network drawing shall have a standard grid coordinate system with alpha designations on the *Y* axis (top to bottom) and numerical designations on the *X* axis (left to right) for quick activity reference and for following the planned sequence when using multi-sheet networks. Logic ties which cannot be graphically demonstrated as continuous constraints between different segments of the network shall be identified as remote dummies and shall be referenced as "to/or from event number _____, page number _____," followed by appropriate alpha, numeric grid references, or equivalent designation.

I. As part of each update submission, the status of work in progress shall also be similarly identified and the reported percent complete graphically indicated on each activity remaining in progress as of the last report period.

1.4 USE OF COMPUTERS

A. The mathematical analysis of the Detailed Project Schedule shall be made by computer and a tabulation for each activity shall include as a minimum the following:

1. Preceding (i) and following (j) event numbers; or unique event numbers for each activity if activity on node is selected;
2. Activity description;
3. Activity code(s);
4. Schedule and actual/remaining durations for each activity;
5. Earliest start date (by calendar date);
6. Earliest finish date (by calendar date);
7. Actual Start Date (by calendar date);
8. Actual Finish Date (by calendar date);
9. Latest start date (by calendar date);
10. Latest finish date (by calendar date);
11. Float in work days;
12. Monetary value of each activity;
13. Percentage of activity completed;
14. Contractor's earnings based on the reported portion of activity completed.

B. The computer programs used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities. The program shall also be capable of accepting revised completion dates as modified by approved time adjustments and recomputation of all activity dates and float accordingly.

C. The following computer outputs shall be required as part of the initial schedule submission and each update thereafter:

1. Activity sort by preceding event number from lowest to highest and then in the order of the following event number;
2. Activity sort by the amount of total float, then in order of preceding event number;
3. Activity sort by early start for the next sixty (60) calendar days, then in order of preceding event number;
4. Activity sort by late finish for the next sixty (60) calendar days, then in order of preceding event number;
5. Activity sort(s) by organizational responsibility.
6. Outputs (a) and (b) above shall show all activities, including constraints for the duration of the project.

1.5 CASH FLOW PROJECTION

A. Using the cost assigned to each activity of the Detailed Project Schedule, the Contractor shall develop a cash flow analysis illustrated by a computer listing and a graphic display, both of which shall depict the estimated cash drawdown in the aggregate, by month, over the life of the project. The cash flow projection shall be updated each month to show actual cash drawdown and a forecast of remaining payments to be made over the remaining life of the project.

1.6 MANPOWER REQUIREMENTS FORECAST

A. The Contractor shall prepare a manpower analysis in the form of a series of graphic displays depicting manpower by principal trades in the aggregate, and in accordance with the Detailed Project Schedule. The graphs shall display the number of man-days of effort, for each month, over the life of the project. This submission may be computerized or manually prepared, but shall be correlated with the manpower assigned to each activity of the Detailed Project Schedule. The Manpower Requirements Forecast shall be updated monthly and shall include the manpower actually used by trade as of the current report period and the manpower required to complete all remaining contract work.

1.7 SUBMITTALS

A. The detailed Project Schedule (logic diagrams and computer tabulations), the Master Summary Schedule, the Cash Flow Projection and the Manpower Requirements Forecast shall be submitted to County for approval within (15) calendar days after notice of award in the following quantities:

1. Detailed and Summary Schedules in E size (reproducible and 5 sets of prints);
2. Computer tabulations (5 copies 8 ½ " x 11" in size);
3. Manpower Requirements Forecast (5 copies 8 ½" x 11" in size):
4. Cash Flow Projections (5 copies 8 ½" x 11" in size).
   a) Submit initial cash flow projection in accordance with the requirements of General Conditions Article 37.

B. In addition to the above, the Contractor shall provide a copy of its computer file in the form of a hard or floppy disk. The disk shall include the information contained in the schedule submittal. If additional submittals are necessary, a disk for each submittal shall be provided by the Contractor.

1.8 APPROVAL PROCESS

A. The County shall approve or disapprove, in writing, the Contractor's submission within ten (10) calendar days after receipt of all required information.

B. If the Contractor fails to submit the initial Detailed Project Schedule, Master Summary Schedule, Manpower Requirements Forecast, Cash Flow Projection, or the computer disk within the time prescribed, or revisions thereof within the requested time, County may withhold approval of progress payment estimates until such time as the Contractor submits the required information.

C. At the request of County, the Contractor shall be required to participate in any meetings necessary to reach a mutual agreement and approval of the initial Detailed Project Schedule, Master Summary Schedule, Manpower Requirements Forecast, Cash Flow Projections, or the computer disk.

D. If any of the required submissions are returned to the Contractor for corrections or revisions, they shall be resubmitted along with a new computer disk for approval within ten (10) calendar days after the return mailing date. Resubmittals shall be in the same quantities as noted above. Review and response by County shall be given within ten (10) calendar days after receipt of each new submission.

1.9 UPDATES

A. The initial updating shall take place during the first week after the approval of the Contractor's schedule. Subsequent updates shall be scheduled at the beginning of each month thereafter for the duration of the contract. The Detailed Project Schedule and computer tabulations shall be reviewed jointly at a meeting with County for the purpose of verifying:

1. Actual start dates;
2. Actual completion dates;
3. Cost value of work reported in place.
4. Activity percent completion
5. Revised logic (as-built and projected) and changes in activity durations, cast and manpower assigned;
6. Influence of change orders, if any;
7. Revisions due to unauthorized modifications;
8. Incorporation of approved time extensions. County shall inform the Contractor of the date, time, and place of each updating.

B. The Contractor shall come to the updating meeting with the above data prepared in advance for each meeting to provide, as of the end of the updating period, a complete and accurate report of current procurement and construction progress and a depiction of how the Contractor plans to continue the work to meet all contract completion dates. All network changes and status data agreed to during each update shall be considered as acceptable by both parties unless written notice of any exceptions is given by an objecting party within ten (10) calendar days after receipt of the Contractor's update submission. For major network changes that cannot be agreed to during an updating meeting, the Contractor shall submit, in writing, such revisions for County's approval prior to inserting such changes into the network. Submissions may be in the form of marked-up networks, fragnets, or schedule abstracts, provided they are submitted with a letter of transmittal. The submission and approval procedures for this information shall follow the same timetable described for *Change Order, Delays, and Time Extensions* noted below.

C. As part of the monthly updating process, the Contractor shall prepare a Narrative Progress Report describing the physical progress during the report period, plans for continuing the work during the forthcoming report period, actions planned to correct any negative float predictions, and an explanation of potential delays and/or problems and their estimated impact on performance and the overall project completion date. In addition, alternatives for possible schedule recovery to mitigate any potential delay and/or cost increases should be included for consideration by County.

D. Five copies each of the Narrative Progress Report, the updated Detailed Project Schedule (networks and computer computations), the Summary Master Schedule, the Cash Flow Projection, the Manpower Requirements Forecast and an updated computer disk shall be submitted to County within five (5) calendar days after each updating meeting.

E. If the Contractor fails to timely submit any of the update deliverables, County may withhold approval of progress payment estimates until such time as the Contractor submits the required update reports.

1.10 CHANGE ORDERS, DELAYS, AND TIME EXTENSIONS

A. When change orders or delays are experienced by the Contractor and the Contractor requests an extension of time, the Contractor shall submit to County a written Time Impact Analysis illustrating the influence of each change or delay on the current contract schedule completion date. Each Time Impact Analysis shall include a fragnet demonstrating how the Contractor proposes to incorporate the change order or delay into the Detailed Project Schedule. A fragnet is defined as a sequence of new activities and/or activity revisions that are proposed to be added to the existing schedule to demonstrate the influence of delay and the method for incorporating delays and impacts into the schedule as they are encountered.

B. Each Time Impact Analysis shall demonstrate the estimated time impact based on the events of the change or the delay, the date the change was given to the Contractor or the delay was incurred, the status of construction at that point in time, and the event time computation of all activities effected by the change or delay. The event times used in the analysis shall be those included in the latest update of the Detailed Project Schedule or as adjusted for the events of delay.

C. Time extensions will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total or remaining float along the path of activities at the time of actual delay or at the time notice to proceed was issued for a change. Each Time Impact Analysis shall be submitted in triplicate and within fifteen (15) calendar days after a delay occurs or notice of direction for proceeding with a change order is given to the Contractor. In cases where the Contractor does not submit a Time Impact Analysis for a specific change order or delay within the specified period of time, it shall be deemed to have irrevocably waived its rights to any additional time and cost.

D. Approval or rejection of each Time Impact Analysis by County shall be made within fifteen (15) calendar days after receipt of each Time Impact Analysis, unless subsequent meetings and negotiations are necessary. Upon approval, a copy of a Time Impact Analysis signed by County shall be returned to the Contractor for incorporation into the schedule.

E. Upon mutual agreement by both parties, fragments illustrating the influence of change orders and delays shall be incorporated into the Detailed Project Schedule during the first update after agreement is reached.

F. In the event the Contractor does not agree with the decision of County regarding the impact of a change or delay, it shall be resolved in accordance with the Sections 9 and 35 of the General and Supplementary Conditions of the Contract.

1.11 COMPENSATION

A. MEASUREMENT

1. The work of this section will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS

2.1 SOFTWARE SCHEDULING PROGRAMS

A. The following scheduling software programs are acceptable for use on this project.

1. Sure Trak © Project Manager published by Primavera Systems, Inc.
2. Primavera Project Planner © (P3) published by Primavera Systems, Inc.

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01340 – SHOP DRAWINGS

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Procedure for shop drawing submission.

B. Procedure for review.

C. Certified Shop Test Reports.

1.2 RELATED SECTIONS

A. Document General Conditions: Shop Drawings and Samples

B. Section 01300 - Submittals

C. Section 01600 - Material and Equipment

D. Section 01700 - Contract Closeout

1.3 PROCEDURE FOR SHOP DRAWING SUBMISSION

A. The Contractor shall prepare and submit to the Engineer for his review a tabulation of all principal items of material to be purchased under the Contract, with appropriate spaces to insert the following listed information:

1. Date on which shop drawings are requested from manufacturer.
2. Date on which shop drawings are received from manufacturer.
3. Date on which shop drawings are submitted to Engineer.
4. Date on which shop drawings are returned by Engineer for revision.
5. Date on which shop drawings are revised by manufacturer.
6. Date on which shop drawings are resubmitted to Engineer.
7. Date on which Engineer returns shop drawings marked "Approved" or "Approved as Noted".
8. Date on which reviewed shop drawings are transmitted to manufacturer.
9. Final revised date of manufacturer's scheduled delivery.
10. Date on which delivery is actually made.

B. A black-on-white print of this tabulation shall be brought up to date bi-weekly and submitted to the Engineer on request. This submission shall also be prerequisite to any partial estimate and shall be included with each request for payment.

C. The Contractor, on approval from the Engineer, may submit manufacturer's literature as a substitute for, or supplement to, the shop drawings. The minimum size for any such submission shall be 8 1/2 inches by 11 inches, and the maximum size shall not exceed 24 inches by 36 inches. All shop drawings and printed matter submitted shall clearly indicate the Section of the Contract Documents to which they correspond.

D. Shop drawings or printed matter shall give all dimensions and sizes to enable the Engineer to pass on the suitability of the material or layout for the purpose intended. The shop drawings shall, where needed for clarity, include outline and sectional views, and detailed working dimensions and designations of the kind of materials and kinds of machine work and finishes required. Shop drawings for submission, shall be coordinated by the Contractor with shop drawings previously submitted, with shop drawings being prepared, and with the design and function of any equipment or structure.

E. If the Shop Drawings show variances from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment; otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though such shop drawings have been approved by the Engineer.

F. Material shall not be purchased or fabricated for equipment or structures until the Engineer has reviewed the shop drawings, which shall represent all materials and work involved in the construction. No materials or equipment for which a submittal of a shop drawing is required shall be delivered to the site unless they are in conformance with the shop drawings which have been "Approved."

G. Work shall not be done upon any part of a structure, the design or construction of which is dependent upon the design of equipment or other features, for which approval is required, until such approval has been received from the Engineer.

H. All major construction items, shop drawings, and shop drawings essential for the operation of the facility shall be submitted to the Engineer sufficiently in advance of construction of each item to afford adequate time for review and revisions if necessary. Shop drawings shall include those items necessary for the operation of the facility.

I. If the shop drawing submission is in reasonable conformance to the requirements of the Contract Documents, the Engineer will return the required marked sets and comments within ten (10) business days from receipt.

1.4 PROCEDURE FOR REVIEW

A. Submit the number of copies that the Contractor requires plus two (2) copies, which will be retained by the Engineer, plus one (1) copy to be forwarded to the County. By submitting the shop drawing, the Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, catalog numbers and similar data, or will do so, and that he has checked and coordinated each shop drawing with the requirements of the Work and of the Contract Documents.

B. The Contractor shall review all drawings or literature submitted to him by subcontractors and manufacturers for correctness and adequacy of data prior to submitting such shop drawings and literature to the Engineer for approval. The Contractor shall be responsible for the prompt submission of all shop drawings, so that there shall be no delay to the work due to the absence of such drawings.

C. The Engineer will review the shop drawings, but only for conformance with the design concept of the project and with the information given in the Contract Documents.

D. Two (2) copies of the shop drawings or printed matter will be retained by the Engineer plus one (1) copy to be forwarded to the County. The remaining copies will be returned to the Contractor marked in one of the following ways, all subject to Contract requirements:

1. "No Exceptions Taken," which means that no exceptions are taken. Any approval by the Engineer of such, or part of such, shop drawings, manufacturer's literature, or other data relative to the work or material to be furnished for the Contract shall not be construed in any way as relieving the Contractor from his responsibility for errors or omissions in the shop drawings or from any of his other responsibilities under the terms of the Contract, but shall be interpreted only to mean that an examination of the exhibits has been made, that no variation from the Contract requirements has been discovered, and that no criticism is offered. The Engineer's approval of a separate item shall not indicate approval of an assembly in which the item functions.
2. "Exception as Noted," which means that minor corrections as noted and/or indicated on the submittal shall be made. Resubmittal is required as directed by the Engineer
3. "Submit Specified Item," which means that submittal is incomplete, and that reviewer-listed products, taken from the indicated Specification sections, are yet to be submitted. This mark will be used normally in conjunction with one of the other review marks. When used with marks "No Exceptions Taken" and "Exception as Noted", Contractor need not resubmit the present submittal but shall make a supplemental submittal for items listed by the reviewer; if the Contractor proceeds with the work before gaining acceptance of the supplemental submittal and if the work is affected by the supplemental submittal, he proceeds at his own risk. When used with marks "Revise and

Resubmit" and "Rejected," Contractor shall resubmit the present submittal and make a supplemental submittal for the items listed by the reviewer; the resubmittal and supplemental submittal may be combined or separate.

4. "Revise and Resubmit," which means that major corrections are noted and/or indicated on the submittal and resubmittal is required.
5. "Rejected," which means that the submittal is completely rejected and a resubmittal is required. The Contractor shall direct specific attention, in writing or on resubmitted shop drawings, to revisions other than the corrections noted and/or indicated by the Engineer on previous submission.

E. The Contractor shall be responsible for the prompt submission of all shop drawings, so that there shall be no delay to the Work due to the absence of such drawings.

F. Any approval by the Engineer of such, or parts of such, shop drawings, manufacturer's literature, or other data relative to the work or material to be furnished for the Contract shall not be construed in any way as relieving the Contractor from his full responsibilities under the terms of the Contract, but shall be interpreted only to mean that an examination of the exhibits has been made, that no variation from the Contract requirements has been discovered, and that no criticism is offered. Approval of a separate item shall not indicate approval of an assembly in which the item functions.

1.5 CERTIFIED SHOP TEST REPORTS

A. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. Tests shall be conducted in accordance with the test codes of the ASME, NEMA, and other applicable standards.

B. Equipment shall not be shipped to the work until the Engineer has notified the Contractor in writing that the results of the shop tests are acceptable.

C. When the Specifications require witness shop tests at the point of manufacture, the only tests that will be accepted are those made in the presence of the Engineer or his representative. The Contractor shall give the Engineer written notice ten (10) days in advance of the time when the equipment will be ready for the witness shop tests, or as required by the Specifications. This notification shall include a diagram of the testing setup and a list of the instruments the manufacturer proposes to use for the tests. All instruments shall be ranges suitable for the quantities to be measured, with approved laboratory calibration.. Five (5) copies of the witness shop test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer.

1.6 COMPENSATION

A. MEASUREMENT

1. The work of this section will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01400 – QUALITY ASSURANCE / CONTROL

PART 1: GENERAL

1.1 RELATED SECTIONS

A. Section 01090 – Reference Standards.

B. Section 01300 – Submittals: Submission of Manufacturers' Instructions and Certificates.

C. Section 01340 – Shop Drawings.

D. Section 01600 – Material and Equipment: Requirements for material and product quality.

1.2 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

G. The Engineer shall determine and decide all questions which may arise as to the quality and acceptability of materials and Work performed; the manner of performance and the rate of progress of said Work; the interpretations of the Contract Documents relating to the Work; the acceptable fulfillment of the Contract Documents on the part of the Contractor; and the amount and quantity of the several kinds of Work performed and materials which are to be paid for under the Contract.

1.3 INSPECTION AND TESTING LABORATORY SERVICES

A. County will appoint, employ, and pay for services of an independent firm to perform inspection and testing unless otherwise indicated in individual Specification Sections.

B. The independent firm will be a consultant of the Engineer and will perform inspections, Quality Assurance (QA) tests, and other services specified in individual Specification Sections, and as required by the Engineer.

C. Contractor shall employ and pay for services of an independent testing laboratory to perform Quality Control (QC) sampling and testing as indicated in individual Specification Sections to be performed by Contractor.

D. Reports will be submitted by the independent firm to the Engineer indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage and assistance as requested. Provide incidental labor and facilities to provide access to Work to be tested, to obtain and handle samples at the Site or at source of products to be tested, and to facilitate tests and inspections.

F. Notify Engineer and independent firm 24 hours prior to expected time for operations requiring services.

G. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

H. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting will be charged to the Contractor by deducting inspection or testing charges from the Contract Price.

I. Employment of testing laboratory by County shall in no way relieve the Contractor of obligations to perform Work in accordance with requirements of Contract Documents.

1.4 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Specification Sections, required material or Product suppliers or manufacturers shall provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, and quality of workmanship as applicable, and to initiate instructions when necessary.

B. Individuals shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report within ten (10) days of observation to Engineer for review.

1.5 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.
2. No separate payment will be made for the cost to employ an independent testing agency for services specified in individual Specification Sections. Payment for such services shall be included in the unit cost price to perform the Work requiring independent testing.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01500 – PRELIMINARIES AND TEMPORARY WORKS

PART 1: GENERAL

1.1 SCOPE OF WORK

A. The Work of this Section of the Specifications consists of supplying all items necessary for the timely mobilization and demobilization, insurance, and temporary facilities necessary to complete the Work for the Project.

1.2 DEFINITIONS

A. **Mobilization**: Mobilization shall consist of preparing work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site to perform the Work; for the establishment of offices, buildings, temporary bridge and road facilities, and other work for operations which must be performed or costs incurred when beginning the Work on the Project.

B. **Demobilization**: Demobilization shall consist of all work and operations necessary to perform final cleaning up; move personnel, equipment, supplies, and incidentals from the project site; remove all offices, buildings, temporary bridge and other facilities that were necessary for the Work on the Project, and for other work that must be performed or costs incurred after acceptable completion of construction operations on the Project.

1.3 COMPENSATION

Bid Item 01500/01 – Mobilization and Demobilization

A. MEASUREMENT

1. Bid Item 01500/01 – Mobilization and Demobilization will not be measured for payment.

B. PAYMENT

1. The lump sum unit price amount bid for item 01500/01 will cover mobilization and demobilization, and payment shall be full compensation for all Work required by this Section.
2. Payment for mobilization will be for three quarters of the lump sum in item 01500/01. It will be made for the first interim payment. Payment for demobilization will be for one quarter of the lump sum in item 01500/01. It will be made after final acceptance of the Project.

Bid Item 01500/02 – Temporary Works

A. MEASUREMENT

1. Bid Item 01500/02 – Temporary Works will not be measured for payment.

B. PAYMENT

1. Item 01500/02 will cover temporary facilities and payment shall be full compensation for all Work required by this Section.
2. Contractor will be paid as a lump sum for the provision, maintenance and clearing away the temporary facilities, including, but not limited to fences, gates, access roads, bridges, drains, parking space, office space, telephones, fax machine, lighting, power, utilities and sanitary facilities, etc.
3. Contractor will be paid as a lump sum for the provision, maintenance, decommissioning and clearing away all temporary dewatering and drainage systems including, but not limited to monitoring devices, temporary ditches, channels, flumes, sumps, pumps, deep wells, well points and all associated equipment and services for these systems.
4. Twenty-five (25) percent of the lump sum for Temporary Works will be paid with the first interim payment, if all the facilities are in place. The remaining seventy-five (75) percent will be paid in equal amounts in the interim payments spread over remainder of the Work.
5. The office trailers, all office equipment, temporary power and lighting shall be supplied within ten (10) days of the Notice to Proceed. If these items are not provided within the required time frame, the Engineer may obtain any or all of the items at his/her sole discretion and deduct all direct costs associated with the procurement of the items, including a five (5) percent markup, and all labor costs charged at rates in accordance with the Engineer's standard fee schedule. The costs shall be deducted form the Contractor's first payment application.

Bid Item 01500/03 – Insurance

A. MEASUREMENT

1. Bid Item 01500/03 – Insurance will not be measured for payment.

B. PAYMENT

1. The lump sum unit price amount bid for item 01500/03 will cover insurance, and payment shall be full compensation for all Work required by this Section.
2. Payment will be made in equal amounts for the first two (2) interim payments providing all insurance is in place and copies of the certificates have been given to the Owner.

PART 2: PRODUCTS (NOT APPLICABLE)

PART 3: EXECUTION

3.1 ACCESS ROAD AND VEHICLE PARKING AREA

A. The Contractor shall develop and maintain the road providing access to the Site as well as to the space for office trailers and vehicle parking.

3.2 OFFICE SPACE

A. The Contractor shall provide and maintain proper fully equipped offices on the Site for exclusive use of the Engineer and his/her site staff for the duration of the Work at the Site. The Engineer's office facilities shall consist of one standard office trailer. The office trailer shall be furnished at the project site within ten (10) days of the Notice to Proceed. The office trailer shall be fitted out as follows:

B. One separate office, one separate storage cabinet equipped with a lock, and remainder open space with a simple (but strong) wooden bench constructed along one long wall. The office shall have a desk, two filing cabinets, and three chairs. The open space shall also have a desk, a chair, two stools and two large stainless steel kitchen-type sinks for washing soil samples and equipment.

C. The trailer shall have full facilities, equipment and utilities required to operate as an office including, but not limited to, lighting, heating, air conditioning, piped water, electricity, etc. The piped water will be required for cleaning and testing laboratory samples. This piped water does not have to be potable, but it must be clean enough for use in the soils laboratory. The Contractor shall also supply electrically cooled, potable water for drinking.

D. The Contractor shall supply and maintain a telephone with a dedicated line, answering machine, a fax machine, photocopier, microwave and water cooler for the Engineer's office.

E. The Contractor shall provide maintenance contracts for all equipment.

F. The Contractor shall remove all office facilities and debris upon completion of the Work.

3.3 TEMPORARY LIGHTING AND POWER

A. The Contractor shall provide all temporary lighting, power and telephone connections necessary for the proper completion of the Work together with all necessary temporary wiring and meters and maintaining the same as necessary and paying all fees and charges legally demandable in connection therewith and at completion clear away such temporary utilities and any rubbish or debris resulting therefrom.

B. Temporary power and lighting shall be supplied to the office trailers within ten (10) days of the Notice to Proceed.

3.4 SANITARY FACILITIES AND JANITOR AND SECURITY SERVICES

A. The Contractor shall provide, erect and maintain in a clean and sanitary condition sanitary facilities for the operating site staff and Engineer and on completion of the contract clear away and deodorize the ground, all to the satisfaction of the Engineer and in compliance with all applicable Laws and Regulations. The Contractor shall provide Janitor, Trash Removal, and Security Services for the site and for the Engineer's office facilities throughout the period of Work at the Site. The Engineer's office shall be cleaned at least two times per week for this period.

3.5 TEMPORARY ROADS WITHIN THE SITE

A. The Contractor shall provide all temporary roads, tracks, parking areas, bridges and all other similar works within the Site necessary for the proper completion of the Work and clean away such temporary works and all rubbish and debris resulting therefrom and making good all ground disturbed. All roads on site shall be maintained in a safe condition, graded and watered to reduce dust, as required, to the satisfaction of the Engineer.

3.6 TEMPORARY DRAINS

A. The Contractor shall provide and maintain all necessary temporary drains and culverts for the efficient drainage of the site during the progress of the Work to the satisfaction of the Engineer and clear away such temporary works and rubbish and debris resulting therefrom upon completion of the Project.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01600 – MATERIAL AND EQUIPMENT

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.2 RELATED SECTIONS

A. Instructions to Bidders: Product options and substitution procedures.

B. Section 01400 - Quality Assurance/Control: Product quality monitoring.

1.3 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacturer, for similar components.

1.4 TRANSPORTATION AND HANDLING

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.5 STORAGE AND PROTECTION

A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.

B. For exterior storage of fabricated products, place on sloped supports, above ground.

C. Provide off-site storage and protection when site does not permit on-site storage or protection. Products stored off-site shall be stored and maintained in a bonded warehouse.

D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.

E. Store loose granular materials on solid flat surfaces in a well-drained area. Provide mixing with foreign matter.

F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.6 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

1.7 SUBSTITUTIONS

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this Section.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the Substitution as for the specified product.
3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to County.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse County for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence.
3. The Engineer will notify Contractor, in writing, of decision to accept or reject request.

1.8 COMPENSATION

A. MEASUREMENT

1. The work of this section will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 01700 – CONTRACT CLOSEOUT

PART 1: GENERAL

1.1 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's inspection.

B. Provide submittals to Engineer that are required by governing or other authorities.

C. Submit final Application for Payment in accordance with the requirements of Technical Specification Section 1027 and Sections 36, 37 and 39 of the General and Supplementary Conditions identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.2 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean site; remove temporary surface water controls, sweep paved areas, rake clean landscaped surfaces.

C. Remove waste and surplus materials, rubbish, and construction facilities to a landfill or to a location acceptable to the Engineer.

1.3 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work:

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed product data, and samples.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

E. Delete Engineer title block and seal from all documents.

F. Final "as-built" drawings shall be submitted in both reproducible and electronic format.

G. Submit documents to Engineer with claim for final Application for Payment.

1.4 COMPENSATION

A. MEASUREMENT

1. The Work required for this Section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment will be made for compliance with the requirements of this specification section. All work and incidentals necessary to comply with the requirements of this Specification Section are deemed to be included with the lump sum price bid for Item No. 01500/02 – Temporary Works.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

DIVISION 2

SITE WORKS

TECHNICAL SPECIFICATION

SECTION 02060 – STRUCTURAL DEMOLITION

PART 1: GENERAL

1.1 WORK INCLUDES

A. Remove materials and equipment from site.

B. Remove existing sewerline piping and associated structures.

C. Remove existing spillway and associated structures.

D. Remove buried structures including underground slabs, manholes and all service lines.

E. Abandon existing 10-inch diameter metal pipe penetrating the existing embankment.

1.2 SUBMITTALS

A. Permit for transport and disposal of debris.

B. Demolition procedures and operation sequence for review and acceptance by Engineer.

C. Permit of proposed disposal facility.

1.3 PHASING

A. Removal of sewerline piping and associated structures as indicated on the Construction Drawings.

B. Removal of the existing manholes indicted on the Construction Drawings.

C. Abandonement of existing 10-inch diameter metal pipe penetrating the existing embankment by pressure grouting the pipe and cutting the pipe flush with the downstream slope as indicated on the Construction Drawings.

D. Removal of existing spillway and its associated structures as indicated on the Construction Drawings and encountered on site.

E. Any structures necessary for the completion of the work and not indicated on the Construction Drawings or as directed by the Engineer.

1.4 PERMITS AND NOTIFICATIONS

A. Contractor shall obtain, and pay for all certifications, licenses, permits, etc. that are required by law in order to permit Contractor and Contractor's employees to perform work under this specification.

1.5 COMPENSATION

TECHNICAL SPECIFICATION

SECTION 02060 – STRUCTURAL DEMOLITION

Bid Item No. 02060/01 – Structural Demolition

A. MEASUREMENT

1. Bid Item No. 02060/01 – Strucural Demolition will not be measured for payment.

B. PAYMENT

1. The lump sum price bid for Bid Item No. 02060/01 – Structural Demolition shall be full compensation for all labor, equipment, materials and incidentals necessary for the excavation, grouting, breaking, sawing, loading, hauling and proper and safe disposal of all structures and items identified on Sheets C2 and C3 or elsewhere in the Contract Documents for demolition and removal.
2. No separate payment will be made for repair or replacement of adjacent structures not scheduled for demolition, appurtanences or anything damaged or destroyed as a result of Contractor's demolition operations.

PART 2: PRODUCTS

2.1 MATERIALS

A. Immediately remove all demolition debris from site to the satisfaction of Engineer.

PART 3: EXECUTION

3.1 DEMOLITION

A. Perform demolition in accordance with authorities having jurisdiction.

B. Repair demolition performed in excess of that required.

C. Do not burn demolition debris on site.

D. Check with Engineer to coordinate items to be turned over to Engineer. Remove demolished materials, tools, and equipment upon completion of work. Dispose of materials at an off-installation site at the Contractor's expense.

E. Do not dispose of any material on site or adjacent properties.

F. Leave site in condition acceptable to Engineer.

3.2 POLLUTION CONTROLS

A. Comply with governing regulations for environmental protection. Use water sprinkling, temporary enclosures, and other suitable methods to limit amount of dust and dirt rising and scattering in air. Provide hoses and water main or hydrant connections. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution. Dust control will be strictly enforced.

B. There shall be no spillage of material on any local road.

3.3 STRUCTURE DEMOLITION:

A. Completely demolish structure(s) and appurtenances in orderly and careful manner and remove materials from site. Proceed with demolition from top of structure to ground. Remove piping in a sectional manner. Locate demolition equipment throughout structure and remove materials so not to impose excessive loads to supporting walls, floors, or framing. Demolish and remove below-grade construction and concrete slabs-on-grade.

B. Dispose of demolition debris in permitted facility in compliance with all local and State regulations.

3.4 FILLING VOIDS

A. Completely fill below-grade areas and voids resulting from demolition of structures. Use soil materials meeting the requirements of these specifications and plans. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen material, trash, and debris. Place fill materials in horizontal layers not exceeding 6 inches loose depth. Compact each layer in accordance with Section 02266 of these Specifications. After fill placement and compaction, grade surface to meet adjacent contours and provide flow to surface drainage structures.

3.5 UTILITY SYSTEM DEMOLITION

A. Completely remove all utility lines shown on the drawings, including electric, water, sanitary sewer, storm sewer, and spill control, etc.

B. Protect all utilites not scheduled for removal that are in close proximity to structures scheduled for demolition or relocation.

3.6 ABANDONMENT OF EXISTING 10-INCH DIAMETER METAL PIPE

A. The existing 10-inch diameter pipe shall be grouted following lowering of the lake level.

B. The existing pipe shall be pressure-grouted to prevent future flow through the conduit.

C. Once grouting of the pipe is complete the pipe shall be cut to be flush with the stripped subgrade on the downstream face of the existing embankment.

D. The downstream end of the grouted pipe shall be encased within the sand drainage blanket to be constructed on the downstream face of the existing embankment. Embankment material around the pipe shall be excavated and replaced with additional drainage blanket sand. The excavation shall extend to a minimum depth of 6 inches and at least 12 inches in each direction from the pipe to ensure that the end of the pipe is completely encased within the sand drainage blanket.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02110 – CLEARING, GRUBBING AND TOPSOIL HANDLING

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications consists of providing all labor, materials, services, equipment, and transportation required to complete clearing and grubbing of vegetated areas of the site on which permanent features will be constructed. This includes the new dam's footprint, spillway, and vegetated areas disturbed during the construction of surface water management features, permanent access roads, and sewerline piping.

B. The Work also consists of providing labor, materials, services, equipment, and transportation required to strip topsoil from the areas described above and placement of topsoil as shown on Drawings.

1.2 DEFINITIONS

A. **Clearing**: Clearing shall consist of the cutting and felling of trees to within one (1) foot of ground level and the satisfactory disposal of trees, limbs, rubbish, and other vegetation.

B. **Grubbing**: Grubbing shall consist of the removal and disposal of roots, root mat, stumps, logs, and other objectionable matter which could affect the quality of the subgrade or borrow material as determined by the Engineer. Generally grubbing shall extend to a minimum depth of eighteen (18) inches or as determined by the Engineer and all roots or root mat in excess of one (1) inch diameter shall be removed and disposed of in accordance with the Specifications.

C. **Topsoil**: Topsoil is the upper soil horizon which is characterized by a significant organic content or as determined by the Engineer. Generally topsoil stripping shall extend to a minimum depth of about six (6) to twelve (12) inches or as determined by the Engineer. All organic soils shall be removed and stockpiled in accordance with the Specifications.

1.3 COMPENSATION

Bid Item No. 02110/01 – Clear and Grub

A. MEASUREMENT

1. All Work required for clearing, grubbing, and proper disposal of cleared material within approved areas will be measured for payment to the nearest 0.1 acre. Measurement will be a planimetric projection of areas specified to be cleared. Only the area actually cleared and grubbed, as shown on contract drawings, or as designated by the Engineer, will be measured.

B. PAYMENT

1. The Unit Price for Bid Item 02110/01 shall be full compensation for clearing and grubbing of approved areas that have not been cleared during previous Work at the Site and shall be full compensation for all Work required by this Section. This shall include the proper disposal of such material in accordance with this Section.
2. No separate payment will be made for clearing for areas of haul roads, temporary building and office sites and Contractor work areas including material stockpile and staging areas if such areas are located outside of areas specified to be cleared.

Bid Item No. 02110/02 – Strip and Stockpile Topsoil

A. MEASUREMENT

1. Measurement of the total amount of topsoil stripped and placed in topsoil stockpiles will be calculated by measurement of the stripped area in acres as determined by survey. Depth of topsoil shall be as defined in these specifications or as noted on the drawings, up to a maximum of 12 in. depth.

B. PAYMENT

1. The unit price bid for Bid Item No. 02110/02 shall be full compensation for all excavation, stripping, loading, hauling, dumping, spreading, temporary seeding and incidental work necessary to place topsoil in designated stockpile areas.
2. Payment for topsoil designated as unsuitable material and disposed of offsite will be made under Bid Item No. 02222/01 – Unsuitable Excavation Disposal (Offsite).
3. Payment for topsoil designated as unsuitable material and disposed of onsite will be made under Bid Item No. 02222/02 – Unsuitable Excavation Disposal (Onsite).

Bid Item No. 02110/03 Place Topsoil from Stockpile

A. MEASUREMENT

1. Topsoil removed from stockpile and placed on completed works to a depth of six (6) inches, will be measured by the square yard.
2. Topsoil furnished from other sources and placed on completed works.

B. PAYMENT

1. The unit price bid for Bid Item No. 02110/03 shall be full compensation for furnishing suitable material from stockpile or other sources, hauling, placing, processing, finishing, and dressing on earthfills, reservoir embankments, or in other areas designated by Engineer and in accordance with these Specifications, or as directed by the Engineer.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION

3.1 AREAS TO BE CLEARED AND GRUBBED

A. Perform clearing and grubbing only in specified areas. Clear and grub all areas in which the construction of permanent features is to take place under this contract.

B. Trees and shrubs designated to be left in place, and those outside of construction limits and above normal pool area, shall not be damaged.

3.2 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

A. With the exception of such timber that the Contractor may elect to salvage and remove from the site, all trees, logs, rubbish, stumps, and other combustible debris from the clearing and grubbing operations may be disposed of by burning within the project area if approved by the appropriate authorities. Any organic material remaining after burning shall be either removed to an approved stockpile if it is within the lake area or buried or covered with soil if it is outside the reservoir area. The minimum amount of soil cover, in either case, shall be two (2) feet. Disposal of cleared and grubbed material shall be at locations that will not interfere with subsequent or future construction and must be acceptable to the Engineer.

B. The Contractor shall secure all permits, if required, and abide by all Local and State Laws, if any, regarding open burning. No burning will be permitted between May 1 and October 1. If the Work is performed during this period, the Contractor shall dispose of cleared and grubbed material off-site in accordance with all Local and State Laws.

C. Give Engineer 24 hours notice prior to burning. During burning required to perform Work, prevent accidental fires and fire damage and take fire protection measures necessary to meet requirements of authorities having jurisdiction.

3.3 TOPSOIL STRIPPING

A. Topsoil will need to be stripped from the construction footprint. Excavated topsoil shall be stockpiled in areas specified and designated by the Engineer.

3.4 PLACEMENT OF TOPSOIL

A. At the completion of placing all other materials in the embankments, topsoil shall be placed on the downstream slopes, and other areas that require topsoil, as shown on the Drawings or as directed by the Engineer. The material shall be placed in thin lifts and compacted by a tracked dozer traveling up and down the slopes so that each area is compacted by at least one pass of the tracks.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02220 – EXCAVATION, BACKFILL, FILL AND GRADING FOR STRUCTURES

PART 1: GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary to perform all excavation, foundation preparation, backfill, fill, grading for structures, and finish grading in preparation for landscaping and grassing, required to complete the work shown and specified. The work shall include, but not necessarily be limited to: excavation for structures, footings, all backfilling and fill, and grading for structures; disposal of waste and surplus materials; and all related work such as sheeting, bracing and pumping.

B. Topsoil, if any, excavated under this Section may be salvaged for convenience for use as necessary for landscaping.

1.2 QUALITY ASSURANCE

A. Provide services of a Registered Engineer or Land Surveyor to lay out site.

B. Establish and maintain bench marks on the site for reference. All vertical dimensions shall be checked from these bench marks.

C. Finished grades, as used herein, mean the required final grade elevations indicated on the drawings. Should finished grades shown on spot elevations conflict with those shown by the contours the spot elevations shall govern.

D. Soil moisture during fill placement should be between -1% to +3% of the Standard Proctor of the optimum value determined by ASTM D 698-00 for general area fill structural fill and backfill.

E. All fill areas and areas at grade shall be proof-rolled with a fully loaded tri-axle dump truck or a 20-ton roller to detect any soft areas. Any areas which pump or rut excessively and cannot be densified by continued rolling shall be undercut.

1.3 JOB CONDITIONS

A. Consider the Limits of Work indicated to make determination of the amount of grading. Limit grading to the work as shown and do not disturb the existing terrain or trees outside this work.

B. **Subsurface soil data:**

1. Subsurface investigation has been performed and data is available for reference. However, neither Engineer, nor County assumes responsibility for completeness or accuracy of data contained therein and no claims for extra compensation or extension of time will be considered based on assumptions. Data may be examined in Engineer’s or County's office.
2. Items of historic or archaeological value discovered during earthwork operations shall remain property of the County.

C. Operations shall be suspended if in the opinion of the Engineer conditions are unsatisfactory due to rain, snow, frost, unsatisfactory material or any other unsatisfactory conditions. Any placed fill material which has been damaged by the action of rain, frost, snow or any other detrimental cause shall be removed and replaced with satisfactory material at no additional cost to the County. No fill shall be placed while either material being placed, or surface material already in place, is frozen. After precipitation or thawing, no equipment shall operate upon fill until it has dried sufficiently, so that excessive rutting will not occur.

1.4 PROTECTION

A. Lateral Support of Excavation for Structures:

1. Furnish, put in place, and maintain sheeting and bracing required to support the sides of the excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect streets and utilities from damage due to lateral movement or settlement of ground.

B. Monitoring and Control of Groundwater Level:

1. The Contractor shall frequently monitor the groundwater level during excavation for the structures. Monitoring shall be through the installation and use of temporary piezometers, open auger holes, excavations or such other methods as approved by the Engineer. Contractor shall bear the cost of installation, maintenance and proper abandonment of all temporary piezometers necessary to monitor water levels.
2. Maintain the groundwater level at least three (3) feet below subgrade of the structure until the concrete structures are up high enough to prevent flooding the structure. Support shall be maintained at both bottom and top levels of wall to prevent flotation. After the structure has been completed in its entirety, backfill as described hereinafter, flotation shall be prevented by maintaining a positive and continuous operation of the dewatering system. The responsibility and liability for all damages which may result from failure of this system shall be included in the work of this Section. Disposal of drainage water shall be in an area approved by the County. Precautions shall be taken to prevent the flow or seepage of drainage back into the drainage area. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

1.5 TESTING

A. The Engineer will perform the following testing:

1. Compaction tests in accordance with ASTM D698-00.
2. Field density tests for each 8" loose lift, in accord with ASTM D2937-94 one test for each 5,000 sq. ft. of fill per lift. One test is to be conducted for at least every 500 cubic feet of fill in trenches or restricted area fills.
3. Inspection and testing subgrades and proposed fill materials.

4. Examination of foundation excavations to determine if required soil bearing has been achieved.
5. Examination of excavations to determine that required rock has been removed prior to fill placing and compacting.
6. Verification of unsuitable soil materials to be removed, where classified excavation is indicated.

B. Contractor duties relative to testing include:

1. Provide representative fill soil samples to testing agency for test purposes.
2. Provide 50 lb. of samples of each fill soil to be tested.
3. Advise testing agency sufficiently in advance of operations to allow for completion of quality tests and for assignment of personnel.

C. The responsibility for paying costs of additional testing beyond scope of that required and for re-testing if initial test reveals nonconformance with specified requirements shall be included as part of the work in this Section.

1.6 COMPENSATION

A. No separate or additional payment will be made for structural excavation, structural backfill or structural fill. All costs for structural excavation, structural backfill or structural fill are deemed to be included in the price bid for the individual structure in which the work described by this specification section is incorporated.

Bid Item No. 02220/01 – Working Mat (Lean Concrete)

A. MEASUREMENT

1. Bid Item No. 02220/01 – Working Mat (Lean Concrete) will be measured by the cubic yard. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of material in place as shown in the plans or as specified by the Engineer. Materials placed outside the above limitations will not be measured for payment.

B. PAYMENT

1. The Unit Price bid for Bid Item No. 02220/01 – Working Mat (Lean Concrete) shall be full compensation for furnishing and placement of lean concrete necessary to comply with Sub-article 2.1.D of this technical specification section. Such payment shall be deemed to include all costs for cleaning of rock surfaces, to the satisfaction of the Engineer, to receive the lean concrete mix.
2. No separate or additional payment will be made for furnishing and placement of lean concrete to fill voids created by over-excavation beyond approved lines and grades, or failure to properly protect completed subgrade.

PART 2: PRODUCTS

2.1 MATERIALS

A. Compacted fill which will provide support for building or structure foundations will be referred to as structural fill. Backfill which is placed against the exterior side of the building walls or as fill over pipe lines will be referred to as common fill.

B. Structural Fill:

1. The soil subgrade immediately beneath pavements and floor slabs shall be compacted to at least 98% of the Standard Proctor as determined by ASTM D 698-00 in the upper 18" of fill areas and the upper 12" of cut areas if they become disturbed during construction. Materials for compacted fill shall be gravel, sandy gravel, or gravelly sand free of organic material, loam, wood, trash, and other objectionable material and shall be well graded within the following limits:

SIEVE SIZE	PERCENT FINER BY WEIGHT
6”	100
No. 4	20-95
No. 40	0-60
No. 200	0-8

2. Fill soils shall be non-expansive material with a plasticity index of less than 30, a liquid limit of less than 50 and a maximum dry density (standard proctor ASTM D 698-00) of at least 90 pcf. Soil classifications GM, GC, SW, SP, SM, and SC will be allowed provided they meet the above criteria.

C. **Common Fill:** Mineral soil, substantially free of organic material, loam, wood, trash, or other objectionable material which may be compressible or which cannot be properly compacted. Common fill shall not contain stones larger than six (6) inches in any dimension. Common fill shall not contain broken concrete, masonry, rubble, asphalt pavement or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling.

1. Except as noted in the following paragraph, material used below subgrade within the limits of support of structures shall consist of lean concrete or materials meeting the requirements for structural fill as defined above. Crushed stone of #57 size or finer may be used.
2. Where excavation occurs in rock, the working mat shall consist of a lean concrete placed directly on firm rock after all loose rock has been removed.

D. **Lean Concrete:** Concrete having a minimum 28 day compressive strength (Fc) of 2,500 psi, and in compliance with the requirements of specification Section 03300 sub-article 2.3 (Concrete Fill).

PART 3: EXECUTION

3.1 EXCAVATION BELOW GRADE

A. If the bottom of any excavation is taken out below the limits indicated or specified, it shall be refilled with concrete or maximum six (6) inch thick layers of compacted structural fill.

1. If the subgrade surface is not cared for through failure to postpone final excavation immediately above the subgrade until shortly before placing of the new work thereon, or other failure, or neglect to conduct the excavation work properly so that the surface of the subgrade is in proper condition when ready for construction, remove the unsuitable material and replace it with concrete or compacted structural fill.

3.2 STRUCTURE EXCAVATION AND COMPACTION PROCEDURES

A. Excavation shall be made to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and draining; and the bottom of the excavations shall be rendered firm and dry in all respects.

1. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Subgrade soils which become soft, loose, quick, or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by structural fill.
2. Dewatering shall be such as to prevent boiling or detrimental saturation at the base of the excavation as specified herein. Install such means as required to preserve the stability of the base of the operation.
3. Excavating equipment shall be satisfactory for carrying out the work in accordance with the Specification. In no case shall earth be plowed, scraped, or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade.
4. During final excavation to subgrade level, take whatever precautions are required to prevent disturbance and remolding of the subgrade. Material which has become softened and mixed with water shall be removed. Hand excavation of the final three (3) to six (6) inches will be required as necessary to obtain a satisfactory undisturbed bottom.
5. When excavation for foundations has reached prescribed depths, the Engineer shall be notified, and will inspect conditions.
6. The fill shall be placed in layers having a maximum thickness of eight (8) inches measured before compaction. Each layer of fill shall be compacted to at least 95% of maximum dry density determined by ASTM Compaction Test, Designation D 698-00.
7. Large compaction equipment should operate no closer than five (5) feet from backfilled wall.

3.3 COMPACTION

A. Compaction shall be performed as specified hereinafter for the particular materials and operations.

1. Self-propelled compactors shall make compaction passes at a speed of approximately 5 miles per hour.
2. Areas adjacent to structures, and other areas inaccessible to a roller, shall be compacted with hand operated mechanical compaction equipment. Compaction of the fill by such means shall be to the same degree of compaction as obtained by other approved equipment, and the County may make the necessary tests to determine the amount of compactive effort necessary to obtain equal compaction. Unless such tests indicated that modifications may be made, the fill compacted by mechanical compactors shall be placed in six (6) inch layers and thoroughly tamped over the entire surface. Compaction equipment is subject to approval by the Engineer.
3. Compacted structural fill for structural foundations shall be placed in layers not to exceed eight (8) inch thickness by loose measure and shall be compacted to at least 95% of maximum dry density as determined by ASTM Test Designation D 698-00. The upper one (1) foot of material in fill or at grade areas or cut surfaces should be scarified and compacted to a minimum of 98% of the Standard proctor minimum dry density.
4. The surface of filled areas shall be graded to smooth, true lines, strictly conforming to grades indicated, and no soft spots or uncompacted areas will be allowed in the work.
5. Temporary bracing shall be provided as required during filling and backfilling of all structures to protect partially completed structures against all construction equipment loads, hydraulic pressures and earth pressures.

3.4 BACKFILLING - COMMON FILL

A. Common fill may be used as backfill against the exterior walls of the structures. Material conforming to the requirements of common fill shall be placed in layers having a maximum thickness of eight (8) inches measured before compaction.

B. Common fill shall be compacted to at least 95% of maximum density as determined by ASTM compaction tests, Designation D 698-00.

C. Materials placed in fill areas shall be deposited to the lines and grades shown making due allowance for settlement of the material and for the placing of topsoil thereon.

D. The surfaces of filled areas shall be graded to smooth, true lines, strictly conforming to grades indicated on the paving and grading drawings, and no soft spots or uncompacted areas will be allowed in the work.

E. No compacting shall be done when the material is too wet either from rain or from excess application of water. At such times, work shall be suspended until the previously placed and new materials have dried sufficiently to permit proper compaction.

3.5 EARTH EMBANKMENTS

A. All organic materials, including peat and loam, shall be removed from areas beneath new embankments. If the subgrade slopes are excessive, the subgrade shall be stepped to produce a stable surface for the placement of the embankments. The natural subgrade shall then be compacted by mechanical compaction equipment. The prepared subgrade shall be inspected and approved by the County's Representative prior to the placement of structural fill.

1. Fill shall be placed in layers a maximum of eight (8) inches thick measured before compaction. Each layer shall be compacted to at least 95% of the maximum dry density as determined by the ASTM compaction test, Designation D-698-00.

3.6 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

A. Unsuitable excavated materials and pavement shall become the property of the Contractor and removed and disposed of by him off the project site.

1. Suitable excavated material may be used for fill or backfill if it meets the specifications for common fill and is approved by the Engineer. Excavated material so approved may be neatly stockpiled at the site. If space limitations do not permit stockpiling on the site, the Contractor will be required to make arrangements for off-site stockpiling. Transport of such material from and to the immediate site, including any stockpiling agreements, shall be entirely at the Contractor's expense and shall not constitute grounds for additional payment.
2. Surplus excavated material shall be used to fill depressions or for other purposes as the Engineer may direct; otherwise, it shall become the property of the Contractor and shall be removed and disposed of by the Contractor off the project site.

3.7 GRADING

A. Grading in preparation for placing of topsoil, planting areas, paved walks and drives and appurtenances shall be performed at all places indicated, to the lines, grades, and elevations shown, and shall be performed in such a manner that the requirements for formation of slopes, lines and grades can be followed. All material encountered, of whatever nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, the subgrade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the prosecution or condition of the work.

1. If at the time of grading it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

2. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies or in order to obtain satisfactory construction.
3. Stones or rock fragments larger than four (4) inches in their greatest dimensions will not be permitted in the top six (6) inches of the finished subgrade of all fills or embankments.
4. In cuts, all loose or protruding rocks on the backslopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross section and alignment shown.

3.8 DEFINITION OF ROCK

A. **General Excavation:** Any material which cannot be excavated with a single-tooth ripper drawn by a crawler tractor having a draw bar pull rated at not less than 56,000 pounds (Caterpillar D8K or equivalent) or excavated by a front-end loader with a minimum bucket breakout force of 25,600 pounds (Caterpillar 977 or equivalent).

B. **Trench Excavation:** Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 33,000 pounds (Caterpillar 225B or equivalent).

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02221 – EXCAVATION, BACKFILL, FILL AND GRADING FOR PIPE

PART 1: GENERAL

1.1 SCOPE OF WORK

A. This section includes, except as elsewhere provided, all excavation for piping and associated appurtenances including; foundation preparation, filling, backfilling, grading, disposal of surplus material and restoration of trench surfaces and easements.

B. Furnish and place all sheeting, shoring, bracing, and supports and remove from the excavation all materials that the Engineer may deem unsuitable for backfilling. The bottom of the excavation shall be firm, dry and in all respects acceptable. Deposit pipe bedding, or refill for excavation below grade, directly on the bottom of the trench immediately after excavation has reached the proper depth and before the bottom of the trench has become softened or disturbed by any cause whatever. The length of open trench shall be related closely to the rate of pipe laying. All excavation shall be made in open trenches.

C. All work associated with the installation of underground piping shall conform with the requirements of this Section including but not necessarily limited to: trench excavation, Sheeting and/or shoring, dewatering, pipe installation, backfill, and compaction.

D. The work of this article is further defined to include whatever excavating and backfilling is necessary to install the mechanical work. Coordinate the work with other excavating and backfilling in the same area, including dewatering, and other temporary facilities. Coordinate the work with other work in the same area, including dewatering, and other temporary facilities. Coordinate the work with other work in the same area, including other underground services (existing and new), landscape development, paving, and floor slabs on grade. Coordinate with weather conditions and provide temporary facilities needed for protection and proper performance of excavating and backfilling.

1.2 QUALITY ASSURANCE

A. Work shall be performed by qualified firms with at least three (3) years of successful installation experience.

1.3 COMPENSATION

A. No separate or additional payment will be made for excavation, backfill, fill, bedding or grading for pipe for otherwise complying with the requirements of this specification section. All costs for excavation, backfill, fill and grading for pipe are deemed to be included in the unit or lump sum price bid for the item in which the work of this specification section is incorporated.

PART 2: PRODUCTS

2.1 MATERIALS

A. **General:** Materials for use as fill shall be as described below. For each material, notify the Engineer of the source of the material and furnish, for approval, a representative sample weighing approximately 50 pounds, at least ten calendar days prior to the date of anticipated use of such material. Materials shall be furnished as required from off site sources and hauled to the site. Disposal of unsuitable materials is specified in this Section. See paragraph 3.1.

B. **Common Fill:** Common Fill shall consist of mineral soil, free of organic material, loam, wood, trash, snow, ice, frozen soil and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than six (6) inches in any dimension, broken concrete, masonry, rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling. Material falling within the above specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. Any material, which, in the opinion of the Engineer, is not suitable for reuse, shall be spoiled as specified herein for disposal of unsuitable materials.

C. **Crushed Stone:** Crushed stone shall be used for pipe bedding, manhole bases, as a drainage layer below structures with underdrains and at other locations indicated on the drawings. Crushed stone shall be size No. 57.

D. **Pipe Bedding:** Pipe installed on the project, other than sanitary sewer pipe, shall be bedded in a concrete cradle throughout its entire length. Sanitary sewer pipe shall be bedded in accordance with Section 15140, except where concrete encasement is identified in the Drawings.

PART 3: EXECUTION

3.1 DISPOSAL OF MATERIALS

A. Excavated material shall be stacked without excessive surcharge on the trench bank. Inconvenience to traffic and abutters shall be avoided as much as possible. Excavated material shall be segregated for use in backfilling as specified below.

B. Surplus excavated material, which is suitable for use in backfilling or for replacing rock, and boulders shall be stockpiled. Unsatisfactory surplus material including paving, rock or boulders and other material shall be disposed of in accordance with Specification section 02222.

C. It is expressly understood that no excavated material shall be removed from the site of the work or disposed of by the Contractor except as directed by the Engineer.

D. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored. When required, it shall be re-handled and used in backfilling the trench. No additional compensation will be made for re-handling material.

3.2 SHEETING AND BRACING

A. Furnish, put in place, and maintain sheeting and bracing required to support the sides of the excavation and prevent loss of ground which could damage or delay the work or endanger adjacent structures. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.

3.3 TEST PITS

A. Contact and coordinate with local utilities before excavating test pits for the purpose of locating underground utilities of structures as an aid in establishing the precise location of new work. Test pits shall be backfilled as soon as the desired information has been obtained. The backfilled surface shall be maintained in a satisfactory condition for travel until resurfaced as hereinafter specified.

1. Excavation of test pits shall be considered work incidental to furnishing and laying sewer pipe.
2. If, for any reason, a test pit is left open for any period of time, it shall be barricaded and lighted.

3.4 DRAINAGE

A. Furnish all materials and equipment and perform all incidental work required to install and maintain the drainage system proposed for handling groundwater or surface water encountered. Construction shall not begin until the Engineer is assured that the proposed method will be satisfactory. The requirements for a stable subgrade are indicated above, and the Contractor must alter his drainage methods if the trench bottom is unsatisfactory.

B. Provide pumping equipment and devices to properly remove and dispose of all water entering trench and excavation for structures. The grade shall be maintained acceptably dry until structures to be built therein are completed. All drainage shall be performed without damage to the trench, pavements, pipes or other utilities.

C. Pipe and masonry shall not be laid in water or submerged within 24 hours after being placed. Water shall not flow over new masonry within four days after placement.

1. In no event shall water rise to cause unbalanced pressure on structures until the concrete or mortar has set at least 24 hours. Prevent flotation of the pipe by promptly placing backfill.
2. If underdrains are used for handling water, furnish and install pipe and crushed stone graded from coarse to fine, and furnish and install all pumps and equipment necessary to maintain the water level continuously at the required elevation. Pipe underdrains shall be laid with open joints and bedded in crushed stone for the full width of trench, to a depth of six (6) inches below the invert of underdrain.
3. The invert of underdrain shall be 12" below the normal subgrade. Pipe underdrains shall have no permanent outlet and shall be sealed at the completion of the work. The length of continuous underdrain to be used shall be limited as conditions require. An impervious bulkhead of clay or concrete shall be constructed in the trench bottom between 100 ft. lengths of the underdrainage system to obstruct the free flow of groundwater after construction is completed. For all excavation below normal grade for the purpose of installing underdrains, the crushed stone and underdrain pipe shall be considered a part of the drainage work to be done under the pipe items. Continuously guard against the loss of earth through subbase or the underdrain. Should loss of either take place, alter the stone size to provide a satisfactory barrier or filter.
4. Where other methods of handling water prove inadequate, furnish, install, operate, and remove proper well point facilities.

3.5 TRENCH EXCAVATION (UNCLASSIFIED)

A. Excavation shall be made for all trenches that are required for the installation of pipes and manholes.

B. Make excavations to the depth indicated on the drawings and in such a manner and to such widths as will give suitable room for laying the pipe within the trenches, for bracing and supporting, and for pumping and drainage facilities. Render the bottom of the excavations firm and dry in all respects. Excavations shall be extended to firm residual soils as directed by the Engineer.

C. The trench may be excavated by machinery to, or just below the designated subgrade provided that the material remaining in the bottom of the trench is no more than slightly disturbed.

D. Excavate the bottom of trenches to the required depth to reach firm residual soils as directed by the Engineer or to the minimum depth required for the concrete cradle.

E. Rock, when encountered, shall be removed to a minimum of eight (8") inches clearance around the bottom and sides of the pipe being laid.

3.6 PIPE BEDDING

A. The Contractor shall furnish and install pipe on the type of bedding shown on the drawings and as specified herein.

B. Bedding classes are as defined below and shown on the drawings: One (1) type of bedding is specified: Pipe installed on the project shall be bedded in a concrete cradle for its entire length. Where the trench bottom has been excavated below grade, concrete backfill will be used.

C. Construct the concrete cradle according to the details in the Construction Drawings.

3.7 PIPE INSTALLATION

A. All piping and conduit piping shall be laid accurately to line and grade by the use of lasers, or batter boards (spaced not more than 25' apart), plumb lines, etc. Three consecutive batter boards shall be in place at all times when installing pipe. When necessary, deflect pipe at joints. Deflection shall not exceed manufacturer's recommendations.

B. Prior to making joints all surfaces of pipe joint and jointing materials shall be cleaned and dried. Lubricants, primer, adhesives, etc., shall be used as recommended by the pipe or joint manufacture. Joints shall then be made in approved workmanlike manner to obtain a water-tight joint. Trenches shall be kept free of water during bedding, laying and jointing.

3.8 BACKFILLING

A. As soon as practicable after the pipe has been laid and jointed, backfilling shall begin and thereafter be prosecuted expeditiously.

B. Backfill along the pipe shall be thoroughly compacted by hand-tamping as placed.

C. Any space remaining between the pipe and side of the trench shall be packed full by hand shovel with earth fill, free from stones having a diameter greater than two (2) inches and thoroughly compacted with a tamper as fast as placed up to a level of one (1) foot above the top of the pipe.

D. The filling shall be carried up evenly on both sides with at least one person tamping for each person shoveling material into the trench.

E. Backfill shall be placed in maximum 8" loose lifts to obtain compaction required per Section 3.11 of this specification.

F. The remainder of the trench above the compacted backfill, as just described shall be filled and thoroughly compacted by rolling, ramming, or tamping, to prevent subsequent settling.

G. Backfill around manholes shall be of selected material, and compacted by puddling (compaction of earthfill at a moisture content well above optimum to achieve a watertight bond between the earthfill and the concrete). All backfill shall be compacted, especially under and over pipes connected to the structures. Selected backfill shall be free from stones larger than two (2) inches.

H. Rock fragments shall not be placed until the pipe has at least two (2) feet of earth cover. Small stones and rocks shall be placed in thin layers alternating with earth to insure that all voids are completely filled. Filling shall not be dropped into the trench in a manner to endanger the pipe. Rock fragments used shall not exceed ten (10) pounds.

3.9 FILL PLACEMENT

A. Material placed in fill areas under and around structures shall be deposited within the lines and to the grades shown on the drawings, making due allowance for settlement of the material. Fill shall be placed only on properly prepared surfaces that have been inspected and approved by the Engineer. No fill shall be placed on a frozen surface, nor shall snow, ice, or frozen material of any sort be placed in fill. If sufficient common fill material is not available from excavation on site, provide borrow as may be required. Gravel base course material and crushed stone shall be provided as borrow. Fill shall be brought up to substantial level lifts throughout the site, starting in the deepest portion of the fill. The entire surface of the work shall be maintained free from ruts, and in such condition that construction equipment can readily travel over any section. Fill shall not be placed against concrete structures until they have attained sufficient strength. Fill shall be dumped and spread in layers by a bulldozer or other approved method. During the process of dumping and spreading, all roots shall be removed from the fill areas. If the compacted surface of any layer of material is determined to be too smooth to bond properly with the succeeding layer, it shall be loosened by harrowing or by another approved method before the succeeding layer is placed. All fill materials shall be placed and compacted in a dry condition. De-water excavated areas as required to perform the work and in such a manner as to preserve the undisturbed state of the natural inorganic soils.

B. Operations shall be suspended if in the opinion of the Engineer conditions are unsatisfactory due to rain, snow, frost, unsatisfactory material or any other unsatisfactory conditions. Any placed fill material which has been damaged by the action of rain, frost, snow, or any other detrimental cause shall be removed and replaced with satisfactory material at no additional cost to the County. No fill shall be placed while either material being placed, or surface material already in place, is frozen. After precipitation or thawing, no equipment shall operate upon fill until it has dried sufficiently, so that excessive rutting will not occur.

3.10 COMPACTION

A. Gravel, sand and backfill in trenches shall be placed in layers not to exceed eight (8) inches in depth as measured before compaction. Each layer shall be compacted by a minimum of four (4) coverages with the equipment described below, to at least 95% of maximum dry density as determined by ASTM D1557, Method D. Incidental compaction due to traffic by construction equipment will not be credited toward the required minimum four (4) coverages.

B. Compaction equipment in open areas shall consist of fully loaded ten-wheel dump trucks, tractor bulldozers weighing at least 30,000 pounds and operated at top speed, or by vibratory roller.

C. Areas adjacent to structures and other confined areas inaccessible to the roller or truck shall be compacted with approved hand guided mechanical compaction equipment. Compaction of the fill by such means shall be to the same degree of compaction as obtained by the rubber-tired equipment. Fill compacted by mechanical compactors shall be placed in six (6) inch layers and thoroughly tamped over the entire surface.

D. It is the intention that the fill materials, with respect to moisture, be used in the condition they are excavated insofar as this is practicable. Material which is too wet shall be spread on the fill area and permitted to dry, assisted by harrowing if necessary, until the moisture content is reduced to allowable limits.

E. If the Engineer shall determine that added moisture is required, water shall be applied by sprinkler tanks or other sprinkler systems, which will ensure uniform distribution of the water over the area to be treated, and give complete and accurate control of the amount of water to be used. If too much water is added, the area shall be permitted to dry before compaction is continued.

3.11 GRADING

A. Grading shall be performed at such places as are indicated on the drawings, to the lines, grades, and elevations shown and shall be made in such a manner that the requirements for formation of embankments can be followed. All unacceptable material encountered, of whatever nature within the limits indicated, shall be removed and disposed of as directed. During the process of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the progress or condition of the work.

B. If at the time of excavation it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled in approved areas for later use.

C. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the drawings or in order to obtain satisfactory construction.

D. Stones or rock fragments larger than four (4) inch in their greatest dimensions will not be permitted in the top six (6) inches of the subgrade line of all dikes, fills or embankments.

E. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment on the drawings.

F. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the drawings.

G. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains are plugged at manholes.

3.12 DISPOSAL OF UNSUITABLE SURPLUS MATERIAL

A. Unsuitable and surplus excavated materials and pavement shall be removed and disposed of in accordance with specification Section 02222.

B. Suitable excavated materials may be used for fill or backfill if it meets the Specification for common fill. Excavated material so approved may be neatly stockpiled at the site where designated by the Engineer. If space limitations do not permit stockpiling on the site, make arrangements for offsite stockpiling.

C. Surplus excavated materials may be used to fill depressions or other purposes as the Engineer may direct.

3.13 DISPOSAL AND REPLACING OF ROCK

A. Remove and dispose of all pieces of rock that are not suitable for use in other parts of the work. Rock disposed of by hauling away to spoil area is to be replaced by approved surplus excavation obtained elsewhere on the site, insofar as it is available. Any deficiency in the backfill material shall be made up with acceptable material from outside sources as approved by the Engineer.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02222 – EXCAVATION

PART 1: GENERAL

1.1 SUMMARY

A. The work included in this section of the specifications consists of excavating whatever material is encountered below existing ground surface to the dimension, lines and grades shown on the drawings and/or found in the specifications. Refer to the drawings for existing site conditions.

B. The Work of this Section also consists of the excavation and off-site or on-site disposal of unsuitable materials at a location arranged by the Contractor.

1.2 RELATED SECTIONS

A. 02220 – Excavation, Backfill, Fill and Grading for Structures

B. 02221- Excavation, Backfill, Fill and Grading for Pipe

C. 02224 – Foundation Preparation

1.3 DEFINITIONS

A. All excavation will be designated as Common Excavation or Rock Excavation in accordance with the following definitions:

1. **Common Excavation**: Common Excavation shall consist of and include all grass, sod, earth, clay, sand, silt, gravel, loosely cemented gravel, soft or disintegrated rock, and similar materials that can be removed by hand, heavy ripping equipment, or combined use of wheel tractor scrapers and pusher tractors and shall also include all boulders and loose rock measuring less than one (1) cubic yard in volume.
2. **Rock Excavation:** Rock Excavation shall consist of and include all excavation which cannot be removed by the methods described for common excavation and shall also include all boulders and detached rock measuring one (1) cubic yard or greater in volume. Limited volumes of Rock Excavation are anticipated in the Work.

B. Additional definitions are provided for clarity as follows:

1. **Heavy Ripping Equipment:** Heavy Ripping Equipment shall be defined as a tractor mounted, heavy duty, single-tooth ripping attachment mounted on a tracked bulldozer having a minimum power rating equivalent to a D8M bulldozer (285 net horsepower measured at the flywheel).
2. **Unsuitable Material:** Excavated material that does not materially qualify for use as Earthfill.

1.4 SUBMITTALS

A. The Contractor shall submit in writing, as part of his execution plan, within fifteen (15) days following the Award of Contract, an overall plan showing sequence and excavation methods proposed. Within seven (7) days of receipt of the proposed plan, the Engineer will submit a written approval or rejection of that plan in part or in whole to the Contractor. If approval is withheld, the Contractor shall submit a revised plan within seven (7) days.

1.5 MISCELLANEOUS

A. Excavation associated with the installation of all piping and structures will be considered incidental to the installation of the respective item. Bid prices for installation of those items (i.e. concrete spillway, low level outlet pipe, etc.) should reflect the effort associated with excavation, and appropriate backfill, for that item.

B. Measurement for excavation will be conducted by a surveyor licensed in the State of Georgia and selected by the Contractor with prior approval of the Engineer. The amount determined for payment will be the decision of the Engineer based on the surveyed quantities.

C. The Engineer will determine the required depth and extent of the excavations after examining materials encountered.

1.6 COMPENSATION

Bid Item No. 02222/01 – Unsuitable Excavation Disposal (Offsite)

A. MEASUREMENT

1. Bid Item No. 02222/01 – Unsuitable Excavation Disposal (Offsite) will be measured in bank cubic yards.
2. Cross-sectional surveys will be conducted before and after the excavation of unsuitable material. Individual surveys will be performed for material to be disposed of on-site and off-site.
3. Over-excavation beyond the neat lines and grades authorized by the Engineer and unauthorized excavation will not be measured for payment.

B. PAYMENT

1. The Unit Price bid for Item No. 02222/01 – Unsuitable Excavation Disposal (Offsite) shall be full compensation for excavation, loading, hauling, dumping, spreading, stockpiling and other incidentals necessary to dispose of unsuitable material to a location offsite or otherwise perform the Work of this section.
2. The Unit Price shall include identifying, making all necessary arrangements, and paying all required fees for disposing of material off-site at location(s) identified by Contractor and approved by Engineer.

TECHNICAL SPECIFICATION

SECTION 02222 – EXCAVATION

Bid Item No. 02222/02 – Unsuitable Excavation Disposal (Onsite)

A. MEASUREMENT

1. Bid Item No. 02222/02 – Unsuitable Excavation Disposal (Onsite) will be measured in bank cubic yards.
2. Cross-sectional surveys will be conducted before and after the excavation of unsuitable material. Individual surveys will be performed for material to be disposed of on-site and off-site.
3. Over-excavation beyond the neat lines and grades authorized by the Engineer and unauthorized excavation will not be measured for payment.

B. PAYMENT

1. The Unit Price bid for Item No. 02222/02 – Unsuitable Excavation Disposal (Onsite) shall be full compensation for excavation, loading, hauling, dumping, spreading, stockpiling and other incidentals necessary to dispose of unsuitable material in proposed Treatment Wetland areas to bring these areas to grade or to an onsite area designated by the Engineer.

PART 2: PRODUCTS

2.1 USE OF EXCAVATED MATERIAL

A. To the extent that they are needed, all suitable materials removed from the specified excavations shall be used in the construction of the specified portions of the permanent Works. Engineer will determine the suitability of materials for specific purposes. Contractor shall not waste or otherwise dispose of suitable excavated materials unless directed by the Engineer. Areas for stockpiling suitable material will be designated by the Engineer.

B. Approximately 850 cubic yards of unsuitable material will be disposed of on site to bring proposed Treatment Wetland areas to grade.

PART 3: EXECUTION

3.2 OVEREXCAVATION

A. Unless otherwise authorized by the Engineer, excavation shall not extend below the proposed grades shown on the Drawings. Excavation beyond the limits of these specified elevations shall be corrected by the Contractor filling the resulting voids to the specified contours and elevations with approved compacted earth fill as directed by the Engineer. This Work shall be done at the Contractor's expense.

3.3 GROUNDWATER AND SURFACE WATER CONTROL

A. In the event that groundwater or surface water is encountered in excavation areas, the Contractor shall control the water by the use of well points, drainage ditches, sumps, pumping or any other method acceptable to the Engineer. Control of water shall enable earth fill material to be placed and compacted to the required density and moisture content as specified in Section 02266.

3.3 OPERATING POOL ELEVATION OF IMPOUNDMENT

A. The Contractor shall be responsible for draining the water level in this the impoundment down to elevation 805 ft.-MSL prior to cleaning and grubbing of the downstream slope, replacement of the outlet works, placement of rip rap wave protection, and preliminary fill placement on the downstream face of the embankment.

B. The Contractor shall be responsible for maintaining the water level at elevation 805 ft.-MSL until the replacement of the outlet works has been completed, including construction of the concrete discharge channel, and earth fill on the downstream face of the embankment has progressed beyond elevation 800 ft.-MSL.

C. The Contractor shall comply with all requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit No. GAR1000001.

D. The operating water level of the impoundment shall not be lowered below elevation 805 ft-MSL. It will be the responsibility of the Contractor to provide temporary cotterdams, barriers, etc. as necessary to complete the work.

E. The Contractor shall be responsible for evaluating whether to lower the water level in preparation of heavy precipitation to prevent the water level from exceeding 805 ft-MSL.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02224 – FOUNDATION PREPARATION

PART 1: GENERAL

1.1 SUMMARY

A. The work specified in this section consists of proofrolling subgrades and other areas where pavement and structures will be constructed, replacing unsuitable foundation fill and/or providing foundation treatment for the proper support of the structure to be placed above it. Foundation treatment may consist of any of the following:

1. Proofrolling compacting
2. Replacing unsuitable fill with compacted fill or lean concrete mix.

1.2 DEFINITIONS

A. **Subgrade**: Subgrade is the material at the elevation of ground which will accommodate the indicated construction.

B. **Structure Excavation**: This is the removing and transporting of material from within pay limits indicated in the Drawings, regardless of the material's nature and size and regardless of the method by which removed and transported, to accommodate structures.

C. **Structural Fill**: Structural Fill is that earthen material, which will be placed against precast and cast-in-place concrete and that placed earthen material on which structures will be founded.

D. **Unsuitable material**: Unsuitable Material is earthen material beyond the limits of excavation defined on the drawings for finish grade and subgrade where determined by the Engineer to be incapable of bearing embankment and a backfill, and unfit to be finished grade and subgrade on which structure foundation, piping, conduits, and pavements will be placed

1.3 COMPENSATION

A. MEASUREMENT

1. The work required for this section of the Specifications will not be measured for payment.

B. PAYMENT

1. No separate payment shall be made for the Work necessary to comply with the requirements of this specification section. All costs to comply with the various bid items to which requirements of this specification section shall be deemed to be included in the unit or lump sum prices bid for the various bid items to which these requirements apply.
2. The Work of this specification section applies include, but are not limited to, 02220/01, 02222/01-02, 02230/01-02, 02235/01-06, 02266/01of the Unit Price Schedule.

TECHNICAL SPECIFICATION

SECTION 02224 – FOUNDATION PREPARATION

PART 2: PRODUCTS

2.1 GENERAL

A. Refer to Sections 02220, 02221, 02222, 02230, 02235 and 02266 for specifications regarding earth fill materials.

PART 3: EXECUTION

3.1 SUBGRADE PREPARATION

A. On subgrade and existing ground on which embankment fill will be placed:

1. Proofroll subgrade with roller described in GDOT SSCRB Article 221.02 in presence of the Engineer. Proofroll within limits indicated by the Engineer with two passes of the roller loaded to weigh 35 tons at the approximate finished grade elevation (+ 0.5 feet). Travel at a speed of two to five miles per hour during all passes. Fill depressions, resulting from proofrolling, with specified fill material, compact fill, and proofroll areas thus filled.
2. Remove subgrade material and any unsuitable material to a depth which the Engineer determines to be unsuitable to bear fill; place fill conforming to Section 02266 of this Section, and proofroll that fill.

B. Subgrade on which structures and Structural Fill will be placed:

1. If subgrade material has been disturbed, either compact subgrade to 100 percent of maximum dry density, when tested in accordance with ASTM D698, or remove and replace material with structure backfill.
2. If either structure or structure backfill is indicated to be placed on subgrade, and subgrade has been undercut to an elevation lower than that indicated, fill undercut space with structure backfill and compact backfill to 100 percent of maximum dry density, when tested in accordance with ASTM D698, and to a dry density of not less than 95 pounds per cubic foot.

C. Subgrade on which pipes and conduits will be placed:

1. This section refers to pipes and conduits placed outside the embankment and not those that penetrate the embankment fills. Note: all pipes that penetrate the embankment fills will be encased in concrete.
2. Adjust trench bottom to line and grade by either scraping away soil or placing pipe bedding. Bed pipe and conduit to line and grade on shaped trench.
3. Smooth bottom of trench; remove rock which would be within eight inches of pipe and conduit. Fill undercut space with pipe bedding, and shave and compact bedding to bottom of pipe and conduit elevation.
4. If, in opinion of Engineer, material at trench bottom is unsuitable to bear pipe and conduit, remove that unsuitable material and fill undercut space with bedding. Shape and compact bedding to bottom of pipe and conduit elevation.

5. Cut recess in bottom of trench for pipe bell in a manner which will ensure that pipe barrel will rest on trench bottom.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02230 – RIP RAP

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications shall consist of the supply and installation of loose rock rip rap for lake embankments, culvert outlets, surface water channels, plunge pools or as specified by the Engineer. Rip rap material and its installation shall meet the requirements of Article 805 of the Georgia DOT Standard Specifications for Road and Bridge Construction.

1.2 DEFINITIONS

A. **Rip Rap**: Rip rap shall be sound and durable broken gneiss, schist, granite or other acceptable material weighing at least 150 lbs. per cubic foot. The material shall be resistant to the action of air and water, and in all other respects suitable for use as rip rap. Materials not meeting these requirements shall not be used unless approved by petrographic analysis. Flat, slabby and shaley pieces are not acceptable.

1.3 COMPENSATION

Bid Item No. 02230/01 Rip Rap (Type 1)

A. MEASUREMENT

1. Bid Item No. 02230/01 – Rip Rap (Type 1) will be measured by the ton in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of rip rap placement as shown in the plans or as specified by the Engineer. Materials placed beyond the limits shown in the plans or as directed by the Engineer will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02230/01 – Rip Rap (Type 1) shall be full compensation for furnishing, placing, stockpiling, handling and incidentals necessary to place Type 1 rip rap and otherwise comply with the requirements of this specification section.

Bid Item No. 02230/02 Rip Rap (Type 3)

A. MEASUREMENT

1. Bid Item No. 02230/02 – Rip Rap (Type 3) will be measured by the ton in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of rip rap placement as shown in the plans or as specified by the Engineer. Materials placed beyond the limits shown in the plans or as directed by the Engineer will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02230/02 – Rip Rap (Type 3) shall be full compensation for furnishing, placing, stockpiling, handling and incidentals necessary to place Type 3 rip rap and otherwise comply with the requirements of this specification section.

Bid Item No. 02230/03 – Geotextile Under Rip Rap

A. MEASUREMENT

1. Bid Item No. 02230/03 – Geotextile Under Rip Rap will be measured by the square yard, in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of geotextile placement as shown in the plans or as directed by the Engineer.
2. Overlaps, wastage, material placed in anchor trenches or placed beyond the limits shown in the plans or beyond the limits directed by the Engineer will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02230/03 – Geotextile Under Rip Rap shall be full compensation for furnishing and installing, handling, proper storage of the specified geotextile under rip rap of any type.

Bid Item No. 02230/04 – Graded Aggregate Base (GAB) Under Riprap

A. MEASUREMENT

1. Bid Item No. 02230/04 – GAB Under Riprap will be measured by the ton in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of GAB placement as shown in the plans or as specified by the Engineer. Materials placed beyond the limits shown in the plans or as directed by the Engineer will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02230/04 – GAB Under Riprap shall be full compensation for furnishing, placing, stockpiling, handling and incidentals necessary to place GAB and otherwise comply with the requirements of this specification section.

1.4 MISCELLANEOUS

A. Before placement of rip rap commences and after surfaces to receive such material have been prepared as specified, a surveyor will take and record longitudinal sections and cross-sections to determine form and elevations of ground surfaces. A further series of sections will be taken at appropriate times to record extent and depth of GAB and rip rap.

B. Sections may be checked at that time by Engineer and mutually agreed between Contractor and Engineer and shall not thereafter be subject to dispute. Such sections will be used to check compliance with this Section of the Specifications and as basis for measurement of rip rap and geotextile materials.

PART 2: PRODUCTS

2.1 RIP RAP

A. Stone for rip rap shall be processed in such a manner as to produce a quarry-run material including rock fines which will meet the gradation for the following two types:

1. **Type 1**: For severe drainage conditions or moderate wave action: The largest pieces of material shall have a maximum approximate volume of two cubic feet. At least 35% of the mass shall be comprised of pieces which weight 125 pounds or more.
2. **Type 3**: For general use or normal drainage conditions: The largest pieces of material shall have a maximum approximate volume of one cubic foot. At least 35% of the mass shall be comprised of pieces which weight 15 pounds or more.

B. The remainder of Types 1 or 3 shall be well-graded down to the finest sizes. Rock fines shall comprise a maximum of 10% of the total mass. Rock fines are defined as material passing a No. 4 sieve.

C. Sound concrete may be substituted for stone, if it is broken into the sizes here specified.

D. A geotextile filter fabric shall be placed under all rip rap. GAB shall be placed under riprap where specified in the Plans.

2.2 GEOTEXTILE

A. The geotextile shall be of, non-woven, needle-punched construction meeting the applicable requirements of Division 02235 of the Technical Specifications.

2.3 GAB

A. Use GAB material of a uniform quality. GAB shall be obtained from an approved source or deposit that will yield a satisfactory mixture meeting all requirements of this Specification.

B. GAB gradation shall be as follows:

Sieve Size	Percent Passing By Weight
2 in (50 mm)	100
1-1/2 in (37.5 mm)	97-100
3/4 in (19.0 mm)	60-95
No. 10 (2 mm)	25-50
No. 60 (250 µm)	10-35
No. 200 (75 µm)	7-15

PART 3: EXECUTION

3.1 GENERAL

A. Areas to be rip rapped shall be trimmed and dressed to conform to cross-sections as shown on the Drawings or as directed by the Engineer. Areas not in conformance with the cross-sections shall be brought to grade by filling with approved material and compacted.

B. The Contractor shall use filter fabric placed according to manufacturer's recommended procedures as a liner for rip rap. Stone for rip rap shall be placed on prepared filter fabric, in such a manner as to produce a well-graded mass of rock with minimum practicable percentages of voids and constructed within specified tolerance to lines and grades indicated on Drawings or as directed by the Engineer.

3.2 SUBGRADE PREPARATION

A. The subgrade surfaces on which the rip rap is to be placed shall be cut or filled and graded to the lines and grades shown on the Drawings. When fill is required to achieve subgrade lines, it shall consist of approved materials and shall conform to the requirements of the specified class of fill.

B. Rip rap shall not be placed until the foundation preparation is completed and the subgrade surfaces have been inspected and approved by the Engineer.

3.3 GEOTEXTILE PLACEMENT

A. The geotextile shall be placed in accordance with all pertinent manufacturers' installation instructions. Successive geotextile sheets shall be overlapped in such a manner that the upstream sheet is placed over the downstream sheet and/or upslope over downslope. The sheets shall also be arranged to minimize the number of separate pieces of fabric required.

B. Geotextile seams shall be overlapped a minimum of eighteen (18) inches.

C. A geotextile patch shall be placed over any damaged areas and shall extend a minimum of three (3) feet beyond the perimeter of the damaged area.

3.4 GAB PLACEMENT

A. GAB shall be placed to full course thickness in one operation and in such a manner as to avoid displacing geotextile.

B. The GAB shall be placed in a careful, controlled manner in such a way as to avoid damaging the underlying filter fabric. GAB shall not be dropped onto the geotextile from a height of more than one (1) foot. If the filter fabric is damaged it shall be replaced by the Contractor at no cost to the County.

3.5 PLACEMENT OF RIP RAP

A. Rip rap shall be placed to full course thickness in one operation and in such a manner as to avoid displacing geotextile or GAB. Placing rip rap in layers or by methods likely to cause segregation of various sizes shall not be permitted. Desired distribution of various sizes of stones throughout rip rap shall be obtained by selective loading of material at stockpile; by controlling dumping of successive loads during final placing; or by any other approved methods designed to produce specified results. Rearrangements of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain a well graded distribution of stone sizes.

B. The rip rap shall be placed in a careful, controlled manner in such a way as to avoid damaging the underlying filter fabric or GAB. Rip rap shall not be dropped onto the geotextile or GAB from a height of more than one (1) foot. If the filter fabric is damaged it shall be replaced by the Contractor at no cost to the County.

3.6 TESTING

A. Engineer may perform such tests as he deems necessary to verify that the rip rap and geotextile materials and the completed Work meet the requirements of this Specification. These tests are not intended to provide the Contractor with the information he needs to assure that the materials and workmanship meet the requirements of this Specification, and their performance will not relieve the Contractor of the responsibility of performing his own tests for that purpose.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02235 – DRAIN AND FILTER MATERIALS

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications comprises supply of all labor, materials and equipment and performance of all Work necessary for furnishing, placing and compacting the fine aggregate material required in the construction of the blanket, toe, and cut-off drains and the main drainage outlets as shown in the Drawings.

B. Also included is the supply of all labor, materials and equipment and performance of all Work necessary for placing geotextile and drain pipes within specified portions of the Work.

1.2 DEFINITIONS

A. **Drain and Filter Materials**: Drain and filter materials means fine grained aggregate which consists of freely draining natural sand, gravel or crushed stone.

B. **Geotextile Fabric**: Geotextile fabric means a non-woven, needle punched synthetic geotextile which is placed as a separator between native soils, earth fill or rock fill and drain and filter materials, roadway base material or rip rap.

1.3 REFERENCES

A. Publications listed below form part of this Specification to the extent specified in this Section:

American Society for Testing and Materials (ASTM):

D 442-63 (98)	Standard Method for Particle-Size Analysis of Soils
D 698-91 (98)	Standard Test Method for Moisture-Density Relations of Soils Using 2.5 kg Rammer and 304.8 mm Drop.
D 1140 (97)	Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve
D 4253-93	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
D 4254-91	Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
D 1556-90 (96)	Standard Test Method for Density of Soil in Place by the Sand Cone Method
D 2922 (96e1)	Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

D 2434-68 (94e1) Standard Test Method for Permeability of Granular Soil (Constant Head)

1.4 SUBMITTALS

A. The Contractor shall submit test data and samples of the filter and drainage materials for approval prior to the delivery of such material to the work site. Unless otherwise specified, all such samples shall be obtained and delivered by the Contractor to a point designated by the Engineer at least thirty (30) days prior to placing the material in the various zones of the embankment.

B. The Contractor shall submit his proposed methods for placing all types of drain and filter materials to the Engineer for approval.

1.5 COMPENSATION

A. General Measurement Procedures

1. Before placement of drainage and filter material commences, and after surfaces to receive such material have been prepared as specified, a surveyor licensed in the State of Georgia and selected by the Contractor with prior approval of the Engineer will take and record longitudinal sections and cross-sections to determine form and elevations of ground surfaces. A further series of sections will be taken at appropriate times to record extent and depth of drain and filter materials.
2. Sections may be checked at that time by Engineer and mutually agreed upon between Contractor and Engineer and shall not thereafter be subject to dispute. Such sections will be used to check compliance with this Section of the Specifications and as basis for measurement of drainage and filter materials.
3. Where the Engineer directs placement of drain or filter materials outside the lines and grades to replace unsuitable foundation material, the volume of such fill will be measured for payment, but only to the extent that the unsuitable condition is not a result of the Contractor’s improper construction operations as determined by the Engineer.

TECHNICAL SPECIFICATION

SECTION 02235 – DRAIN AND FILTER MATERIALS

Bid Item No. 02235/01 – GDOT No. 10 Sand

A. MEASUREMENT

1. Bid Item No. 02235/01 – GDOT No. 10 Sand will be measured by the ton, in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of compacted material in place as shown in the plans or as specified by the Engineer. Materials placed outside the above limitations will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02235/01 – GDOT No. 10 Sand shall be full compensation for furnishing and placing GDOT No. 10 Sand in cut-off and blanket drains. Such payment shall be deemed to include all costs for furnishing, stockpiling, loading, unloading, hauling, handling, placing and compacting as required.

Bid Item No. 02235/02 – GDOT No. 89 Stone

A. MEASUREMENT

1. Bid Item No. 02235/02 – GDOT No. 89 Stone will be measured by the ton, in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of compacted material in place as shown in the plans or as specified by the Engineer. Materials placed outside the above limitations will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02235/02 – GDOT No. 89 Stone shall be full compensation for furnishing and placing GDOT No. 89 Stone in longitudinal, blanket and outlet drains. Such payment shall be deemed to include all costs for furnishing, stockpiling, loading, unloading, hauling, handling, placing and compacting as required.

Bid Item No. 02235/03 – GDOT No. 4 Stone

A. MEASUREMENT

1. Bid Item No. 02235/03 – GDOT No. 4 Stone will be measured by the ton in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of compacted material in place as shown in the plans or as specified by the Engineer. Materials placed outside the above limitations will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02235/03 – GDOT No. 4 Stone shall be full compensation for furnishing and placing GDOT No. 4 Stone in toe and outlet drains. Such payment shall be deemed to include all costs for furnishing, stockpiling, loading, unloading, hauling, handling, placing and compacting as required.

TECHNICAL SPECIFICATION

SECTION 02235 – DRAIN AND FILTER MATERIALS

Bid Item No. 02235/04 - Geotextile for Drains

A. MEASUREMENT
   1. Bid Item No. 02235/04 – Geotextile for Drains will be measured by the square yard, in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of depth and length shall be confined to such dimensions of geotextile placement as shown in the plans or as directed by the Engineer.
   2. Overlaps, wastage, material placed in anchor trenches or placed beyond the limits shown in the plans or beyond the limits directed by the Engineer will not be measured for payment.

B. PAYMENT
   1. The unit price bid for Bid Item No. 02235/04 – Geotextile for Drains shall be full compensation for furnishing, installing, handling and proper storage of the specified geotextile or drainage material in reservoir embankment.

Bid Item No. 02235/05 – PVC Pipe (Solid – Schedule 80 – 6” Diameter)

A. MEASUREMENT
   1. Bid Item No. 02235/05 – PVC Pipe (Solid – Schedule 80 – 6” Diameter) shalll be measured by the linear foot along the centerline of the pipe actually installed. Wyes, tees, bends, joints and other fittings will not be measured separately, but will be included in the linear measurement of the pipe.

B. PAYMENT
   1. The unit price bid for Bid Item No. 02235/05 – PVC Pipe (Solid – Schedule 80 – 6” Diameter) shall be full compensation for the item. Such payment shall be deemed to included excavation, furnishing and hauling of all materials, installation, cutting of pipe where necessary, repair or replacement of damaged sections, all necessary connections, providing temporary drainage and for joining and extension to an existing structure where required. Such payment shall also be full compensation for removal, disposal or use of all excavated material as directed by the Engineer.

   2. Such price shall also be deemed to include incidental items such as animal guards and protective markers.

Bid Item No. 02235/06 – PVC Pipe (Perforated – Schedule 80 – 6" Diameter)

A. MEASUREMENT
   1. Bid Item No. 02235/06 – PVC Pipe (Perforated – Schedule 80 – 6" Diameter) will be measured by the linear foot along the centerline of the pipe actually installed. Wyes, tees, bends, joints and other fittings will not be measured separately, but will be included in the linear measurement of the pipe.

B. PAYMENT
   1. The unit price bid for Bid Item No. 02235/06 – PVC Pipe (Perforated – Schedule 80 – 6" Diameter) shall be full compensation for the item. Such payment shall be deemed to included excavation, furnishing and hauling of all materials, installation, cutting of pipe where necessary, repair or replacement of damaged sections, all necessary connections, providing temporary drainage and for joining and extension to an existing structure where required. Such payment shall also be full compensation for removal, disposal or use of all excavated material as directed by the Engineer.
   2. Such price shall also be deemed to include incidental items such as animal guards and protective markers.

PART 2: PRODUCTS

2.1 DRAIN AND FILTER MATERIALS

A. Drain and filter materials shall consist of sand, sandy gravel or crushed rock. Sand and sandy gravel shall consist of clean, sound mineral particles free from any roots, topsoil or other debris. Crushed stone shall consist of broken fragments of approved strong, hard, durable, dense rock free from cracks and seams. The sand and crushed hard rock particles to be used in the filters and drains shall be hard, strong and dense and shall not weather, deteriorate or become cemented over the life of the project.

B. For the purposes of this Specification, drain and filter materials shall be classified as follows:

GDOT No. 10 Sand: The material shall be imported, clean, hard, granular, durable, natural material or crushed rock free of organics which meets the Georgia D.O.T. Specification for No. 10 sand. This material shall be well graded within the following limits:

Sieve Size	Percent Passing by Weight
3/8 inch	100
#4	95-100
#16	45-95
#50	8-30
#100	1-10
#200	0-3

In addition to being within the gradation limits specified above, the material shall satisfy the following criteria:

- The material shall be free draining and shall have a permeability greater than 1.2 x 10^{-3} cm/sec., as measured by ASTM D 2434-68.
- The material shall be of a type that does not segregate and shall have a coefficient of uniformity ($C_u=D_{60}/D_{10}$) less than 5, as measured by ASTM D422-90.
- The material shall be a "collapsing soil" in that it shall have no measurable cohesion and shall not be capable of sustaining a crack. The material shall pass the "sand castle test," which involves filling a 4 inch deep, steep sided truncated cone container (similar to a beach sand castle bucket) with moist material. The container is then inverted into a 2 inch deep tray and the container removed so that a "sand castle" is left standing. The tray is then flooded. The material passes the test if the sand castle collapses immediately after or during flooding.

GDOT No. 89 Stone: The material shall be imported, clean, hard, granular material or crushed rock free of organics which meets the Georgia DOT Specification for No. 89 crushed stone and have a permeability greater than 4.7 cm/s, as measured by ASTM D 2434-68. This material shall be well graded within the following limits:

Sieve Size	Percent Passing by Weight
1/2 inch	100
3/8 inch	90-100
#4	20-55
#8	0-15
#16	0-10
#50	0-5

GDOT No. 4 Stone: The material shall be free draining and shall have a permeability greater than 35 cm/sec, as measured by ASTM D 2434-68 (94e1). The material shall be imported, clean, hard, durable, granular material or crushed rock free of organics which meets Georgia DOT Specifications for No. 4 crushed stone. The material shall be well graded within the following limits:

Sieve Size	Percent Passing by Weight
2 inch	100
1-1/2 inch	90-100
1 inch	20-55
3/4 inch	0-15
3/8 inch	0-5

Drain Pipes: Drain pipes within the embankment drains shall be six (6) inches in diameter Schedule 80 PVC pipes with 3/8-inch diameter holes at six (6) inch spacings along the pipe as shown on the Drawings.

Geotextile: The geotextile filter fabric shall be on a non-woven synthetic geotextile . The minimum required properties of the fabric are as follows:

PROPERTY	TEST PROCEDURE	MINIMUM PHYSICAL PROPERTIES
Weight, oz/sq yd	ASTM D 3376-88 (94)	10
Thickness, mils	ASTM D 1777 (96)	125
Tensile strength, lbs	ASTM D 5035 (95)	305
Elongation, %	ASTM D 5034 (95)	60
Puncture, Strength, lbs	ASTM D 751 (98)	130
Coefficient of Permeability, cm/sec	ASTM D 4491 (96)	0.34
Flow Rate, gal/ft^2/min	ASTM D 4491 (96)	80
Permittivity, sec^{-1}	ASTM D 4491 96)	1.07
AOS, Sieve Size	ASTM D 4751 (95)	70
Abrasion Resistance, lbs	ASTM D 3884 (92) Taber Test (1000 revolutions, 1 kg load wheel)	190
Trapezoidal Tear Strength, lbs	ASTM D 4533 (91)	100

PART 3: EXECUTION

3.1 FOUNDATION PREPARATION

A. The foundation area for the drainage and filter materials shall be shaped and dressed to the lines and grades shown on the Drawings. The foundation surfaces and trenches shall be maintained free of standing water during placement of materials. Foundation preparation shall conform to Section 02224 of the Technical Specifications.

3.2 PLACEMENT OF DRAINAGE AND FILTER MATERIALS

A. The drainage and filter materials shall not be placed until the subgrade has been inspected and approved by the Engineer.

B. The drain and filter materials shall be placed to the lines and grades shown on the Drawings or as directed by the Engineer.

C. Trench drains shall be backfilled with the required filter material immediately after excavation to avoid collapse of the trench sides.

D. The materials shall be placed in such a manner as to avoid the segregation of particle sizes within the filter and to avoid mixing the filter materials with the foundation materials. Any damage to the surface of the foundation area during placement of the filter shall be repaired before proceeding with the Work. The filter and drain materials shall be spread in horizontal layers of uniform thickness by backhoe or other approved means.

E. The filter materials shall be placed in horizontal layers not exceeding 12 inches in depth.

F. The upper surface of drains constructed concurrently with adjacent zones of compacted earth fill shall be maintained at an elevation of at least one (1) foot above the upper surface of the adjacent fill.

G. There are a number of possible methods of placing the blanket drain and outlet drains. The method used by the Contractor shall be acceptable to the Engineer. The method of placement used shall prevent contamination of the drain, filter and adjacent fill materials, ensure continuity of the drains and ensure that the minimum thicknesses and sizes shown on the Drawings are achieved at all locations.

H. Traffic will not be allowed to cross over the drains at random. Equipment cross-overs shall be maintained at an elevation at least one (1) foot above the upper surface of the adjacent fill. The number of equipment cross overs and location of such shall be established and approved by the Engineer.

3.3 COMPACTION

A. Each layer of drain and filter material shall be thicker than six (6) inches. If compaction is necessary compact by means of approved power tampers to a dry density of 70 percent of its relative density as determined by ASTM D 4253-93 and ASTM D 4254-91.

3.4 DRAINAGE PIPES

A. Pipes within the outlet drains shall be placed on a minimum three (3) inch bedding layer of Georgia DOT. No. 89 or No. 4 stone.

B. Pipe joints and connections shall be glued together with appropriate PVC cement and allowed to set up prior to backfilling.

C. At the discharge point of pipes, place rip rap as detailed in the plans.

3.5 GEOTEXTILE FABRIC

A. A geotextile filter fabric shall be placed above the blanket, toe and outlet drains, on the upstream face of the embankment and beneath road base materials as shown on the Drawings or as directed by the Engineer to prevent contamination of the drainage and filter materials, base course and rip rap.

B. The geotextile should be placed according to manufacturer’s recommendations and in such a manner to minimize the number of separate pieces of fabric required. At all locations where fabric edges meet, the edges shall overlap by a minimum of eighteen (18) inches unless the manufacturer recommends a greater overlap. Care should be taken during placement of subsequent drain layers or earth fill layers that the fabric does not puncture, tear or become damaged in any way.

3.6 FIELD QUALITY CONTROL

A. Final acceptance of drain and filter materials will only be made after materials have been dumped, spread and compacted in place. Rejection by Engineer may be made at source, transporting vehicle, or in place. Contractor shall cooperate with Engineer to ensure that only acceptable drain and filter materials will be hauled from source to Work.

B. Engineer will perform tests at random intervals to determine if drain and filter materials meet requirements of this Section of the Specifications. Tests will be carried out at County's expense and test data will be made available to the Contractor.

3.7 ANIMAL GUARDS

A. Provide animal guards at outlet ends of pipes as detailed on plan Sheet C-12.

3.8 PROTECTIVE MARKERS

A. Provide posts with reflective markers at outlet ends of pipes and headwalls as detailed on plan Sheet C-18.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02266 – EARTH FILL

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications comprises supply of all labor, materials and equipment, and performance of all Work necessary for developing a borrow source, and excavating, processing, moisture conditioning, loading, transporting, unloading, spreading, and compacting earth fill for construction of the embankment. The Work shall also include the above items related to using embankment material supplied by the Owner and stockpiled at the site.

1.2 DEFINITIONS

A. **Earth Fill**: Earth fill means soil-like fill material that shall be placed and compacted in the embankment and other portions of the site to achieve design grades. Borrow areas shall be approved by the Engineer and the material shall be approved by the Engineer prior to placing fill in the designated areas.

1.3 REFERENCES

A. Publications listed below form part of this Specification to the extent specified in this Section:

American Society for Testing and Materials (ASTM):

D 422-63 (98)	Standard Method for Particle-Size Analysis of Soils.
D 698-91 (98)	Standard Test Method for Moisture-Density Relations of Soils Using 2.5 kg Rammer and 304.8 mm Drop.
D 1140-97	Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve.
D 1556-90 (96)	Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
D 1557-91 (98)	Standard Test Method for Moisture-Density Relations of Soils Using 4.5 Kg Rammer and 457 mm Drop.
D 2922 (96e1)	Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
D 3017 (96e1)	Standard Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
D 2937-94	Standard Test Method for Density of Soil in Place by the Drive and Cylinder Method

D 4643-87	Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Method
D 5080-90	Standard Test Method for Rapid Determination of Percent Compaction

1.4 SUBMITTALS

A. The Contractor shall submit to the Engineer, in writing, not more than fifteen (15) days after the Execution of Agreement, an overall plan (Borrow Area Development Plan) showing sources of borrow material and sequence of embankment construction. The Plan must clearly show how the Contractor will supply suitable fill material for completion of the project and shall laboratory test data to demonstrate that it meets the requirements of these Specifications. At monthly intervals, throughout the construction of the embankment, the Contractor shall submit updated versions of the Plan that are satisfactory to the Engineer.

B. Before placement of earth fill commences, and after surface to receive such material has been prepared as specified, a survey will be taken to record longitudinal sections and cross-sections to determine form and elevations of ground surface. A further series of sections will be taken for each payment application to record extent and depth of fill. Cross sections along the embankments shall be taken at sufficient intervals to provide sufficient detail for accurate earth fill measurements and shall be taken at no more than 50-foot spacing. All such sections may be checked at that time by Engineer and mutually agreed between Contractor and Engineer and shall not thereafter be subject to dispute. Such sections will be used to check compliance with this Division of the Specification and as basis for measurement of earth fill.

1.5 COMPENSATION

Bid Item No. 02266/01 – Earthfill

A. MEASUREMENT

1. Bid Item No. 02266/01 – Earthfill will be measured by the cubic yard, compacted in place and accepted by the Engineer. Lateral measurements shall be confined to an area bounded by the neat line planes shown in the plans. Measurements of cross sectional area shall be confined to such dimensions of fill placement as shown in the plans or in areas of fill placement as directed by the Engineer. Materials placed beyond the limits shown in the plans or as directed by the Engineer will not be measured for payment. Earth fill volume shall be computed to the nearest cubic yard by the method of average cross sectional end areas. No deductions in volume will be made for minor structures such as monitoring wells and piezometers, or piping 36” or less in diameter. The volume occupied by major structures such as spillways, large diameter pipe or concrete structures, will be deducted from the quantity of Earth Fill to be paid. The volume of material paid elsewhere in the Unit Price Schedule will not be measured for payment under this bid item.

B. PAYMENT

1. The Unit Price bid for Bid Item No. 02266/01 – Earth fill shall be full compensation for excavation, placement, and compaction of fill material obtained from off-site borrow sources and placed in permanent earthfills associated with the embankment, test fills, and other site features. Such compensation shall be deemed to include all costs for borrow area development, laboratory testing, excavation, loading, hauling, unloading, handling, temporary stockpiling, scarifying, moisture conditioning, spreading, compacting, fine grading and other incidentals necessary to comply with the Work of this section.
2. No separate or additional payment will be made for excavation of material used for earth fill from off-site borrow areas.
3. No separate or additional payment will be made for double handling material or for stockpiling material used for earth fill.
4. No additional payment will be made due to settlement of the embankment foundation or fill material within the embankment. All allowances for settlement shall be included in the unit cost for this bid item.
5. No separate or additional payment will be made for constructing test fills as required by this Section.

PART 2: PRODUCTS

2.1 MATERIALS

A. All earth fill materials shall be obtained from Contractor supplied borrow areas, required excavations, or material provided by the Owner and stockpiled onsite, as directed by the Engineer. The selection, blending, routing, and disposition of materials in the various fills shall be subject to approval by the Engineer.

B. Earth fill materials shall contain no excessive amounts of micaceous minerals, and no sod, brush, roots or other perishable and unsuitable materials and the type of materials used as earth fill shall be as described in the Specifications and Drawings. Excavated material that is suitable for earth fill with the exception that it contains tree roots and limbs shall be used as earth fill and the Contractor shall be responsible for removing all tree roots and limbs to the satisfaction of the Engineer at no additional cost to the County.

C. Earth fill materials shall not contain stones larger than six (6) inches in any dimension, broken concrete, masonry, rubble or other similar materials. Excavated material that is suitable for earth fill with the exception that it contains less than 10% of particles larger than six (6) inches shall be used as earth fill and the Contractor shall be responsible for removing the oversized particles to the satisfaction of the Engineer at no additional cost to the County.

D. Dispersive soils shall not be used as earth fill material.

E. Highly micaceous soils shall not be used as earth fill material: No material with a standard Proctor maximum dry density (ASTM D 698) of less than 90 lbs/ft^3 shall be used as earth fill.

F. Earth fill material shall consist of residual sandy and clayey silts and silty sands. Earth fill material shall be a ML, SM, CL or SC material based on the United Soil Classification System.

PART 3: EXECUTION

3.1 FIELD COMPACTION TEST FILLS

A. As soon as practicable after borrow areas become exploitable, perform tests to ascertain compactive effort required for compaction of rolled earth fill. At a minimum, one test fill shall be constructed for each borrow area. Locate test sections for performance of these tests in the borrow areas, stockpile area or any other area approved by the Engineer. If performed in the permanent Work, materials shall remain in place at the discretion of the Engineer. If tests are not performed in permanent Work, materials may be excavated for use in Work with approval of the Engineer.

B. Test fills shall be staked out and constructed by Contractor to lines, grades and cross-sections as directed by the Engineer. Test fills shall be constructed to the following minimum dimensions: four (4) feet thick, 50 feet long, and 25 feet wide. Lines and grades shall be established by Contractor from monuments provided by the Engineer. Engineer reserves the right to vary lift thickness and number of lifts, to make changes in lines and grades, and to require construction of supplemental test fills.

C. Construction equipment shall be furnished by Contractor as required for excavating, hauling, processing, placing, controlling moisture and compacting test fills in accordance with specified requirements. Except as otherwise approved by the Engineer, all equipment shall be of the same type as will be used in construction of the embankment.

D. Material for construction of test fills shall be obtained from approved borrow areas and shall meet specified requirements.

E. Subgrade at each test fill location shall be stripped of vegetation, debris and other objectionable material. Test area shall be graded as required to provide an adequately drained surface suitable for tests. Where surface at each test location has been stripped, graded, cleaned and approved by Engineer, subgrade shall be compacted by at least six (6) passes of a 20 ton vibratory tamping foot roller. The roller shall travel at speeds not to exceed five (5) miles per hour.

F. Materials shall be spread in uniform layers over the entire width and length of test fill under construction to such depth that, before compaction, lift thickness will be as directed by Engineer.

G. Moisture content shall be adjusted to within allowable limits from optimum value as determined by the Engineer on the basis of results of tests by addition of water where required, and by harrowing and aerating where excess moisture is evident.

H. Compaction shall be performed by successive passes over test fill with specified compaction equipment in accordance with Engineer's instructions.

I. In-situ and laboratory compaction tests will be performed and test trenches shall be excavated across compacted test sections at locations as directed by the Engineer to determine overall efficiency of compaction methods used.

J. Based on the results of these test sections, the number of passes required shall be determined.

3.2 PROTECTION

A. The Contractor shall schedule his work to minimize disruption due to adverse weather. Operations shall be suspended if in the opinion of the Engineer conditions are unsatisfactory due to rain, snow, frost, unsatisfactory material or any other unsatisfactory conditions. Any placed fill material which has been damaged by the action of rain, frost, snow or any other detrimental cause shall be removed and replaced with satisfactory material at no additional cost to the County. No earth fill shall be placed while either material being placed or surface material already in place, is frozen. After precipitation or thawing, no equipment shall operate upon fill until it has dried sufficiently, so that excessive rutting will not occur.

B. In order to minimize effect of precipitation on placed fill, surface shall be made smooth and adequate drainage shall be provided with onset of precipitation where operations must be suspended.

C. All openings through embankments for construction purposes and for constructing finger and cutoff drains shall be subject to Engineer's approval. Slope of openings left through embankments and end of any unfinished section shall not be steeper than 6 horizontal to 1 vertical.

D. Layer or layers which, in the opinion of Engineer, have suffered a reduction in density after compaction due to action of rain, equipment, or for any other reason, shall be removed, and allowed to dry, or worked with harrow, disc, or other suitable equipment, to reduce moisture content to required amount, and it shall be recompacted by Contractor before placing operations are resumed.

E. Contractor shall maintain and protect all material in satisfactory condition at all times until final completion and acceptance of Work.

F. Surface of rolled fill shall be protected from drying by sprinkling or by other means as may be approved by the Engineer.

3.3 FOUNDATION PREPARATION

A. Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified. Foundation preparation shall conform to Section 02224 of the Specifications.

B. Groundwater levels in areas of embankment fill shall at all times, unless otherwise directed by the Engineer, be maintained at a minimum depth of three (3) feet below the base of the initial excavation and subsequent levels of fill placement.

C. Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of two (2) inches. The moisture content of the loosened material shall be controlled as specified for the earth fill, and the surface materials of the foundation shall be compacted and bonded with the first layer of earth fill as specified for subsequent layers of earth fill.

D. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two (2) inches in depth normal to the slope and shall be at such moisture content that the earth fill can be compacted against them to effect a good bond between the fill and the abutments.

E. Foundation and abutment surfaces shall be not steeper than 2 horizontal to 1 vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earth fill conforming to this Section.

3.4 BONDING

A. To achieve best possible contact between rolled earth fill and abutment foundations, concrete and where rock surface is sufficiently regular, slope the fill layers up against the contact. Use pneumatic-tired units, or approved power tampers, to compact earth fill directly against abutment foundation, rock surfaces and concrete, as required by Engineer.

B. Those portions of the earth fill adjacent to concrete structures and abutments, which in the opinion of the Engineer, cannot be properly compacted as described above, shall be placed in layers not exceeding four (4) inches before compaction and compacted to required density by use of approved power tampers. Carry out such compaction carefully and thoroughly to ensure that material is tightly compacted at boundaries of abutting concrete, rock, or foundation material.

C. During Work, whenever, in opinion of Engineer, surface of rolled earth fill already in place becomes too dry or too smooth to bond properly with succeeding layer, and whenever fill operations resume after 24 hours suspension, disc or scarify the fill surface in place to such depths as specified by Engineer, and at specified moisture content. Prior to resumption of operations after suspension, prepared surfaces shall be approved by Engineer before they are covered by an additional lift of material.

D. During Work, whenever, in opinion of Engineer, surface of prepared foundation, or surface of rolled earth fill is too wet for proper compaction of layer of earth material to be placed thereon, it shall be removed, allowed to dry, or worked with harrow, disc, or other suitable equipment, to reduce moisture content to required amount, then it shall be

recompacted before the succeeding layer of earth fill is placed thereon. Mixing on the fill to achieve the required moisture content will not be allowed.

3.5 PLACING

A. Earth fill placement shall not begin until a heavy duty disk harrow is on the site for use in discing fill materials after placement. The harrow shall be capable of discing uncompacted material deeper than the thickness of uncompacted layers.

B. Placing of earth fill shall be directed to obtaining a homogenous fill, which is free of horizontal stratifications and of lenses or pockets of materials which do not satisfy requirements of this Section.

C. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than two (2) inches before the next layer is placed.

D. Spread earth fill materials in horizontal layers of uniform thickness by bulldozers or other approved means. If necessary, employ discing, harrowing, or other approved means to break up the material and to blend it before compaction.

E. Unless otherwise specified, thickness of rolled earth fill layers before compaction shall not exceed eight (8) inches for fill compacted by a 20 ton vibratory tamping foot or sheepsfoot roller or accepted alternative, and four (4) inches for fill compacted by approved hand operated power tampers.

F. The approved vibratory tamping foot roller, sheepsfoot roller or vibratory roller shall travel at speeds not to exceed five (5) miles per hour.

G. Compaction units shall travel in a direction parallel to the axes of embankments.

H. The top surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than two (2) percent shall be maintained to insure effective drainage, and except as otherwise specified for fine aggregate fill zones. If the Drawings or Specifications require, or the Engineer directs, that fill be placed at a higher level in one part of an embankment than another, the top surface of each part shall be maintained as specified above.

I. Dam embankments shall be constructed in continuous layers except where openings to facilitate construction or to allow the passage of stream flow during construction are specifically authorized in the contract.

J. Embankments built at different levels as described above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 6 horizontal to 1 vertical. The bonding surface of the embankment in place shall be stripped of all loose material, and shall be scarified, moistened and recompacted when the new fill is placed against it, as needed, to insure a good bond with the new fill and to obtain the specified moisture content and density at the junction of the in-place and new fill.

K. The existing embankment shall be cleared, grubbed and stripped of all topsoil, organic matter, soft material, road gravel and other unsuitable material as directed by the Engineer, prior to fill placement. After stripping and during new fill placement an approximate 2 ft. bench shall be cut into the existing slope during each successive lift of fill to insure a good bond between the in-place and new fill.

L. Prevent earth fill from being contaminated by mixing with adjacent materials. Remove all material which has become contaminated.

M. Hauling equipment shall travel in direction parallel to axis of embankment and no roads or tracks shall be formed across it, unless authorized by Engineer. Vehicles and machines shall not follow each other in same paths but shall spread their tracks over surface of fill.

N. During compacting operations, effect turning of equipment carefully to ensure uniform compaction and kneading action. Lifts of earth fill and at junction with adjacent lifts shall be compacted in strips, with adjacent strips overlapping not less than one (1) foot. Compaction of any lift shall be achieved completely by a single type of compaction unit.

O. Backfill material in existing drainage ditches that have to be filled shall be placed in the same manner as fill in the embankment dam.

P. Remove any and all materials not approved as earth fill which accumulate on the surface of any layer or prepared foundation before further material is placed on succeeding layer.

Q. Final acceptance of earth fill material will only be made after material has been dumped, spread and compacted in place. Rejection by Engineer of material may be made in borrow area, in transporting vehicle, or in place. Contractor shall cooperate with Engineer to ensure that only acceptable earth fill material will be hauled from borrow areas to the embankment area.

R. Remove any materials placed outside prescribed zone limits or slope lines.

S. The slopes of the embankment should be formed by overbuilding the slopes by a minimum of two (2) feet and then removing the overbuild material to form a compact slope face.

3.6 MOISTURE CONTENT

A. Maintain uniform placement water content in each layer of fill and control within following limits unless otherwise specified by Engineer.

B. Placement water content of earth fill materials in the embankment shall be maintained between a value of one (1) percent below laboratory optimum condition, as defined in ASTM D 698-91 and three (3) percent above laboratory optimum condition. During placement and compaction of earth fill, the moisture content of the fill materials being placed shall be maintained within the specified range.

C. Moisture conditioning of earth fill materials, if needed, shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement on the fill, if necessary. Uniform moisture distribution shall be obtained by discing, blading or other approved methods prior to compaction of the layer.

D. Material that is too wet when deposited on the fill shall either be removed or be dried to the specified moisture content prior to compaction.

E. If the top surface of the preceding layer of compacted fill or a foundation or abutment surface in the zone of contact with the fill becomes too dry to permit suitable bond it shall be scarified and moistened by sprinkling to an acceptable moisture content prior to placement of the next layer of fill.

3.7 COMPACTION

A. Earth fill shall be compacted to a dry density of at least 95 percent of maximum dry density as determined by ASTM D 698-91. This compaction shall include at least four passes of the approved roller, or equivalent as approved by the Engineer.

B. The passage of heavy equipment will not be allowed: (1) over cast-in-place conduits prior to 14 days after placement of the concrete; (2) over cradled precast conduits prior to seven (7) days after placement of the concrete cradle; or (3) over any type of conduit until back fill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or two (2) feet, whichever is greater.

C. The final side slopes of the completed embankment shall be further compacted by walking a track-type tractor or bulldozer up and/or down the slopes until the entire surface is traversed by at least one pass of the tractor or dozer tread.

3.8 REMOVAL AND REPLACEMENT OF DEFECTIVE FILL

A. Earth fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the Specifications shall be reworked to meet the requirements or removed and replaced by acceptable fill. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control, and compaction.

3.9 FIELD QUALITY CONTROL

Quality Control by Engineer

A. The overall gradation and the percentage of soil particles passing the No. 200 sieve shall be determined from samples of embankment fill material or backfill obtained from

uncompacted borrow material placed in the dam embankment and/or placed around or adjacent to structures.

B. Compaction tests will be performed during the construction of the embankment to determine compliance with moisture and density specifications in accordance with the approved plan and to detect any significant changes in the material properties over the construction period. The Engineer or his representative will conduct such tests in accordance with ASTM procedures at the following minimum frequencies.

1. One (1) field test for every 1,000 cubic yards of compacted embankment fill, with at least one (1) test per lift;
2. One (1) field test for every 200 cubic yards of compacted backfill in trenches or around structures, with at least one test per lift;
3. One (1) test any time there is suspicion of the effectiveness of compaction; and
4. Supplementary laboratory compaction curves for at least every 20 field density tests.

C. The Contractor shall cooperate with the Engineer during the compaction testing. The Contractor shall excavate or skim the surface of the fill so that representative tests can be performed, as directed by the Engineer. The Contractor shall suspend fill placement and compaction within a 100-foot radius while the Engineer is performing field tests. Field tests will be performed at random locations in the fill chosen by the Engineer. Records of the test results, as well as the test locations, will be kept on Site during construction.

D. Engineer will notify Contractor of any deficiencies in materials or construction when results of the tests are known. Deficiencies shall be remedied by such measures as Engineer may direct. Remedies shall include complete removal of portions of embankment if so directed by Engineer. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.

Additional Measures to Increase Density

E. In case of earth fill which does not have specified density, additional measures which may be specified to increase density include:

1. Compacting with additional passes of roller.
2. Adding ballast to rollers (or increasing the frequency of vibrating rollers) up to maximum capacity specified by roller manufacturer.
3. Reducing layer thickness.

Additional Measures to Lower Moisture Content

F. In case of earth fill which is too wet, additional measures which may be specified to lower moisture content include:

1. Aerating by discing, harrowing, scarifying or employing other suitable means to facilitate drying. This applies to compacted wet fill and to uncompacted wet fill spread on compacted fill.

2. Mixing wet fill with fill having lower moisture content. This applies to uncompacted fill in the borrow areas only.
3. Installing interceptor ditches in borrow areas to prevent rain and surface run-off from soaking into material.

Additional Measures to Raise Moisture Content

G. In case of earth fill which is too dry, additional measures which may be specified to raise moisture content include:
   1. Adjusting moisture content of fill prior to compacting. In general the application of additional water, where required, shall be made in the borrow areas, supplemented, if necessary, by sprinkling the surface of the material following spreading with required amount of water and mixing uniformly throughout the layer, or by such other means as may be approved by Engineer.
   2. Water supplied on a layer of fill shall be sprinkled in a uniform manner at a controlled rate so that free water will not appear on surface during or subsequent to rolling.
   3. Irrigating borrow pits by approved methods.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02280 – EMBANKMENT INSTRUMENTATION

PART 1: GENERAL

1.1 SUMMARY

A. The work in this section includes abandonment of existing piezometers and monitoring wells, installation of piezometers in the downstream toes and at the downstream slope of the embankment, and installation of settlement monuments in the crest of the embankment.

B. The piezometers are required to measure pore water pressures within the foundation during reservoir filling and long-term operations.

C. The settlement monuments will be installed at locations directed by the Engineer to monitor settlements during and after construction of the embankment and foundation soils.

D. The Contractor may be required to supplement instrumentation placed in the embankment and foundations in accordance with requirements of this Specification by additional instrumentation as directed by the Engineer.

E. Data acquisition and interpretation is not included as part of this Section.

1.2 DEFINITIONS

A. **Settlement Monuments:** Concrete monuments to measure vertical and lateral movements of the embankment crest.

B. **Standpipe Piezometer:** A borehole containing a slotted PVC piezometer tip assembly placed in a sand pack within a specified measuring interval and connected to the ground surface by riser pipes.

1.3 SUBMITTALS

A. Equipment and Materials

1. The Contractor shall submit the type of drilling equipment and materials he proposes to use for the piezometers and settlement monuments to the Engineer for approval two weeks prior to their delivery to the Site. Piezometer boreholes shall be advanced using hollow stem augers in soil and rotary diamond drilling equipment in rock. Coring operations shall be performed using triple-tube swivel type core barrels.
2. The Contractor shall submit to the Engineer sufficient data and drawings obtained from the material manufacturers to verify that materials and equipment meet the requirements of this Specification.

B. Construction Records

1. The Contractor shall submit to the Engineer the following information:
   a). Horizontal and vertical locations of all instrumentation upon completion of installation measured to the nearest 0.01 ft;
   b). Detailed boring logs, soil samples and rock cores at each piezometer location; and
   c). Detailed piezometer installation logs including the measured depths of screen intervals and bentonite seals. Grout volumes and piezometer head completion details shall also be included as applicable.

1.4 COMPENSATION

Bid Item No. 02280/01 – Standpipe Piezometers

A. MEASUREMENT

1. Bid Item No. 02280/01 – Standpipe Piezometers will be measured by the linear foot of piezometer installed, in place and accepted by the Engineer. Measurements of length shall be confined to points beginning at the ground surface to the depth shown on the plans or directed by the Engineer.
2. Standpipe piezometer covers will not be measured for payment.

B. PAYMENT

1. The unit price bid for Bid Item No. 02280/01 – Standpipe Piezometers shall be full compensation for all materials, equipment and labor to install standpipe piezometers. Such price shall be deemed to include all costs for drilling, casing, screening, grouting, bentonite pellets and incidentals necessary for a full and complete installation of standpipe piezometers.
2. No separate or additional payment will be made for Standpipe piezometer covers.
3. Protective Markers

Bid Item No. 02280/02 – Settlement Monuments

A. MEASUREMENT

1. Bid Item No. 02280/02 – Settlement Monuments will be measured per each unit installed, complete, in place and accepted by the Engineer.

B. PAYMENT

1. The unit price bid for Bid Item No. 02280/02 – Settlement Monuments shall be full compensation for all materials, equipment and labor required to install settlement monuments in the locations specified in the plans or directed by the Engineer.
2. Protective Markers.

Bid Item No. 02280/03 – Existing Piezometer Abandonment

A. MEASUREMENT
   1. Bid Item No. 02280/03 – Existing Piezometer Abandonment will be measured by the linear foot of borehole properly abandoned and accepted by the Engineer. Measurements of length shall be confined to points beginning at the ground surface to the depth shown on the plans or directed by the Engineer.

B. PAYMENT
   1. The unit price bid for Bid Item No. 02280/03 – Existing Piezometer Abandonment shall be full compensation for all materials, equipment and labor to abandon existing piezometers. Such price shall be deemed to include all costs for drilling, flushing, tremie grouting, cutting disposal and incidentals necessary for a full and complete abandonment of existing piezometers.

PART 2: PRODUCTS

2.1 STANDPIPE MATERIALS

A. Standpipes shall be 2 in. inside diameter (ID) PVC flush mount Schedule 40 screw coupled piping.

B. Standpipe screen intervals shall consist of 2 in. ID, machine slotted #10 PVC Schedule 40 screen.

C. Protective covers for the standpipe piezometers shall be of the standard lockable aluminum type as approved by the Engineer.

D. The grout shall be a cement/bentonite/water mix as directed by the Engineer.

E. The bentonite pellets shall be a standard type as approved by the Engineer.

F. The sand shall be a 20/40 graded filter sand.

PART 3: EXECUTION

3.1 PIEZOMETERS

A. Drilling Borehole
   1. Boreholes shall be drilled and piezometers installed in the presence of the Engineer.
   2. Boreholes will be advanced through soil to the depths and locations as shown in Drawing C-18 or as directed by the Engineer.
   3. The boreholes shall be advanced through the fill and underlying soil using a hollow stem auger.
   4. Soil samples will be logged and boxed by the Engineer.
   5. The boring will be terminated as directed by the Engineer.

B. Piezometer Installation
   1. The Contractor shall procure, supply, store, protect, and handle all materials and equipment required for the installation of the piezometers. This must be done to the satisfaction of the Engineer.
   2. The piezometers shall be constructed in the following manner:
      a). Tremie grout the borehole with cement/bentonite slurry up to the bottom of the screen interval, as necessary. The screen interval will be determined by the Engineer based on borehole data. Allow the slurry to set.
      b). Place a minimum of 1 ft. of bedding sand down the borehole, as directed by the Engineer. Tremie the sand in place using a 1-inch minimum inside diameter (ID) pipe.
      c). Install piezometer on sand bed within the central portion of the borehole. Standpipe slotted screen intervals shall be 5 ft. long, or as directed by the Engineer.
      d). Place sand to the top of the screen interval, tamping the sand in place in 2 ft. lifts.
      e). Add a minimum 2 ft. layer of bentonite pellets, tamped in place.
      f). Tremie grout remaining annulus of borehole above the bentonite seal with cement/bentonite grout, removing any temporary casing from the borehole.
      g). A vented cap shall be placed on the standpipe piezometers and a protective casing shall be placed around the standpipes as shown on the Drawings.
      h). All piezometers shall be clearly and permanently labeled.
   3. All piezometer installation shall be done in the presence of, and to the satisfaction of, the Engineer.

C. Abandonment of the piezometers shall consist of the following:
   1. Drill out the piezometer or well to at least the same diameter and total depth as the original boreholes;
   2. Thoroughly flush out piezometer/well construction materials from borehole;
   3. Tremie grout from the bottom of the borehole to the ground surface with a cement/bentonite grout mix or bentonite grout mix as approved by the Engineer; and
   4. Allow grout to set and top off the borehole with additional grout as necessary.

D. Settlement Monuments
   1. The settlement monuments shall be installed in the manner and at the locations shown on the Drawings. They shall be installed from the crest of the embankment after all fill materials have been placed.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02369 – LANDSCAPE PLANTINGS

PART 1 : GENERAL

1.1 QUALITY ASSURANCE

A. Containerized Plants:

1. Containerized plants shall be inspected onsite prior to installation for acceptability by the Engineer, as described hereinafter.

a. Plants shall either be containerized or bare root seedlings.
b. All containerized plants shall be labeled.
c. Bare root seedlings shall be labeled on the shipping container.
d. The Contractor shall provide the bag identification tags to the Engineer for plant material received prior to installation.
e. All plants shall be healthy and free from insect infestation and disease.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Transport all plants in enclosed trailer or covered with a tarpaulin during transportation from harvesting site to Project Site.
2. Place all plants on transport vehicles in an orderly fashion to prevent damage and to facilitate handling.
3. All cut plant material shall arrive on the jobsite within 8 hours of cutting or as approved by the Engineer if a commercial supplier is used. The Contractor shall schedule the cutting and delivery of the live cuttings to the site so that the materials can be installed a maximum of 2 days after they arrive.
4. Trees and shrubs shall be kept moist. Containerized plants shall be transported in a manner to prevent disturbance of potting soil.

B. Storage:

1. Live Cuttings: Store and protect live cuttings not installed on day of arrival at Project Site.

a. Store in water or heeled-in in moist soil for a maximum of 2 days without refrigeration.
b. Outside storage locations shall be continually shaded and protected from wind.
c. Protect from drying at all times.
d. When temperature reaches 50 degrees F and above on day material is harvested, live cut branches shall not be stored, but shall be installed on day of harvesting.
e. Live cut branches that have been fabricated into live stakes must be used on the day of fabrication and may not be stored.
f. If live stakes are not installed on the same day they are harvested, they shall be soaked in a root hormone solution overnight for next-day installation. This includes live cuttings from commercial suppliers, if the cuttings are not installed on the Project the same day they are harvested by the supplier.

2. Containerized and bare root plants shall be stored and protected if not installed on the day of arrival at the Project Site.
a. Outside storage locations shall be continually shaded and protected from wind.
b. Plants shall be protected from drying at all times.

C. Handling:

1. All plant material shall be handled with care to limit stress and damage.
2. Damaged plants will be rejected.

1.3 ENVIRONMENTAL REQUIREMENTS

A. Plant materials shall be planted during their individual dormant seasons as directed in the planting schedule or as advised by a commercial plant supplier. Plants shall be installed per the recommendations shown on the individual labels and as directed in the planting schedule or as advised by a commercial plant supplier.

B. After planting and/or installing, water all of the plantings. Plant installations shall continuously be watered as needed.

C. Fertilize trees and shrubs according to the fertilizer and mycorrhizal provisions in the Drawings and Specifications.

1.4 PERFORMANCE REQUIREMENTS

A. The Contractor shall warranty all plant material under this Contract for a period of 1 year from the date of Final Acceptance. Plants which die during the warranty period shall be removed and replaced under the original Specifications, no later than the following planting season, at the Contractor's expense. All replacement plants shall have a 1 year warranty period from the time of their acceptance.

B. The end of the original guarantee period does not release the Contractor from his responsibility to care for the replacement plants.

C. Only plants alive and healthy and properly installed at the time of final inspection will be accepted.

D. The Contractor shall be responsible for the replacement of any nonliving plants before and immediately after the end of the first growing season.

E. Planting acceptance shall be as follows for sprouting, leaf growth, or ground cover (in percent) based on inspections after the first growing season (late Summer/early Fall) and at the beginning of the second growing season (late Spring/early Summer):

1. Trees: 80 percent survival (75 percent of the plant showing sprouting and/or leaf production).

2. Shrubs: 80 percent survival (75 percent of the plant showing sprouting and/or leaf production).

3. Herbaceous plants: 80 percent survival of plants installed.

F. Replaced plantings shall be under warranty for an additional year.

G. The acceptability of the Plant material furnished and planted as specified will be determined at the end of an establishment period. A semifinal inspection will take place during the first September following the end date of planting.

H. At the time of the semifinal inspection, the plant material shall exhibit a survival rate as described in these Specifications. Survival rate will be determined by conducting a count of planted vegetation in the designated planting zones. Each plant will be counted and a survival rate for each species will be determined. Plant species which fail to meet these minimum requirements due to death or unsatisfactory growth shall be replanted. A plant shall be considered unsatisfactory if the top portion of the plant dies back and new leaves sprout from the base or if the plant is not planted according to the Specifications and the plans. All costs for replanting shall be included in the Contractor's bid. Replanting shall be done in quantities sufficient to establish the number of live plants per species at 100% of the original quantities specified.

I. All replanting shall be done between November 1 and March 15, in the year following the initial planting. A final inspection will be made during the September following the replanting, using the same measurement method described herein determine survival rate.

1.5 MAINTENANCE

Maintenance shall begin immediately after each plant has been installed and continue throughout construction until at least 1 year after acceptance of the construction or until the Engineer accepts the work. The following are maintenance requirements:

A. Maintenance of new installations shall begin immediately after installation and consists of spraying for insects and diseases, weeding, watering, and inspecting to see that the live plant materials are healthy and performing adequately. The Contractor shall be responsible for any permits related to pesticides. The Contractor shall report concerns to the Engineer.

B. The Contractor shall be responsible for keeping all installations and work incidental thereto in good condition by performing all other necessary operations during the construction period to care for promotion of healthy root and leaf growth and plant life so that all work is in satisfactory and acceptable condition to the Engineer.

C. All drainage systems shall be kept in good working order by the Contractor so that they do not negatively impact installed plantings.

D. All installation and plant material required by this Contract shall be in a satisfactory and acceptable condition when the Contractor applies for payment.

E. Maintenance for and in conjunction with planting shall be incidental to the work consisting of work furnished, installed and accepted (including all materials, i.e., labor, machinery, and maintenance care necessary to complete the work in a high quality workmanship-like manner).

F. Water, which may be required for temporary storage of plant materials during construction, and for maintenance of installed plantings, shall contain no toxic elements that could be harmful to plant growth. A nearby shaded pond or other area approved by the Engineer may be utilized for these purposes.

1.6 CONTROL OF EXISTING VEGETATION

A. In the areas where new vegetation is to be planted and the project grading does not remove the existing vegetation, the Contractor shall remove the existing exotic and invasive vegetation from the Site. The Engineer and the Contractor shall walk the entire limits of the Project prior to vegetation clearing. Any vegetation to remain shall be identified and preserved.

B. Proposals for herbicide use shall be reviewed by the Engineer.

1.7 COMPENSATION

A. MEASUREMENT

1. The Work of this section will not be measured for payment.

B. PAYMENT

1. Items TW1/01 and TW2/02 will cover all costs for all Work necessary to install the plant material including, but not limited to, the purchase, delivery to the Work Site, onsite storage, delivery to the work areas, ground preparation, furnishing plant species, mycorrhizae, fertilizer, and water to create a satisfactory stand, maintenance, cleanup, and replacement plants. Payment shall be full compensation for all Work required by this Section.
2. When plants are satisfactorily planted, the Contractor may apply for payment equal to 50 percent of total amount for Landscape Plantings as included in the Schedule of Values.
3. After the final inspection and replanting or at final project completion and acceptance, payment for the remaining amount under Landscape Plantings will be made.

SECTION 02369 – LANDSCAPE PLANTINGS

PART 2: PRODUCTS

A. Plants shall be tublings, bare root, or containerized seedlings, meeting the size specifications shown on the plans.

B. Plant species shall be those shown on the plans. Alternate plant species may be used by the Contractor if the plants specified in the plans are unavailable, at the request of the Contractor and upon approval by the Engineer.

PART 3: EXECUTION

A. Plants shall be installed at the spacing shown in the notes on the plans Planting Schedule or as advised by a commercial plant supplier (whichever is closer).

B. The minimum number of trees to be planted per acre shall be per the Planting Schedule shown on the Drawings.

C. Installation instructions shall be in accordance with the notes on the plans, plant labels, or as advised by a commercial plant supplier.

D. Slow release fertilizer packs and mycorrhizal fungus packs shall be placed in each planting hole. The mycorrhizal pack shall be placed first before the hole is completely filled and shall be in direct contact with the roots. The fertilizer pack shall be buried on the upslope side of the plant, approximately two inches deep and two inches away from the Plant stem.

E. After planting, water all of the plantings. Plant installations shall continuously be watered as needed.

***** END OF SECTION *****

TECHNICAL SPECIFICATION

SECTION 02831 – CHAIN LINK FENCING

PART 1: GENERAL

1.1 SCOPE

A. This specification covers material and installation requirements for the erection of chain-link fence as complete units including necessary erection accessories, fittings, and fastenings as specified on the Drawings.

1.2 SUBMITTALS

A. Contractor shall provide Engineer with complete specifications of items he proposes to furnish, including drawings, sketches, or pictures of typical construction details and any special fixtures, gates, hardware, and appurtenances.

1.3 COMPENSATION

A. MEASUREMENT

1. Fencing will not be measured for payment.

B. PAYMENT

1. No separate or additional payment will be made for fences. All costs for furnishing and installing fences shall be deemed to be included in the structure in which the fences are embedded, attached or otherwise incorporated.

PART 2: PRODUCTS

2.1 GENERAL

A. Manufacturer's standard items shall be furnished. When design conditions require special fittings they shall be submitted to the Construction Manager for approval.

2.2 FENCE FABRIC

A. Chain link wire fabric shall be made of No. 9 AWG (0.148 inch) steel wire, woven in a 2 inch mesh. Top and bottom selvages shall be twisted and barbed. Provide one piece fabric widths for fencing up to 12' high.

B. Aluminum coating shall conform to ASTM A392. Minimum coating shall be 2.0 ounces per square foot (Class 2).

C. Vinyl Fused and Bonded to Galvanized Steel Chain Link Fence Fabric shall be made of No. 9 AWG (0.148 inch) steel wire core, woven in a 2 inch mesh with a Plasticized Polyvinyl Chloride (PVC) coating fused and bonded to the steel fence fabric and conforming to the minimum requirements of ASTM F668 Class 2B.

2.3 ACCESSORIES

A. All accessories shall be hot dip galvanized with a minimum coating of 2.0 ounces of zinc per square foot.

B. Fittings shall be of malleable iron, conforming to ASTM A47 Grade 35018. Fittings for post tops shall fit over the outside of posts. Wrought iron and pressed steel may be used as substitutes for malleable iron when approved by the Engineer.

C. Fabric ties shall be pre-formed No. 9 gage (0.148 inch) wire or equivalent strip or clips made of the same material as the fabric.

D. Accessories used in conjunction with PVC coated steel chain link fence fabric shall be PVC coated in accordance with the requirements of ASTM F668 Class 2B.

2.4 POSTS AND BRACINGS

A. All posts used in the construction of the fence shall be hot-dipped galvanized. All pipe uprights and rails shall be Schedule 40 pipe conforming to ASTM A120 or SS-40 of AISI 1010 material, with a zinc coating of 0.9 ounces per sq. ft. with a chromate conversion coating and then a thermoplastic acrylic coating of not less than 0.3 mils dry film thickness.

1. Pipe, posts and bracing used in conjunction with PVC coated steel chain link fence fabric shall be PVC coated in accordance with the requirements of ASTM F668 Class 2B.

B. Normal pipe line posts shall be 2-3/8” OD Schedule 40 pipe weighing 3.65 pounds per foot or 2-3/8” OD SS-40 pipe weighting 3.117 pounds per foot.

C. As an alternate, heavy duty line post material shall conform to ASTM A36. Provide “H” columns weighing 4.1 pounds per lineal foot or 2-1/2” x 1-7/8” “U” bars weighing 4.2 pounds per lineal foot.

D. Terminal and corner posts shall be 2-7/8” OD Schedule 40 pipe weighing 5.79 pounds per lineal foot or 2-7/8” OD SS-40 pipe weighing 4.64 pounds per foot.

E. Top rail shall be 1-5/8" OD Schedule 40 steel pipe, weighing 2.27 pounds per lineal foot or 1-5/8" OD SS-40 pipe weighing 1.84 pounds per lineal foot. Rail shall be furnished with outside self-centering sleeve type couplings not less than seven inches in length.

2.5 CONCRETE

A. Provide concrete consisting of portland cement (ASTM C150), aggregates (ASTM C33), and clean water. Mix materials, using at least 4 sacks of cement per cu yd, to obtain concrete with a minimum 28-day compressive strength of 2500 psi, 1" maximum size aggregate, maximum 3" slump, and 2% to 4% entrained air.

PART 3: EXECUTION

3.1 LOCATION AND POST SETTING

A. The finished fence shall be installed on the concrete box culvert and spillway channel walls as depicted on the drawings.

B. Posts shall be set in 4-inch diameter PVC sleeves cast in the concrete.

3.2 POSTS

A. Line and brace posts shall be set not more than 10 feet on centers in the line of the fence. Terminal, corner, and gate posts shall be set at locations shown on the drawings.

3.3 RAILS AND BRACINGS

A. Top rail shall be installed prior to installation of chain-link fabric. A manufacturer's standard expansion-contraction coupler shall be provided every 100 feet or fraction thereof. Straight runs between braced posts shall not exceed 500 feet. End clamps shall be used for attaching top rail and braces to brace, terminal, and gate posts. Corner clamps shall be used for attaching top rail and braces at corner posts.

B. Horizontal braces and adjustable diagonal bracing extending to the first adjacent line post shall be provided at each terminal, corner, brace, and gate post.

3.4 FABRIC

A. Fabric shall be pulled taut and secured to the top rail close to both sides of each post, at intervals of not more than 24 inches on centers and to the intermediate posts at intervals of not more than 14 inches on centers with wire ties. Fabric shall be attached to terminal, corner, brace, and gate posts with stretcher bars and stretcher-bar bands. Bands shall be equally spaced on the stretcher bar and not over 14 inches on centers. Where rolls of fabric are joined; double block pullers shall properly tension them with ends of fabric matched and joined by a spiral-connecting link.

B. Install PVC coated fabric in accordance with ASTM Practice F567. Handle all vinyl-coated material with care. If vinyl finish is damaged during installation, Contractor shall repair or replace material at no additional cost to County.

3.5 ELECTRICAL GROUND

A. Whenever a power line carrying more than 600 volts passes over the fence, a ground rod shall be installed. The ground rod shall be installed at the nearest point directly below the point of crossing. Where possible the rod shall be driven into the ground for a full 8 feet of penetration. In rocky soil, the rod may be driven slanted, so as to provide 18 inches of cover at the tip. If solid rock is encountered, two ground rods may be installed at the nearest post on each side of the power line crossing where soil conditions will permit. A length of No. 6 bare copper seven stranded wire shall be attached between the fence and the ground with suitable clamps.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02910 – EROSION, SEDIMENTATION AND POLLUTION CONTROL

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications consists of providing and maintaining all necessary measures to control erosion and minimize the production and release of sediment or other pollutants during progress of the Work. Control measures shall be to the satisfaction of the Engineer and in accordance with applicable Federal, State and local Laws and Regulations. The Work shall include the removal of such measures, and any associated debris, upon completion of the Project. Work shall be in accordance with the Contractor's approved, site-specific Erosion and Sediment Control Plan.

B. Temporary vegetation of disturbed areas and stockpiles shall be established as necessary throughout the course of construction.

1.2 SUBMITTALS

A. A site specific erosion, sedimentation and pollution control plan (ESP Plan) shall be prepared by the Contractor and submitted to the Engineer for review within ten (10) days of the Award of Contract. The Contractor shall not proceed with any work that creates a potential for erosion and sedimentation at the site until final approval, from the Engineer, of the ESP Plan. Contractor to comply with all requirements of land disturbance permits with Rockdale County and DeKalb County

1. The Contractor is advised that a minimum of fifteen (15) calendar days will be required for the initial review and return of the base ESP Plan. Seven (7) calendar days should be allowed for review of each re-submittal, if necessary

1.3 COMPENSATION

Bid Item No. 02910/01 – Construction Exit

A. MEASUREMENT

1. Bid Item No. 02910/01 – Construction Exit will be paid as a lump sum item and will not be measured for payment.

B. PAYMENT

1. Bid Item No. 02910/01 – The Construction Exit will be paid as a lump sum item to include installation, maintenance, and removal and will not be measured for payment.

TECHNICAL SPECIFICATION

SECTION 02910 – EROSION, SEDIMENTATION AND POLLUTION CONTROL

Bid Item No. 02910/02 – Sediment Barrier Type Sensitive (Sd1-S) Single Row (Type C Silt Fence)

A. MEASUREMENT

1. Bid Item No. 02910/02 – Sediment Barrier Type Sensitive (Sd1-S) Single Row (Type C Silt Fence) will be measured by the linear feet in place and accepted by the Engineer. Silt fence placed beyond the limits shown in the plans or as directed by the Engineer will not be measured.

B. PAYMENT

1. Bid Item No. 02910/02 – Sediment Barrier Type Sensitive (Sd1-S) Single Row (Type C Silt Fence) will include installation, maintenance, and removal.

Bid Item No. 02910/03 – Sediment Barrier Type Sensitive (Sd1-S) Double Row (Type C Silt Fence)

A. MEASUREMENT

1. Bid Item No. 02910/03 – Sediment Barrier Type Sensitive (Sd1-S) Double Row (Type C Silt Fence) will be measured by the linear feet in place of double-row silt fence and accepted by the Engineer. Per linear foot unit price shall include both rows of silt fence. Silt fence placed beyond the limits shown in the plans or as directed by the Engineer will not be measured.

B. PAYMENT

1. Bid Item No. 02910/03 – Sediment Barrier Type Sensitive (Sd1-S) Double Row (Type C Silt Fence) will include installation, maintenance, and removal.

Bid Item No. 02910/04 – Rock Filter Dam (Rd)

A. MEASUREMENT

1. Bid Item No. 02910/04 – Rock Filter Dam will be measured by the number of units installed and accepted by the Engineer.

B. PAYMENT

1. The Unit Price bid for Bid Item 02910/04 – Rock Filter Dam shall be full compensation for supplying and installation, and maintaining rock filter dams necessary for erosion and sedimentation control.

Bid Item No. 02910/05 – Temporary Sediment Trap (Sd4)

A. MEASUREMENT

1. Bid Item No. 02910/05 – Temporary Sediment Trap will be measured by the number of units installed in place and accepted by the Engineer.

B. PAYMENT

1. The unit price bid for item No. 02910/05 – Temporary Sediment Trap shall be full compensation for all labor, equipment, and materials necessary for installing, maintaining, and removing the Temporary Sediment Traps, including all excavation, grading, hay bales, rip rap, and incidentals necessary to construct the Temporary Sediment Traps as depicted on the Construction Drawings.

Bid Item No. 02910/06 – Erosion Control Matting (Ss $_{RECP}$)

A. MEASUREMENT

1. Bid Item No. 02910/06 – Erosion Control Matting (Ss $_{RECP}$) will be measured by square yard, in place and accepted by the Engineer.

B. PAYMENT

1. The unit price bid for item No. 02910/06 – Erosion Control Matting (Ss $_{RECP}$) shall be full compensation for all labor, equipment, and materials necessary for installing and maintaining the erosion control matting.

Bid Item No. 02910/07 – Tree Protection Fence (Tr)

A. MEASUREMENT

1. Bid Item No. 02910/07 – Tree Protection Fence (Tr) will be measured by the linear feet in place and accepted by the Engineer. Silt fence placed beyond the limits shown in the plans or as directed by the Engineer will not be measured.

B. PAYMENT

1. Bid Item No. 02910/07 – Tree Protection Fence (Tr) will include installation, maintenance, and removal.

Bid Item No. 02910/08 – Temporary Grassing

A. MEASUREMENT

1. All Work required for temporary grassing within approved areas will be measured for payment to the nearest 0.1 acre. Measurement will be a

planimetric projection of areas specified. Only the area actually subjected to temporary grassing, as designated by the Engineer, will be measured.

B. PAYMENT

1. The Unit Price bid for Bid Item 02910/08 – Temporary Grassing shall be full compensation for all labor, equipment, and materials necessary for completing temporary grassing.

Bid Item No. 02910/09 – Straw Bale Check Dams (Cd-Hb)

A. MEASUREMENT

1. Bid Item No. 02910/09 – Straw Bale Check Dams will be measured by the number of units installed and accepted by the Engineer.

B. PAYMENT

1. The Unit Price bid for Bid Item 02910/09 – Straw Bale Check Dams shall be full compensation for supplying and installation, and maintaining check dams necessary for erosion and sedimentation control.

Bid Item No. 02910/10 – NPDES Inspection of BMPs, Sampling of Outfall, and Reporting/Record Keeping

A. MEASUREMENT

1. Bid Item No. 02910/10 – NPDES Inspection of BMPs and Sampling of Outfall by GSWCC certified personnel and Reporting/Record Keeping will be paid as a lump sum item and will not be measured for payment.

B. PAYMENT

1. The Lump Sum bid for Bid Item 02910/10 – NPDES Inspection of BMPs and Sampling of Outfall by GSWCC certified personnel and Reporting/Record Keeping will be paid as a lump sum item and will not be measured for payment. All costs to comply with the various requirements of this bid item shall be deemed to be included in the lump sum price.

PART 2: PRODUCTS

Refer to Construction Drawings.

PART 3: EXECUTION

3.1 EROSION AND SEDIMENT CONTROL MEASURES

A. Dewatering work for structure foundations or earthwork operations adjacent to, or encroaching on, streams or waterbodies shall be conducted by Contractor in a manner to prevent muddy water and eroded materials from entering the streams or watercourses. This shall be accomplished by construction of interception ditches, bypass channels, straw bale barricades, silt fences, log and pole structures, rock check dams, or by other approved means. Efforts to minimize erosion is the primary focus, but measures to control sediment transport must be installed onsite. Excavated materials or other construction materials shall not be stockpiled or deposited near or on streambanks, hillslopes or other watercourse perimeters where they can be washed away by high water or storm run-off, or can in any way encroach upon the watercourse itself.

3.2 CHEMICAL POLLUTION

A. The Contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to be used to dispose of chemical pollutants (such as drained lubricating or transmission oils, greases, soaps, asphalt, etc.) produced as a by-product of the project's Work. At the completion of the Work, sumps shall be voided without causing pollution as specified in Paragraph 3.5 of this Section.

B. All refueling of equipment and routine maintenance shall be performed in an area constructed and managed to prevent accidental release of petrochemicals.

C. Sanitary facilities such as pit toilets, chemical toilets, or septic tanks shall not be placed adjacent to flowing streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water sources. At the completion of the Work, facilities shall be disposed of without causing pollution as specified in Paragraph 3.5 of this Section.

3.3 AIR POLLUTION

A. During dry weather, the Contractor shall water all public access or haul roads and other site roads to fully suppress dust as often as required and at least two times per day or as directed by the Engineer.

B. Local, State and Federal Laws and Regulations concerning the burning of brush or trash or disposal of other materials shall be adhered to.

C. Fire prevention measures shall be taken to prevent the start or the spreading of fires that may result from the Work.

3.4 MUD CONTROL

A. The Contractor shall take all control measures to prevent the spillage of mud onto all local, county and state paved roads.

3.5 MAINTENANCE, REMOVAL, RESTORATION

A. All erosion, sedimentation and pollution control measures and works shall be adequately maintained in a functional condition as long as needed during the Project. The Contractor shall inspect, clean, and repair (if necessary), the silt fencing and all erosion control measures prior to and immediately after rain. The Contractor shall maintain erosion control measures in place after completion of the Work until permanent vegetation is established and has grown sufficiently to where they are no longer needed. At this time the Contractor shall remove such measures and debris as directed by the Engineer.

3.6 PERFORMANCE

A. Land and water resources within the work limits and outside the limits of permanent work shall be preserved in their present condition or shall be restored to a condition that will appear to be natural and not detract from the appearance of the Project.

B. Soil erosion, sedimentation or pollution of streams or other water sources shall be prevented by using natural vegetative screens, approved and properly installed silt fencing and grading.

C. The Contractor shall at all times perform all Work and take such steps required to prevent any destruction to fish and wildlife. The Contractor will not be permitted to alter water flows or otherwise disturb native habitat adjacent to the project area that are critical to fish or wildlife. The Contractor shall not discharge or permit discharge into streams or other water sources fuels, oils, bitumens, garbage, sewage, or materials that may be harmful to fish, wildlife, or vegetation, or that may be detrimental to outdoor recreation. All Work shall be performed in such a manner that objectionable conditions will not be created in waters through or adjacent to the project areas.

D. Sanitary facilities such as chemical toilets, sumps, tanks, or barrels used to temporarily store chemical pollutants such as drained lubricating oils, shall be disposed of in accordance with regulations of the Georgia Department of Natural Resources or other appropriate State and Federal authorities.

E. The location of the Contractor's access and haul roads, storage and other construction buildings, required temporarily in the performance of the Work, shall be approved by the Engineer.

1. All access and haul roads used during construction shall have cross drains installed in all drainageways. Temporary stream channel crossings shall be constructed, maintained, and removed in a manner that will not result in unnecessary pollution. Road surfaces shall be graded to be free draining. Concentrations of water shall be directed into stabilized watercourses or piped to stable outlets. Debris shall be disposed of in spoil areas shown on the Drawings, or at other locations approved by the Engineer, or otherwise disposed of as approved by the Engineer.

2. The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, or stockpiles of excess or waste materials.

F. The Contractor shall not deface, injure or destroy trees or shrubs within or beyond the work area without special authority approved by the County. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for purposes of anchoring unless approved by the County.

G. Monuments, markers, works of art, and sites of natural, historical, or archaeological significance shall be protected before beginning operations near them.

3.7 REVEGETATION

A. Prior to demobilization from the Site, the Contractor shall seed, fertilize and mulch all areas that were disturbed by clearing or construction operations, including all stockpiles. Seeding and grassing shall meet the requirements set forth in the Georgia DOT Standard Specification for the Construction of Roads and Bridges (Latest Edition) or Section 02936 of the Technical Specifications; whichever is considered more appropriate by the Engineer. Mulch, straw and other materials shall be used as specified by Engineer to protect the Works from wind and water induced erosion.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02920 – DIVERSION AND DEWATERING

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Technical Specifications consists of all labor, materials, equipment and performance of all Work necessary for diversion of surface water, lowering the water level within the lake as required for construction, and lowering and continuously controlling piezometric levels of groundwater in the dam footprint. Removal of all such temporary works after they have served their purposes is also included in this Scope of Work.

B. Diversion and dewatering systems will be required during construction of the Lakefield Dam Rehabilitation, including clearing and grubbing of the downstream slope, construction of the spillway structure, placement of embankment fill materials and rip rap wave protection, construction of the treatment wetlands, and in other parts of the construction site.

C. The Contractor's attention is drawn to the fact that elevated groundwater elevations exist downstream of the existing dam in the proposed dam footprint expansion.

1.2 DEFINITIONS

A. **Diversion**: Diversion means performance of all Work to divert off site flow away from the Work during the placement of all fill materials for the construction of the dam embankment and the construction of all appurtenant concrete structures.

B. **Dewatering System**: Dewatering system means ditches, sumps, pumps, dewatering wells, well points, monitoring devices, and all associated equipment and pumping for the removal of surface water and groundwater as needed to perform the required construction in accordance with the Specification.

1.3 SUBMITTALS

A. The Contractor shall furnish to the Engineer, in writing within ten (10) days of the date of the Agreement, his plan for diverting surface water, including details of the diversion channels and pipes used to direct and manage water flows around and through the embankment during construction activities, and controlling groundwater. This plan shall be acceptable to and approved by the Engineer. This shall include, but not be limited to, details of all additional drainage ditches, channels, cofferdams, sumps, deep wells, well point systems, sedimentation ponds, pumps, and pump lines. The plan shall also include the sequence of external drainage channel excavation. Acceptance of this plan will not relieve the Contractor of responsibility for the adequacy of the diversion and dewatering systems to achieve the required results. Success of the plan shall be the sole responsibility of the Contractor. Failure of the plan will require a resubmittal, acknowledgment, and implementation at no extra charge to the Owner. At monthly intervals, throughout the construction of the project, the Contractor shall submit updated versions of his diversion and dewatering plan.

1.4 COMPENSATION

A. No separate or additional payment will be made for the control and diversion of surface water, equipment used to direct and manage water flows around and through the embankment during construction activities, or for the control of groundwater. All costs for controlling surface water and groundwater throughout construction are deemed to be included in the unit or lump sum price bid for the item in which the work of this specification is incorporated.

PART 2: PRODUCTS

2.1 GENERAL

A. The diversion and dewatering system shall consist of cofferdams, channels, flumes, sumps, floats, ditches, pumps, deep wells or well point systems, pipes, and all other equipment and Work necessary to achieve required results.

PART 3: EXECUTION

3.1 SURFACE WATER CONTROL

A. The Contractor shall construct adequate ditches and diversions such that surface water runoff into the lake and from adjacent areas does not impact construction activities or flood the work area.

3.2 DEWATERING THE CONSTRUCTION SITE

Dewatering of Foundations

A. In areas of embankment fill, the groundwater level shall, at all times, unless otherwise directed by the Engineer, be maintained at a minimum depth of three (3) feet below the base of the initial excavation and subsequent levels of fill placement. Groundwater levels shall be lowered and maintained at this specified level below the anticipated depth of the base of the excavation prior to excavating.

B. Foundations, cut-off trenches and other parts of the construction site shall be dewatered and kept free of standing water or excessively muddy conditions as needed for proper execution of the construction Work. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps, casings, deep wells, well points, and other equipment needed to perform the dewatering as specified. Dewatering methods that cause a loss of fines from foundation areas will not be permitted.

C. To effectively dewater all excavations it will be necessary to construct sumps which are strategically placed at low points so that the foundation excavations drain to the sumps. If particularly high inflow occurs into the excavations at local areas, it may be necessary to install well points or interception trenches to intercept and remove the groundwater flow before it reaches the excavation.

D. It will be necessary to construct sedimentation ponds for the discharge from the sumps to settle out the suspended solids. These shall be designed and maintained in such a manner that only clear water is discharged to the adjacent surface waterways. The cost of the sumps, well points, interception trenches and sedimentation ponds shall be incidental to the Work.

E. Where the foundation of concrete structures is below the water table, the groundwater shall be lowered prior to excavating below the measured water level and shall be lowered and maintained at least three (3) feet below the excavation bottom until structural concrete is placed. Observation wells shall be installed prior to excavation to verify that the water level has been lowered sufficiently.

Lowering of Lake Level During Construction

A. The lake shall not be completely drained during the construction. Surface water runoff will continue to flow into the impoundment and the contractor shall be responsible for maintaining the water level of the impoundment. During clearing and grubbing operations, removal and replacement of the spillway structures, placement of embankment fill, and construction of the treatment wetlands, the water level will be maintained at or below elevation 805 ft-MSL. Surface flow from the upland area to the east of the embankment will be diverted during construction by creating a temporary small earthen berm beyond the east end of the embankment.

B. The Contractor shall furnish, install, operate and maintain all sumps, pumps, pipes, hoses, and other equipment needed to maintain the water level in the lake as specified above.

C. The Contractor shall place and compact earthfill, or other materials used to divert surface water flows, in such a manner as to produce a stable structure that will block flows and allow dewatering and earthfill placement within the footprint of the dam.

D. Excess surface water into the lake shall be pumped to downstream of the dam footprint as specified in the Construction Drawings.

3.3 REMOVAL OF TEMPORARY WORKS

A. After the temporary works have served their purposes, the Contractor shall remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works, unless otherwise directed by the Engineer or Owner.

3.4 RE-FILLING OF THE LAKE

A. Uncontrolled filling of the lake following construction will not be allowed. Re-filling of the lake to its normal operating level must be performed in accordance with the requirements of and as approved by the Georgia Safe Dams Program. The Contractor shall be responsible for ensuring that the re-filling of the lake to its normal operating pool level of 811 ft-MSL occurs at a rate not to exceed 2 feet per week. Should surface water runoff cause the lake to fill at a faster rate, excess water shall be release by pumping or by operating the valve on the low-level outlet pipe.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 02936 – GRASSING AND MULCHING

PART 1: GENERAL

1.1 SUMMARY

A. The Work of this Section of the Specifications consists of furnishing labor, equipment and materials and performing all operations necessary in preparing the ground surface, seeding, fertilizing, and mulching areas which are disturbed during the course of construction. All disrupted areas, earth-fill, and earth-excavated slopes outside lake limits created by this Work as specified by the Engineer shall be permanently grassed and mulched. All disrupted areas that are left inactive for more than 14 days (including the inside slopes of the embankment) shall be temporarily vegetated for erosion control.

1.2 COMPENSATION

Bid Item No. 02936/01 – Grassing and Mulching

A. MEASUREMENT

1. Bid Item No. 02936/01 – Grassing and Mulching will measured by the acre of established vegetation accepted by the Engineer. Measurements of area shall be based on a planimetric projection from the surface to be measured with no allowances for irregular surfaces or slopes.
2. Areas for which temporary grassing and mulching is performed, such as stockpiles, temporary drainage channels, areas required for temporary works or areas disturbed by the negligent actions of the Contractor, will not be measured for payment.
3. Measurement will be made to the nearest tenth (0.1) of an acre. No separate measurement will be made for areas in which jute matting has been installed.

B. PAYMENT

1. The unit price bid for Bid Item No. 02936/01 – Grassing and Mulching shall be full compensation for ground preparation, seeding, mulching, jute matting and plant establishment.
2. Topsoil moved from stockpile will be paid for at the price bid for Bid Item No. 02110/03 – Furnish and Place Topsoil - 6" Thick.

TECHNICAL SPECIFICATION

SECTION 02936 – GRASSING AND MULCHING

PART 2: PRODUCTS

2.1 MATERIALS

A. Grass seed mix and fertilizer shall be as follows:

Type	Grass	Planting Timeframe	Seed Application Rate	Fertilizer
Temporary	Annual Ryegrass	August - April	40lb/acre	10-10-10-
	Browntop Millet	April - August	40lb/acre	10-10-10
Permanent	Mix: Tall Fescue	October	30lb/acre	1st and 2nd yr.: 6-12-12
	Common Bermuda	October - Feb	60lb/acre	Maintenance: 10-10-10

B. Mulch shall be straw or hay or a mixture of both.

C. Jute mats shall be open plain weave of undyed and unbleached jute.

D. Staples for securing the mat shall be not less than 12 inches in length No. 8 galvanized wire.

PART 3: EXECUTION

3.1 GRASSING

A. The Contractor shall grass all areas that were disturbed by clearing or construction operations. Grassing shall be by seeding. Before seeding commences, the Contractor shall spread the stored stockpiled topsoil over the entire area, working the better topsoil into the more rocky areas. The entire area shall be smoothed with a drag and all clods broken up. All deleterious material, large stones, roots, limbs, and other debris shall be removed to leave a smooth area that would be suitable for mowing.

B. Grass seed shall be planted at the rate shown in paragraph 2.1A of this section of the Technical Specifications. Fertilizer shall be applied and mixed into the topsoil at the rate of 1,500 pounds per acre.

C. Grassing (by seeding) shall be completed as soon as practical after finish grading is completed in order to minimize erosion from rainfall and run-off. Any erosion occurring in grassed areas shall be immediately repaired.

D. Permanent seeding shall be done only if it can be completed between October and February. Use temporary grass as per paragraph 2.1A of this section of the Technical Specifications during remaining periods, and provide for later permanent seeding as Specified.

E. Seed, fertilizer, mulch, and periodic watering shall be applied in adequate quantities to assure a satisfactory ground cover over the entire disturbed area of construction operations. A satisfactory stand of grass is defined as a full cover, over the seeded area, of live and growing grass with no bare spots larger than two square feet.

F. Grassing may be by hydroseeding or by the following described method.

1. Seed and fertilizer mix shall be as described above. All planting and seeding shall be watered thoroughly as soon as completed and shall be watered at least twice daily, or more often if necessary to provide continuous growth without setback until all growth from seed is thoroughly established.
2. Seeded areas shall be immediately mulched to aid in the establishment of vegetation. The mulching material shall consist of dry straw or hay of good quality free of seeds of competing plants, and at the rate of two (2) tons per acre.
3. Straw or hay mulch will be applied uniformly over the area, leaving about 25 percent of the ground surface exposed. It must be spread within 24 hours after seeding is done. The spreading must be done by blower-type or other mulch-spreading equipment or by hand and anchored by pressing the mulch into the soil. Anchoring must be done immediately after the mulch is spread. A disk harrow with the disk set straight or a special "packer disk" may be used. The disk may be smooth or aerated and should be 20 inches or more in diameter and 8 to 12 inches apart. The edges of the disk should be dull enough not to cut the mulch but sharp enough to press it into the soil leaving much of it in an erect position.
4. Jute mats will be used in lieu of other mulching where shown on the Drawings and/or Specified herein.
5. Jute matting shall be furnished, placed and maintained over seeded areas as indicated.

*** END OF SECTION ***

DIVISION 3

CONCRETE WORKS

TECHNICAL SPECIFICATION

SECTION 03100 – CONCRETE FORMWORK

PART 1: GENERAL

1.1 REFERENCES

A. American Concrete Institute (ACI):
   1. 318-05, Building Code Requirements for Reinforced Concrete.
   2. 347-04, Formwork for Concrete.

1.2 SUBMITTALS

A. Shop Drawings:
   1. Layouts of panel joints, tie hole pattern, and form liners.
   2. Form Ties-Tapered Through-Bolts: Proposed method sealing form tie hole; coordinate with details shown.

B. Samples: One each as follows:
   1. Form ties.

C. Quality Control Submittals:
   1. Statements of qualification for formwork designer.
   2. Form Design Calculations, Stamped by Engineer Registered in Georgia.

1.3 QUALITY ASSURANCE

A. Qualifications: Formwork, falsework, and shoring designs prepared by an engineer licensed in the state of Project.

1.4 COMPENSATION

A. MEASUREMENT
   1. The Work of this section will not be measured for payment.

B. PAYMENT
   1. All costs for furnishing and placing concrete or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the concrete is incorporated. No separate or additional payment will be made for concrete incorporated in the Work.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION

3.1 SYSTEM DESIGN REQUIREMENTS

A. Design formwork in accordance with ACI 347-04 and ACI 318-05 to provide the concrete finishes specified in Section 03300, CAST-IN-PLACE CONCRETE.
   1. Make joints in forms watertight.

3.2 FORM MATERIALS

A. Wall Forms and Underside of Slabs and Beams:
   1. Materials: Plywood, hard plastic finished plywood, overlaid water proof particle board, or steel in "new and undamaged" condition, of sufficient strength and surface smoothness to produce specified finish. Use in combination with form liners where required.

B. Column Forms:
   1. Rectangular Columns: As specified for walls.

C. All Other Forms: Materials as specified for wall forms.

D. Form Sealer:
   1. Material: Surface sealer will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces when applied to most forms or form lines. A ready-to-use water based material formulated to reduce or eliminate surface imperfections, containing no mineral oil or organic solvents. Environmentally safe, meeting local, state, and federal regulations and can be used in clean water treatment plants.
   2. Manufacturer and Product: Master Builders, Inc.; Rheofinish.

E. Rustication Grooves and Beveled Edge Corner Strips:
   1. Nonabsorbent materials, compatible with form surface, fully sealed on all sides prohibiting loss of paste or water between the two surfaces.

F. Form Ties:
   1. Material: Steel
   2. Spreader Inserts:
      a) Conical or spherical type.

      b) Design to maintain positive contact with forming material.

      c) Furnish units that will leave no metal closer than 1 inch to concrete surface when forms, inserts, and tie ends are removed.
   3. Wire ties not permitted.

4. Flat bar ties for panel forms, furnish plastic or rubber inserts with minimum 1-inch depth and sufficient dimensions to permit patching of tie hole.
5. Water Stop Ties: For water-holding structures, pipe galleries, and accessible spaces below finish grade, furnish one of the following:
   a) Integral steel water stop 0.103-inch thick and 0.625-inch in diameter tightly and continuously welded to tie.

   b) Neoprene water stop 3/16-inch thick and 15/16-inch in diameter whose center hole is 1/2 diameter of tie, or a molded plastic water stop of comparable size.

   c) Water Stop: Oriented perpendicular to tie and symmetrical about center of tie.

   d) Design ties to prevent rotation or disturbance of center portion of tie during removal of ends and to prevent water leaking along tie.
6. Through-Bolts: Tapered minimum 1-inch diameter at smallest end.
7. Elastic Vinyl Plug: Design and size of plug to allow insertion with tool to enable plug to elongate and return to original length, and diameter upon removal forming a watertight seal.
   a) Manufacturer and Product: Dayton Superior Co., Miamisburg, OH; Dayton Sure Plug.

3.3 ERECTION

A. General: Unless specified otherwise, follow the applicable recommendations of ACI 347-04.

B. Beveled Edges (Chamfer):
   1. Form 3/4-inch bevels at concrete edges, unless otherwise shown.
   2. Where beveled edges on existing adjacent structures are other than 3/4-inch, obtain ENGINEER's approval of size prior to placement of beveled edge.

C. Wall Forms:
   1. Do not reuse forms with damaged surfaces.
   2. Locate form ties and joints in an uninterrupted pattern for smooth and uniform surface.
   3. Inspect form surfaces prior to installation to assure conformance with specified tolerances.

D. Forms for Curbs, Sidewalks, and Driveways:
   1. Provide standard steel or wood forms to prevent movement.
   2. Set forms to true lines and grades, and securely stake in position.

E. Form Tolerances: Provide forms in accordance with ACI 347-04 and ACI 318-05 and the following tolerances for finishes specified:

1. Wall Tolerances:
   a) Straight Vertical or Horizontal Wall Surface: Flat planes within tolerance specified.
   b) Wall Type W-A: Plumb within 1/4 inch in 10 feet or within 1 inch from top to bottom for walls over 40 feet high.
      1) Depressions in Wall Surface: Maximum 5/16 inch when 10-foot straightedge is placed on high points in all directions.
   c) Wall Type W-B: Plumb within 1/8 inch in 10 feet or within 1/2 inch from top to bottom for walls over 40 feet high.
      1) Depressions in Wall Surface: Maximum 1/8 inch when 10-foot straightedge is placed on high points in all directions.
   d) Thicknesses: Maximum 1/4-inch minus or 1/2-inch plus from dimensions shown.
2. Slab Tolerances:
   a) Exposed Slab Surfaces: Comprise of flat planes as required within tolerances specified.
   b) Slab Finish Tolerances and Slope Tolerances: Crowns on floor surface not too high as to prevent 10-foot straightedge from resting on end blocks, nor low spots that allow a block of twice the tolerance in thickness to pass under the supported 10-foot straightedge.
   c) Slab Type S-A: Steel gauge block 5/16-inch thick.
   d) Slab Type S-B: Steel gauge block 1/8-inch thick.
   e) Slab Type S-A and S-B:
      1) Finish Slab Elevation: Slope slabs to floor drain and gutter, and shall adequately drain regardless of tolerances.
      2) Thickness: Maximum 1/4-inch minus or 1/2-inch plus from thickness shown, except where thickness tolerance will not affect slope, drainage, or slab elevation.
3. Beams and Columns Tolerances:
   a) Exposed Straight Horizontal and Vertical Surfaces: Flat planes within tolerances specified.
   b) Beam Type B-A:
      1) Physical Dimensions: Maximum 1/4-inch minus or 1/2-inch plus from dimension shown.
      2) Elevations: Within 1/2-inch plus or minus except where tops of beams become part of finished slab. In this case refer to slab tolerances.
   c) Column Type C-A:
      1) Physical Dimensions: Maximum 1/4-inch minus or 1/2-inch plus from dimension shown.
      2) Elevations: Within 1/2-inch plus or minus except where tops of beams become part of finished slab. In this case refer to slab tolerances.

d) Column Type C-A:
   1) Physical Dimensions: Maximum 1/4-inch minus or 1/2-inch plus from dimension shown.
   2) Plumb within 1/4-inch in 10 feet in all directions with maximum 1/2-inch out-of-plumb at top with respect to bottom.

3.4 FORM SURFACE PREPARATION

A. Thoroughly clean form surfaces in contact with concrete or previous concrete, dirt, and other surface contaminants prior to coating surface.

B. Exposed Wood Forms in Contact with Concrete: Apply form sealer as recommended by the sealer material manufacturer.

C. Steel Forms: Apply form sealer to steel forms as soon as they are cleaned to prevent discoloration of concrete from rust.

D. Form Liners: Provide liners with full sheets and place seams at horizontal and vertical grooves. Prepare as recommended by form liner manufacturer.

3.5 FORM REMOVAL

A. Formwork not supporting weight of concrete, (i.e., sides of beams, walls, columns, and similar parts of the Work) may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.

B. Leave forms and shoring for elevated structural slabs or beams in place, in accordance with ACI 318-04, Chapter 6, and until concrete has reached compressive strength equal to 80 percent of the specified 28-day compressive strength as determined by test cylinders.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03210 – REINFORCING STEEL

PART 1: GENERAL

1.1 REFERENCES

A. American Concrete Institute (ACI):
   1. 318-05, Building Code Requirements for Reinforced Concrete and Commentary.
   2. SP-66-04, ACI Detailing Manual.

B. American Society for Testing and Materials (ASTM):
   1. A82-90a, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
   2. A185-90a, Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
   3. A497-90b, Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
   4. A61590, Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
   5. A706/A706M-90, Low Alloy Steel Deformed Bars for Concrete Reinforcement.

C. American Welding Society (AWS): ANSI/AWS D1.4-92, Structural Welding Code-Reinforcing Steel

D. Concrete Reinforcing Steel Institute (CRSI):
   1. Placing Reinforcing Bars, 1991, 6th Edition.
   2. Manual of Standard Practice, 1990, 25th Edition.

E. International Conference of Building Officials (ICBO): ICBO Research Report.

F. Wire Reinforcement Institute: Manual of Standard Practice, Welded Wire Fabric.

1.2 SUBMITTALS

A. Shop Drawings:
   1. Prepare in accordance with CRSI 1990 Manual of Standard Practice and ACI SP-66 Detailing Manual and stamped by an Engineer registered in Georgia:
      a) Bending lists.
      b) Placing drawings.
   2. Welded splice, Cadweld splice, and mechanical threaded splice.

B. Quality Control Submittals:
   1. Lab test reports for reinforcing steel showing stress-strain curves and ultimate strengths.
   2. Mechanical Threaded Connections:
      a) Current International Conference of Building Officials (ICBO) Research Report or equivalent code agency report listing findings to include acceptance, special inspection requirements, and restrictions.
      b) Manufacturer's instructions.

c) Verification that device threads have been checked and meet all requirements for thread quality, in accordance with manufacturer's published methods.

3. Welding Qualification: Prior to welding, submit welder qualifications and radiographic nondestructive testing procedures.
4. Test results of field-testing.

1.3 QUALITY ASSURANCE

A. Welder Qualifications: Certified in accordance with AWS D1.4-92.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Unload, store, and handle bars in accordance with CRSI publication "Placing Reinforcing Bars."

1.5 COMPENSATION

A. MEASUREMENT
1. The Work of this section will not be measured for payment.

B. PAYMENT
1. All costs for furnishing and placing reinforcing steel or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the reinforcing steel is incorporated. No separate or additional payment will be made for reinforcing steel incorporated in the Work.

PART 2: PRODUCTS

2.1 MATERIALS

A. Deformed Billet-steel Reinforcing Bars:
1. ASTM A615-90, Grade 60, including Supplemental Requirements S1 where welding is not required.
2. Stirrups and Column Ties: ASTM A615-90, Grade 40 bars.
3. Spirals for Columns: ASTM A615-90, Grade 60.
4. ASTM A706/A706M-90, Grade 60, including Supplemental Requirements for reinforcing to be welded.

B. Splices and Mechanical Connections:
1. Metal Sleeve: Furnish with cast filler metal, capable of developing, in tension or compression, 100 percent of minimum tensile strength of the bar.
2. Manufacturer and Product: Erico Products, Inc., Cleveland, OH; Cadweld T-Series

3. Mechanical Threaded Connections: Furnish metal coupling sleeve for splicing reinforcing in secondary members or in areas of low stress with internal threads engaging threaded ends of bars developing in tension or compression 125 percent of yield strength of bar.
4. Manufacturers and Products:
   a) Erico Products, Inc., Cleveland, OH; Lenton Reinforcing Steel Series. Couplers.
   b) Richmond Screw Anchor Co., Forth Worth, TX; Richmond DB-SAE Dowel Bar Splicers.

C. Welded Wire Fabric:
1. ASTM A185-90a or A497-90b and ACI 318/318R-05, using ASTM A82-90a wire of 75 ksi minimum tensile strength.
2. Furnish flat sheets only, rolled sheets not permitted.

2.2 ACCESSORIES

A. Tie Wire:
1. Black, soft-annealed 16-gauge wire.
2. Nylon-, epoxy-, or plastic-coated wire.

B. Bar Supports and Spacers:
1. Precast concrete bar supports, cementitious fiber-reinforced bar supports, or all-plastic bar supports and side form spacers meeting the requirements of CRSI Manual of Standard Practice. Do not use other types of supports or spacers.
2. In Beams, Columns, Walls, and Slabs Exposed to View After Stripping: Small rectangular concrete blocks made up of same color and strength as concrete being placed around them or all-plastic bar supports and side form spacers.
3. Precast concrete supports of same strength as concrete for reinforcing in concrete placed on grade.

2.3 FABRICATION

A. Follow CRSI Manual of Standard Practice.

B. Bend all bars cold.

PART 3: EXECUTION

3.1 PREPARATION

A. Notify ENGINEER when reinforcing is ready for inspection and allow sufficient time for inspection prior to placing concrete.

B. Clean metal reinforcement of loose mill scale, oil, earth, and other contaminants.

C. Coat wire projecting from precast concrete bar supports with dielectric material, epoxy, or plastic.

3.2 REINFORCING BAR INSTALLATION

A. Bundle or space bars, instead of bending where construction access through reinforcing is necessary.

B. Spacing and Positioning: Conform to ACI 318/318R-05.

C. Location Tolerances: In accordance with CRSI publication, "Placing Reinforcing Bars".

D. Splicing:
1. Follow ACI-318/318R-05.
2. Use lap splices unless otherwise shown or permitted in writing by ENGINEER.
3. Welded Splices: Accomplish by full penetration groove welds and develop at least 125 percent of yield strength of bar.
4. Stagger splices in adjacent bars.
5. Metal sleeves may be used.

E. Mechanical Splices and Connections:
1. Use only in areas specifically approved in writing by the ENGINEER.
2. Install as required by manufacturer with threads tightened and in accordance with ICBO Research Report.
3. Maintain minimum edge distance and concrete cover.

F. Tying Deformed Reinforcing Bars:
1. Tie every other intersection on mats made up of Nos. 3, 4, 5, and 6 bars to hold them firmly at required spacing.
2. Bend all noncoated tie wire to prevent tie wire from being closer than 1-inch from the surface of concrete.

G. Reinforcement Around Openings: Place an equivalent area of steel bars or fabric around pipe or openings and extend as shown, on each side sufficiently to develop bond with each bar.

H. Welding Reinforcement:
   1. Only A706/A706M-90 bars may be welded.
   2. Do not perform welding until welder qualifications are approved.

I. Straightening and Rebending: Field bending of reinforcing steel bars is not permitted.

3.3 WELDED WIRE FABRIC INSTALLATION

A. Use only for single layer reinforced slabs on grade.

B. Extend fabric to within 2-inches of edges of slab, and lap splices at least 1-1/2 courses of fabric or minimum 8-inches.

C. Tie laps and splices securely at ends and at least every 24 inches with tie wire.

D. Place welded wire fabric on concrete blocks at correct distance as shown, above bottom of slab and rigidly support equal to that provided for reinforced bars. Do not use broken concrete, brick, or stone.

E. Follow ACI 318/318R and current Manual of Standard Practice, Welded Wire Fabric.

F. Do not use fabric that has been rolled. Install flat sheets only.

3.4 TESTS AND INSPECTION

A. Test 10 percent of all welds using radiographic, nondestructive testing procedures referenced in AWS D1.4-92.

B. Inspect each splice and verify each component is in accordance with manufacturer's instruction and ICBO Research Report.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03251 – EXPANSION AND CONSTRUCTION JOINTS

PART 1: GENERAL

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. A36-05, Standard Specification for Structural Steel.
   2. A653/A653M-06, Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
   3. D226-06, Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
   4. D227-03, Standard Specification for Coal-Tar-Saturated Organic Felt used in Roofing and Waterproofing.
   5. D994-98(03), Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
   6. D1056-00, Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
   7. D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

B. Corps of Engineers (COE): CRD-C-572-74, Corps of Engineers Specifications for Polyvinylchloride Waterstop.

C. American National Standards Institute (ANSI): ANSI/NSF 61-2005, Drinking Water System Components, Health Effects.

1.2 SUBMITTALS

A. Shop Drawings:
   1. Plastic Type Water Stops: Details of splices to be used and method of securing water stop in the forms and supporting water stop so as to maintain proper orientation and location during concrete placement.
   2. Construction Joints: Layout and location indicating type to be used.
   3. Joint fillers for horizontal and sloped joints.
   4. Water stop.

B. Samples:
   1. Splice, joint, and fabricated cross of each size, shape, and fitting of water stop(s) proposed for use.

C. Quality Control Submittals:
   1. Water stop manufacturer's written instructions for product shipment, storage, handling, installation field splices, and repair.
   2. Joint Filler and Primer: Manufacturer's written instructions for product shipment, storage, handling, application, and repair.

1.3 QUALITY ASSURANCE

A. Waterstop manufacturer shall demonstrate five years (minimum) continuous, successful experience in production of waterstops.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Verify that water stops delivered are in accordance with cross-section dimensions as shown and manufacturer's product data prior to unloading and storing on site.

1.5 COMPENSATION

A. Measurement
   1. The Work of this section will not be measured for payment.

B. Payment
   1. All costs for furnishing and placing expansion and construction joints or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the expansion or construction joint is incorporated. No separate or additional payment will be made for expansion or construction joints incorporated in the Work.

PART 2: PRODUCTS

2.1 PLASTIC WATER STOP

A. Extruded from an elastomeric plastic compound of which the basic resin shall be polyvinyl chloride (PVC). Reclaimed PVC in the compound is not acceptable.

B. Specific Gravity: Approximately 1.4.

C. Shore Durometer Type A Hardness: Approximately 80.

D. Tensile Strength: 2000 psi

E. Performance Requirements: Corps of Engineers' Specification CRD-C-572.

F. Type: Ribbed without center bulb for Contraction and Construction Joints; Ribbed with center bulb for expansion joints.

G. Corrugated or tapered type water stops are not acceptable.

H. Length: Length of water stop shall be a minimum of 9 inches.

I. Thickness: Constant from bulb edge to the outside stop edge.

J. Manufacturers and Catalog Numbers:
   1. Greenstreak Plastic Products, St. Louis, MO; Catalog No. 03250/GRD (1987): Style 646 & 735 (9 inch by 3/8 inch).

2.2 BOND BREAKER

A. Tape for Expansion Joints: Adhesive-backed glazed butyl or polyethylene tape, same width as the joint, that will adhere to the premolded joint material or concrete surface.

B. Use either bond breaker tape or a bond prevention material as specified in Section 03300, CAST-IN-PLACE CONCRETE, except where a tape is specifically called for.

2.3 PREMOLDED JOINT FILLER

A. Bituminous Type: ASTM D994-98(2003) or D1751-04.

B. Sponge Rubber: Neoprene, closed-cell, expanded; ASTM D1056 Type 2C5, with a compression deflection, 25 percent deflection (limits), 119 to 168 kPa (17 to 24 psi) minimum.
   1. Manufacturer and Product: Rubatex Corp.; R451N.

2.4 STEEL EXPANSION JOINT DOWELS

A. Dowels: ASTM A36/A36M-05 round smooth steel bars.

B. Bar Coating: Two-coat System No. 9. FUSION BONDED, STEEL DOWEL COATING, as specified in Section 09900, PAINTING, with a factory-applied lubricating coating.

2.5 ACCESSORIES

A. Nonshrink Grout:
   1. As specified in Section 03600. GROUT.
   2. Compatible with joint sealant.

B. Roofing Felt:
   1. ASTM D226-05, Type II, 30-pound asphalt-saturated or equal weight of ASTM D227-03 coal tar saturated felt.

C. Reinforcing Steel: As specified in Section 03210, REINFORCING STEEL.

D. Nails: As required for securing bituminous type premolded joint filler.

E. Masking Tape: As required to temporarily adhere to concrete at each side of joint to receive filler.

PART 3: EXECUTION

3.1 GENERAL

A. Construct straight joints; make vertical or horizontal, except where walls intersect sloping floors.

B. Commence concrete placement after the joint preparation is complete.

C. Time Between Concrete Pours: As specified in Section 03300, CAST-IN-PLACE CONCRETE.

3.2 SURFACE PREPARATION

A. Construction Joints: Prior to placement of abutting concrete, clean contact surface:
1. Remove laitance and spillage from reinforcing steel and dowels.
2. Roughen surface to a minimum of 1/4-inch amplitude:
   a). Sandblast after the concrete has fully cured.
   b). Water blast after the concrete has partially cured.
   c). Green Cut fresh concrete with high pressure water and hand tools.
3. Perform cleaning so as not to damage water stop, if one is present.

B. Expansion Joint with Pourable Filler:
1. Use motorized wire brush or other motorized device to mechanically roughen and thoroughly clean concrete surfaces on each side of joint from plastic water stops to the top of the joint.
2. Use clean and dry high-pressure air to remove dust and foreign material, and dry joint.
3. Prime surfaces before placing joint filler.
4. Avoid damage to water stop.

C. Expansion Joint without Pourable Filler:
1. Coat concrete surfaces above and below plastic water stop with bond breaker.
2. Do not damage water stop.

3.3 INSTALLATION OF WATER STOPS

A. General:
1. Join water stops at intersections to provide continuous seal.
2. Center water stop on joint.
3. Secure water stop in correct position to avoid displacement during concrete placement.
4. Repair or replace damaged water stop.
5. Place concrete and vibrate to obtain impervious concrete in the vicinity of all joints.

6. Joints in Footings and Slabs:
   a). Ensure that space beneath plastic water stop is completely filled with concrete.
   b). During concrete placement, make a visual inspection of the entire water stop area.
   c). Limit concrete placement to elevation of water stop in first pass, vibrate the concrete under the water stop, lift the water stop to confirm full consolidation without voids, then place remaining concrete to full height of slab.
   d). Apply procedure to full length of plastic water stops.

B. Plastic Water Stop:
1. Install in accordance with manufacturer's written instructions.
2. Splice in accordance with the water stop manufacturer's written instructions, using a thermostatically controlled heating iron, butt splice unless specifically detailed otherwise.
   a). Allow at least 10 minutes before the new splice is pulled or strained in any way.
   b). Finished splices shall provide a cross-section that is dense and free of porosite with tensile strength of not less than 80 percent of the unsplices materials.

3.4 EXPANSION JOINT INSTALLATION

A. General
1. Place bond breaker above and below water stop when premolded joint filler and pourable joint filler is not used.
2. Premolded Joint Filler (sufficient in width to completely fill the joint space where shown):
   a). If a water stop is in the joint, cut premolded joint filler to butt tightly against the water stop and the side forms.
   b). Precut premolded joint filler to the required depth at locations where joint filler or sealant is to be applied.
3. Form cavities for joint filler with either precut, premolded joint filler, or smooth removable accurately shaped material. Entire joint above water stop, in slabs, shall be formed and removed so that entire space down to water stop can be filled with the pourable joint filler.
4. Vibrate concrete thoroughly along the joint form to produce a dense, smooth surface.

B. Bituminous Type Premolded Joint Filler:
1. Drive nails approximately 1 foot 6 inches on center through the filler, prior to installing, to provide anchorage embedment into the concrete during concrete placement.
2. Secure premolded joint filler in forms before concrete is placed.
3. Install in walkways, at changes in direction, at intersections, at each side of driveway entrances, and at 45-foot intervals, maximum.

C. Pourable Joint Filler:
   1. General: Install in accordance with the manufacturer's written instructions, except as specified below:
      a). Apply primer prior to pouring joint filler.
      b). Fill entire joint above the water stop with joint filler as shown.
      c). Use masking tape on top of slabs at sides of joints; clean spillage. Remove masking tape afterwards.
   2. Multicomponent Type for Potable Water Structures: Install in accordance with manufacturer's written instructions.

D. Steel Expansion Joint Dowels:
   1. Install coated and lubricated bars parallel to wall or slab surface and in true horizontal position perpendicular to the joint in both plan and section view, so as to permit joint to expand or contract without bending the dowels.
   2. Secure dowels tightly in forms with rigid ties.
   3. Install reinforcing steel in the concrete as shown to protect the concrete on each side of the dowels and to resist any forces created by joint movement.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03300 – CAST-IN-PLACE CONCRETE

PART 1: GENERAL

1.1 REFERENCES

A. American Concrete Institute (ACI):
1. 211.1-91, Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete (Re-approved 2002).
2. 301-05 Specifications for Structural Concrete for Buildings
3. 304R-00, Guide for Measuring, Mixing, Transporting, and Placing Concrete.
4. 305R-99, Hot Weather Concreting.
5. 306R-88, Cold Weather Concreting.
6. 309R-05, Guide for Consolidation of Concrete.
7. 318/318R-05, Building Code Requirements for Reinforced Concrete.

B. American Society for Testing and Materials (ASTM):
1. C31/C31M-06, Standard Practice for Making and Curing Concrete Test Specimens in the Field.
2. C33-03, Standard Specification for Concrete Aggregates.
3. C39/C39M-05e1, Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
4. C88-05, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
5. C94/C94M-06, Standard Specification for Ready-Mixed Concrete.
6. C143/C143M-05a, Standard Test Method for Slump of Hydraulic Cement Concrete.
7. C150-05, Standard Specification for Portland Cement.
8. C157/C157M-06, Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete.
9. C192/C192M-06, Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
10. C231-04, Standard Test Method for Air Content Freshly Mixed Concrete by the Pressure Method.
11. C260-06, Standard Specification for Air-Entraining Admixtures for Concrete.
12. C311-05, Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture and Portland-Cement Concrete.
13. C452-05, Standard Test Method for Potential Expansion of Portland-Cement Mortars Exposed to Sulfate.
14. C494/C494M-05a, Standard Specification for Chemical Admixtures for Concrete.
15. C595-06, Standard Specification for Blended Hydraulic Cements.
16. C618-05, Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
17. E329-06a, Standard Practice for Use in the Evaluation of Testing and Inspection Agencies as Used in Construction.

C. National Bureau of Standards: Handbook No. 44, Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices.

1.2 DEFINITIONS

A. *Defective* Areas: Surface defects that include honeycomb, rock pockets, indentations, cracks 0.005-inch wide and larger, and cracks that leak in water-holding basins, spalls chips, air bubbles, pinholes, bug holes, embedded debris, lift lines, sand lines, bleed lines, leakage from form joints, fins and other projections, form popouts, texture irregularities, and stains and other color variations that cannot be removed by cleaning.

B. New Concrete: Less than 60 days old.

1.3 SUBMITTALS

A. Administrative Submittals: Preinstallation conference minutes.

B. Shop Drawings:
1. Mix design and cylinder test reports that include air content, strength, and slump.
2. Concrete placement drawings identifying time between adjacent pours, and location of each type of construction joint to be used.
3. Plans and sketches for placing tremie concrete when used on the Project.
4. Manufacturer's data, recommendations, and instructions for specific use on this Project for bonding agent, bond breaker, and patching materials.
5. Gradation for coarse and for fine aggregates and for the coarse and fine combined together (three separate gradings listed as percent passing versus sieve sizes).
6. Water-holding Basin Repair Methods.

C. Quality Control Submittals:
1. Portland Cement:
   a). Cement Manufacturer's Test Reports:
      1) For each batch of cement showing chemical ingredients and percentage of chloride in cement.
      2) Manufacturer's Certificate of Compliance.
2. Admixtures:
   a). Manufacturers' Certificate of Compliance.
   b). Manufacturers' Certificate of Proper Installation.
   c). Manufacturers' Job Service Reports.
   d). Manufacturers' test reports showing chemical ingredients and percentage of chloride in each admixture and fly ash.
   e). Fly Ash:
      1) Source Test Analysis Report(s) for most recent test prior to shipment of material to sire and as requested by Engineer throughout Project life.
      2) Manufacturer's Certificate of Compliance.

3. Aggregates:
   a). Certificate of Compliance for each type used.
   b). Test Reports:
      1) Prepared by an independent testing laboratory, including statement concerning aggregates reactivity and aggregate effects on concrete finish and appearance.
4. Bonding Agent:
   a). Manufacturers' Certificate of Compliance.
   b). Manufacturers' application instructions and pot life.

5. Cold Weather Curing and Protection:
   a). Detailed plan for cold weather curing and protection of concrete to be placed and cured in weather below 40 degrees F.
   b). Record of maximum and minimum air temperature recorded daily.
6. Batch Plant: Statement of Certification.

7. Concrete: Furnish the following reports from a certified testing laboratory prior to placing concrete:
   a). Concrete mix designs.
   b). Certified trial mix laboratory test reports for each mix design.
   c). Certified cylinder test results from laboratory mixes.
   d). Mix and test reports signed by registered engineer.
8. Concrete Delivery Tickets:
   a). Furnish to Engineer with each batch of concrete before unloading at site.
   b). Information: As stated in Section 16 of ASTM C94/C94M-06, record of drum revolution counter, and type, brand, test certification, and amount of fly ash, if used.
   c). Statement that volume in each truck does not exceed the maximum permitted in Article CONCRETE MIXING.
9. Water-Holding Basin Repair Methods: As necessary if water-holding basins fail tests and exposed concrete shows leakage.
10. Patching Material: Certification of chloride quantity and quantities of other chemicals causing corrosion.
11. Manufacturer's Certificate of Compliance for patch work.

D. Contract Closeout Submittals:
   1. Admixtures: Manufacturers' Field Service Reports.
   2. Crack Repair Report: Epoxy injection materials manufacturer certification that crack repair was performed by a licensed and certified applicator in accordance with the manufacturer's recommendations.

1.4 QUALITY ASSURANCE

A. Qualifications
   1. Mix Designer: Licensed professional engineer registered in the state of Project.
   2. Batch Plant: Currently certified by the national Ready Mixed Concrete Association.
   3. Epoxy Injection Applicator: Licensed by epoxy manufacturer.

B. Preinstallation Meetings:
   1. Meeting Attendees:
      a). CONTRACTOR
      b). Ready-mix producer.
      c). Admixture representative.
      d). Testing personnel.
      e). ENGINEER.
   2. Schedule and conduct prior to incorporation of respective products into Project. Notify ENGINEER of location and time.
   3. Agenda shall include:
      a). Admixture types, dosage, performance, and redosing at site.
      b). Mix designs, test of mixes, and Submittals.
      c). Placement methods, techniques, equipment, consolidation, and form pressures.
      d). Slump and placement time to maintain slump.
      e). Finish, curing, and water retention.
      f). Other specified requirements requiring coordination.
   4. Conference minutes as specified in Section 01039, COORDINATION.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Placement:
   1. Do not place concrete when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling, without special protection as specified or as approved by the Engineer.
   2. Do not place concrete against frozen earth or ice, or against forms and reinforcement with frost or ice present.
   3. Provide heated enclosures when air temperatures are below 40 degrees F.

1.6 COMPENSATION

A. MEASUREMENT
   1. The Work of this section will not be measured for payment.

B. PAYMENT
   1. All costs for furnishing and placing cast in place concrete or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the cast in place concrete is incorporated. No separate or additional payment will be made cast in place concrete incorporated in the Work.

PART 2: PRODUCTS

2.1 CEMENT

A. Acquire each type from only one source.

B. Portland Cement Type I or Type II:
1. Meet ASTM C150-05.
2. Alkalies: Maximum 0.60 percent.
3. Tricalcium Aluminate Content of Type I Cement: Maximum 12 percent.
4. Nonhydraulic Above grade Structures: Use either Type I or Type II cement.
5. Hydraulic and Below grade Structures and Sewers: Use either Type II cement or combination of Type I mixed with fly ash.
6. Fly ash may be used in combination with any cement provided requirements of these Specifications are met. Combine fly ash at batch plant or during production of the cement (ASTM C595-06, Type IP cement). For combination fly ash and cement (ASTM C595-06, Type IP cement), cement and fly ash shall meet the requirements of these Specifications.

C. Fine Aggregates:
1. Clean, sharp, natural sand.
2. Meet ASTM C33-03.
3. Materials Passing 200 Sieve: 4 percent maximum.
4. Limit deleterious substances as shown in Table 1 of ASTM C33-03.

D. Coarse Aggregate:
1. Natural gravels, a combination of gravels and crushed gravels, crushed stone, or a combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
2. Materials Passing 200 Sieve: 0.5 percent maximum.

E. Admixtures:
1. Source: All from the same manufacturer.
2. Characteristics: Compatible with each other and free of chlorides or other corrosive chemicals.
3. Air Entraining Admixture:
   a). Meet ASTM C260-06, nontoxic after 30 days and contain no chlorides or other chemicals causing corrosion.
   b). Concrete with air-entrainment admixture added shall maintain air percentage as batched, within plus or minus 2 percent for the time required for placement into the structure.

4. Water-Reducing Admixtures: Meet ASTM C494/C494M-05a, Type A or Type D.
   a). Manufacturers and Products:
      1) Master Builders, Inc., Cleveland, OH; Pozzolith or Pozzolith Polyheed.
      2) W.R. Grace & Co., Cambridge, MA; WRDA HYCOL.
      3) Euclid Chemical Co., Cleveland, OH; Eucon WR-90.
5. Superplasticizers:
   a). Meet ASTM C494/C494M-05a.
   b). Hold slump of 5 inches or greater for the time required for placement into the structure with specified water-cement ratio.
   c). Use type as recommended by manufacturer in applicable temperature ranges allowed.
   d). Type F or G.
   e). Manufacturers and Products:
      1) Master Builders, Inc., Cleveland, OH; Rheobuild or Pozzolith Polyheed at a dosage greater than 10 ounces per 100 pounds of cement.
      2) W.R. Grace & Co., Cambridge, MA; Daracem 100.
      3) Euclid Chemical Co., Cleveland, OH; Eucon Super F or 537G.
      4) No "or-equal" or substitute products will be considered.
6. Pozzolan (Fly Ash): Class C or Class F fly ash meeting ASTM C618-05, including requirements of Tables 1 and 2, except as modified herein:
   a). Loss on Ignition: Maximum 3 percent.
   b). Water Requirement: Maximum 100 percent of control.
   c). $\frac{CaO(\%)}{Fe_2O_3(\%)}$-5: Maximum 1.5
   d). Requirements of Table 1A, apply when aggregates or any portion of coarse or fine aggregates used are reactive as specified under paragraph Aggregates.
   e). Requirements of Table 2A, Reactivity with Cement Alkalies, apply when aggregates or portions of aggregates are reactive as specified under paragraph Aggregates.
   f). Requirements of Table 2A, Uniformity Requirements, apply when loss on ignition of fly ash furnished exceeds 3 percent.
7. Water: Clean potable, free from oil acid alkali, organic matter and containing less than 50 ppm of chlorides.

2.2 ANCILLARY MATERIALS

A. Crack Repair Epoxy:
   1. Water insensitive two component epoxy using SCB Process by Adhesive Engineering Co., San Carlos, CA or two-component water insensitive epoxy injection by Sika Chemical Corp., Lyndhurst, NJ.

B. Bonding Agent:
   1. Furnish as recommended by manufacturer to meet Project requirements including surface finish, pot life, set time, vertical or horizontal application, and forming restrictions.
   2. Manufacturers:
      a). Sika Chemical Corp., Lyndhurst, NJ.
      b). Adhesive Engineering Co., San Carlos, CA.

C. Bond Breaker:
   1. Nonstaining type, providing positive bond prevention.
   2. Manufacturers and Products:
      a). Williams Distributors, Inc., Seattle, WA; Williams Tilt-up Compound.
      b). SCA Construction Supply Div., Superior Concrete Accessories, Franklin Park, IL Silcoseal 77.
      c). Burke Co., San Mateo, CA; Burke Clean Lift Bond Breaker or Burke Tilt Free Bond Breaker.

D. Rubber Pad:
   1. Neoprene meeting ASTM D2000-06, Type M2BC414

E. Patching Material: Low pressure silca fume mortar.

F. Sponge Rubber:
   1. Neoprene, closed-cell, expanded, meeting ASTM D1056, Type 2C5 with compression deflection, 25 percent deflection (limits), 119 to 168 kPa (17 to 24 psi) minimum.

2.3 CONCRETE MIX DESIGN

A. Design: Select and proportion ingredients using trial bathes; sample, cure and test concrete mix through an approved independent testing laboratory in accordance with ACI-309-05 per ACI 211.1-91.

<u>Concrete Compressive Strength, F'c:</u>
   1. 4,000 psi at 28 days, unless otherwise shown.
   2. Design lab-cured trail mix cylinder to meet the requirements of this section.
   3. Use additional cement or cement plus fly ash above minimum specified if required to meet average compressive strength, F'cr.
   4. Use F'cr as a basis for selection of concrete proportions as set forth in Chapter 5 of ACI 318-05 and commentary ACI 318R-05.
   5. F'cr: Equal to F'c plus 1200 when data is not available to establish standard deviation.

Concrete Fill:

1. Design for 2,500 psi at 28 days using 1-inch aggregate, 4-inch maximum slump and 0.46 maximum water-cement ratio.
2. Use water-reducing admixture.

B. Proportions:

1. Design mix to meet aesthetic and structural concrete requirements.
2. In accordance with ACI 211.1-91 unless specified otherwise.
3. Water-cement ratio (or water-cement plus fly ash ratio) shall control the amount of total water added to concrete as follows:

Coarse Aggregate Size	W/C Ratio
1-1/2 inch	0.40
1 inch	0.385
3/4 inch	0.375

4. Minimum Cement Content (or combined cement plus fly ash content when fly ash is used):
   a). 517 pounds per cubic yard for concrete with 1-1/2-inch maximum size aggregate.
   b). 540 pounds per cubic yard for 1-inch maximum size aggregate.
   c). 564 pounds per cubic yard for 3/4-inch maximum size aggregate.
   d). Increase cement content or combined cement plus fly ash content, as required to meet strength requirements.

C. Concrete Shrinkage: Design mix so that shrinkage test results at 28 days do not exceed 0.048 percent, in accordance with ASTM C157/C157M-06.

D. Admixtures:

1. Air Content: 4 to 6 percent when tested in accordance with ASTM C231-04; 3 percent where heavy-duty concrete floor finish is required.
2. Fly Ash: Maximum 25 percent, minimum 15 percent of total weight of fly ash plus cement.
3. Superplasticizers:
   a). Use in concrete mix.

E. Slump Range at Site (Maintain Unit Consolidated in Form):

1. Minimum: 5 inches.
2. Maximum: 9 inches.
3. Take design mix test cylinders from concrete with slump equal to that to be used on the Project.

F. Combined Aggregate Gradings:

1. For Structures: 1-1/2-inch maximum grading, as shown in table unless otherwise specified or shown. Grading selected is Contractor's option.
2. Limit the water-cement ratio to the value specified for the combined grading selected.

3. Grading Limits:

PERCENTAGE PASSING			
Sieve Sizes	**1-1/2" Max.**	**1" Max.**	**3/4" Max.**
	-100	-	-
1-1/2"	95 - 100	- 100	-
1"	65 - 85	90 - 100	- 100
3/4"	55 - 75	70 - 90	92 - 100
1/2"	-	-	68 - 86
3/8"	40 - 55	45 - 65	57 - 74
No. 4	30 - 45	31 - 47	38 - 57
No. 8	23 - 38	23 - 40	28 - 46
No. 16	16 - 30	17 - 35	20 - 36
No. 30	10 – 20	10 -23	14 - 25
No. 50	4 – 10	2 - 10	5 - 14
No. 100	0 – 3	0 - 3	0 - 5
No. 200	0 – 2	0 - 2	0 - 2

2.4 CONCRETE MIXING

A. General: Meet ACI 304R-00 and other requirements specified for mix design, testing and quality control.

B. Concrete Mix Temperatures: As shown below for various stages of mixing and placing:

CONCRETE TEMPERATURES				
Ambient Air Temp.	Concrete Member Size, Minimum Dimension			
	<12"	12"-36"	36"-72"	>72"
	Minimum concrete temperature as mixed for indicated air temperature:			
Above 30 deg. F	60 deg. F	55 deg. F	50 deg. F	45 deg. F
0-30 deg. F	65 deg. F	60 deg. F	55 deg. F	50 deg. F
Below 0 deg. F	70 deg. F	65 deg. F	60 deg. F	55 deg. F
Maximum allowable gradual temperature drop in first 24 hours after curing period and after end of protection:				
--	50 deg. F	40 deg. F	30 deg. F	20 deg. F

C. Truck Mixers:
1. Equip with electrically actuated counters to readily verify the number of revolutions of the drum or blades.
2. Counter:
   a). Resettable, recording type, mounted in driver's cab.
   b). Actuated at time of starting mixers at mixing speeds.
3. Truck mixer operation shall furnish a concrete batch as discharged that is homogeneous with respect to consistency, mix, and grading.
4. If slump tests taken at approximately the 1/4 and 3/4 points of the load during discharge give slumps differing by more than 2 inches when specified slump is more than 4 inches, discontinue use of truck mixer unless causing condition is corrected and satisfactory performance is verified by additional slump tests.
5. Before attempting to reuse unit, check mechanical details of mixer, such as water measuring, and discharge apparatus, condition of unit, admixture dispensing equipment, and clearance of drum.
6. Do not use non-agitating or combination truck and trailer equipment for transporting ready-mixed concrete.
7. Concrete Volume In Truck:
   a). Limit to 63 percent of total volume capacity as described in ASTM C94 when truck mixed.
   b). Limit to 80 percent of total volume capacity when central mixed.
8. Mix each batch of concrete in truck mixer for minimum 70 revolutions of drum or blades at a rate of rotation designated by equipment manufacturer.
9. Perform additional mixing, if required, at speed designated by equipment manufacturer as agitating speed.
10. Place materials, including mixing water, in mixer drum before actuating the revolution counter for determining the number of mixing revolutions.

D. Aggregates: Thoroughly and uniformly wash before use.

E. Admixtures:
1. Air-Entraining Admixture: Use in cast-in-place concrete unless shown otherwise.
2. Water Reducers:
   a). Use in cast-in-place concrete.
   b). Add prior to addition of superplasticizer.
3. Superplasticizers and Air-Entraining Admixtures:
   a). Add at concrete plant only through equipment furnished or approved by admixture manufacturer.
   b). Accomplish variations in slump, working time, and air content for flowable mixes by increasing or reducing superplasticizer dose or air-entraining admixture dose at the ready-mix plant only.
   c). Equipment shall provide for easy and quick visual verification of admixture amount used for each dose.
   d). Discharge amount to be added to each load of concrete into separate dispensing container, verify amount is correct, then add to concrete.
   e). Use in such quantities as recommended by the manufacturers to ensure concrete is workable.

2.5 SOURCE QUALITY CONTROL

A. Cement:
   1. Test for total chloride content.

B. Admixtures:
   1. Fly Ash: Test in accordance with ASTM C311-05.
      a). Analysis: Show items pertinent to this Specification.
      b). Continuing Quality Analysis: Submit throughout life of Project from approved source.

C. Batch Plant Inspection:
   1. Engineer shall have access to and have the right to inspect batch plants, cement mills, and supply facilities of Suppliers, manufacturers, and Subcontractors, providing products included in these Specifications.

D. Batch Plant Certification: Current.
   a. Weighing Scales: Tested and certified to be within tolerances set forth in the National Bureau of Standards Handbook No. 44.
   b. Batch Plant Equipment: Either semiautomatic or fully automatic meeting the requirements of ASTM C94/C94M-06.

PART 3: EXECUTION

3.1 PLACING CONCRETE

A. Preparation: Meet requirements and recommendations of ACI 304R-00 and ACI 318-05, except as modified herein.

B. Inspection:
   1. Notify Engineer at least 1 full working day in advance before starting to place concrete.
   2. Prior to notification complete formwork, ready for inspection, on portion where concrete is to be placed.
   3. Correct *defective* or incomplete Work discovered by the Engineer in a timely fashion to allow for reinspection and further corrective action if necessary.

C. Discharge Time:
   1. As determined by set time, do not exceed 1-1/2 hours after adding cement to water unless special approved time delay admixtures are used. Coordinate information with admixture manufacturer and Engineer prior to start of placing concrete.
   2. Adjust the slump or air content at the site by adding admixtures for a particular load when approved by the Engineer, then adjust the plant dose to meet the Specifications for the rest of the placement. This additional dosage at the site shall be through an approved dispenser, supplied by the admixture manufacturer.

3. Maintain required slump throughout time of concrete placement and consolidation. Discontinue use of superplasticizer if it fails to maintain slump in required range, and redesign mix.

D. Placement Into Formwork:

1. Before depositing concrete, remove debris from space to be occupied by concrete.
2. Prior to placement of concrete, dampen fill under slabs on ground, dampen sand where vapor retarder is specified, and dampen all wood forms.
3. Reinforcement: Secure in position and acceptable to Engineer before placing concrete.
4. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep, except for slabs. Place and consolidate successive layers prior to initial set of first layer to prevent cold joints.
5. Use placement devices, such as chutes, pouring spouts, and pumps, as required.
6. Vertical Free Fall Drop to Final Placement:
   a). 5 feet in forms 8-inch or less wide and 8 feet in forms wider than 8 inches, except as specified.
   b). Superplasticized Mixes: Up to 15 feet if slump is over 6 inches.
   c). For placements where drops are greater than specified, use placement device such that free fall below the placement device conforms to value specified.
   d). Free fall limit is to prevent segregation caused by aggregates hitting reinforcing steel.
7. Do not use aluminum conveying devices.
8. Provide sufficient illumination for interior forms so concrete at places of deposit is visible to permit confirmation of consolidation quality.
9. Joints in Footings and Slabs:
   a). Ensure that space beneath plastic water stop is completely filled with concrete.
   b). During concrete placement, make a visual inspection of the entire water stop area.
   c). Limit concrete placement to elevation of water stop in first pass, vibrate the concrete under the water stop, lift the water stop to confirm full consolidation without voids, then place remaining concrete to full height of slab.
   d). Apply procedure to full length of water stops.
10. If reinforcement is in direct sunlight or is more than 20 degrees F higher in temperature than concrete temperature before placement, wet reinforcement with water fog spray before placing concrete to cool reinforcement.
11. Round off top exposed edges of walls with a 1/4-inch radius steel edging tool.

E. Conveyor Belts and Chutes:
   1. Design and arrange ends of chutes, hopper gates, and other points of concrete discharge throughout conveying, hoisting, and placing system such that concrete passing from them will not become segregated.
   2. Do not use chutes longer than 50 feet.
   3. Minimum Slopes of Chutes: Angled to allow concrete of specified consistency to readily flow without segregation.
   4. Conveyor Belts:
      a). Approved by Engineer.
      b). Wipe clean with a device which does not allow mortar adhering to the belt to be wasted.
      c). Cover conveyor belts and chutes.

F. Retempering: Not permitted for concrete or mortar in which cement has partially hydrated.

G. Pumping of Concrete, Equipment:
   1. Provide standby pump, conveyor system, crane and concrete bucket, or other system acceptable to Engineer, onsite during pumping, for adequate redundancy to assure completion of concrete placement without cold joints in case of a primary placing equipment breakdown.
   2. Minimum Pump Hose (Conduit) Diameter: 4 inches.
   3. Replace pumping equipment and hoses (conduits) that are not functioning properly.
   4. Placement by methods other than pumping shall meet Specification requirements.

H. Maximum Size of Concrete Placements:
   1. Limit size of each placement to allow for strength gain and volume change due to shrinkage.
   2. Where expansion joints or control joints are not shown or where expansion joints or control joints are spaced at more than 60 feet, or where wall expansion or control joints are spaced more than 30 feet from wall corners or intersections, provide intermediate construction joints at maximum spacing of 40 feet.
   3. At least 2 hours shall elapse after depositing concrete in long or high columns and heavy walls before depositing concrete in beams, girders, or slabs supported thereon.
   4. For short columns and low height walls, 10 feet or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.
   5. Consider beams, girders, brackets, column capitals, and haunches as part of the floor or roof system and place monolithically with the floor or roof system.
   6. Should concrete placement sequence result in cold joint located below finished water surface, install water stop in joint prior to additional concrete placement.
   7. Locate joints as shown on Shop Drawings.

I. Minimum Time Between Adjacent Placements:
   1. Construction Joints: 14 days.
   2. Control Joints: 6 days.
   3. Expansion Joints: 1 day minimum; use additional time to repair defects or voids prior to placing joint material and casting adjacent concrete.

J. Removal of Water: Unless the tremie method for placing concrete is specified, remove all water from space to be occupied by concrete.

K. Consolidation and Visual Observation:
   1. Consolidate concrete with internal vibrators with minimum frequency of 8,000 cycles per minute and amplitude required to consolidate concrete in section being placed.
   2. Provide at least one standby vibrator in operable condition at placement site prior to placing concrete.
   3. Consolidation Equipment and Methods: ACI 309R-05.
   4. Provide sufficient windows in the forms or limit form height to allow for concrete placement through windows and for visual observation of concrete.
   5. Vibration consolidation shall not exceed a distance of 5 feet from point of placement.
   6. Vibrate concrete in vicinity of joints to obtain impervious concrete there.

L. Hot Weather:
   1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R-99.
   2. Placement frequency shall be such that lift lines will not be visible in architectural concrete finishes.
   3. Maintain concrete temperature below 80 degrees F at time of placement. Ingredients may be cooled before mixing.
   4. Make provisions for windbreaks, shading, fog spraying, sprinkling, ice, or wet cover, or other means to provide concrete with temperature specified.
   5. Prevent differential temperature between reinforcing steel and concrete.

M. Cold Weather:
   1. Maintain surface temperature of concrete above 40 degrees F and cure concrete as specified in Section 03370, CONCRETE CURING, for a minimum of 7 days.
   2. Provide maximum and minimum thermometers placed on concrete surfaces spaced throughout the Work to allow monitoring of concrete surface temperatures representative of the Work.
   3. Meet requirements and recommendations of ACI 306R-88 and ACI 318-05.
   4. External Heating Units:
   5. Vent heating units to atmosphere, and do not locally heat or dry concrete. Where water cure is specified, maintain wet condition.
   6. Do not exhaust flue gases directly into an enclosed area to prevent concentrated carbon dioxide from causing concrete carbonation.
   7. Maintain curing conditions as specified in Section 03370 CONCRETE CURING.

3.2 CONCRETE BONDING

A. To New Concrete Wall Horizontal Construction Joints:
   1. Thoroughly clean and saturate joint with water.
   2. Cover horizontal wall surfaces with minimum 2 inches of grout, as specified in Section 03600, GROUT, and immediately place concrete.
   3. Limit concrete lift placed immediately on top of grout to 12 inches thick.
   4. Thoroughly vibrate to mix and consolidate grout and concrete together.

B. To Old Concrete:
   1. Mechanically roughen the existing concrete surfaces to a clean, rough surface using a "Blastrac" by Wheelabrator-Frye, Inc.; or "Porta-Shotblast" by Nelco Manufacturing Corp, or equivalent equipment to remove existing concrete surface, and provide a minimum roughness profile of 1/4-inch.
   2. Saturate surface with water for 24 hours, then cover with 2 inches of grout and place grout as specified for new concrete.

3.3 CONSTRUCTION JOINTS

A. As specified in Section 03251, EXPANSION, CONSTRUCTION, AND CONTROL JOINTS.

3.4 PATCHING

A. General:
   1. Inject cracks with crack repair epoxy.
   2. Prior to starting patching work, obtain quantities of color-matched patching material and manufacturer's detailed instructions for use to provide a structural patch with finish to match adjacent surface.
   3. Patching Material: Contain no chlorides or other chemicals that cause steel corrosion.
   4. Develop patching techniques with manufacturer on the mockup panel.
   5. Dress surface of patches that will remain exposed to view to match color and texture of adjacent surfaces. Patching of concrete shall provide a structurally sound surface finish, uniform in appearance or upgrade the finish by other means until acceptable to Engineer.
   6. Provide patching to correct structural and appearance defects.

B. Concrete Finish Tolerances: Obtain Engineer's approval of repair method used on the mockup panels or other panels before proceeding with Work.

C. Tie Holes:
   1. Fill with Category I or II grout as specified in Section 03600, GROUT, except where sealant is indicated. Use only enough water to dry pack.
   2. Match color of adjacent concrete.
   3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

D. Alternate Form Ties - Through-Bolts:
1. Seal through-bolt hole by sandblasting or mechanically cleaning and roughening entire interior surface of hole, epoxy coating roughened surface and driving elastic vinyl plug and then dry packing entire hole on each side of plug with Category II grout, as specified in Section 03600, GROUT. Use only enough water to dry pack grout. Dry pack while the epoxy is still tacky or remove epoxy by mechanical means and reapply new epoxy.
2. Fill through-bolt openings with Category II grout, as specified in Section 03600, GROUT.
3. Compact grout using steel hammer and steel tool to drive grout to high density. Cure grout with water.

E. *Defective* Areas:
1. Remove *defective* concrete to a depth of sound concrete.
2. Small shallow holes caused by air entrapment at surface of forms shall not be considered *defective* unless amount is so great as to be considered not the standard of the industry.
3. If chipping is required, make edges perpendicular to surface with a minimum of 1/2 inch in depth. Do not feather edges. Obtain Engineer's approval of chipping work.
4. Patch *defective* area to match appearance of adjacent concrete surfaces after cracks are filled.

F. Blockouts at Pipes or Other Penetrations:
1. Meet details shown or submit proposed blockouts for review.
2. Use nonshrink, nonmetallic grout, Category I or II.

3.5 CONCRETE WALL FINISHES

A. Type W-1 (Ordinary Wall Finish):
1. Patch tie holes.
2. Knock off projections.
3. Patch *defective* areas.

B. Type W-2 (Finish for Waterproofing):
1. Fill cracks by epoxy injection.
2. Patch tie holes.
3. Knock off projections.
4. Patch *defective* areas.

C. Type W-3 (Smooth Wall Finish):
1. Patch tie holes.
2. Grind off projections, fins, and rough spots.
3. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.

3.6 CONCRETE SLAB FINISHES

A. General:

1. Do not use "jitterbugs" or other special tools designed for the purpose of forcing coarse aggregate away from the surface and allowing a layer of mortar, which will be weak and cause surface cracks or delamination, to accumulate.
2. Do not dust surfaces with dry materials.
3. Use evaporation retardant.
4. Round off edges of slabs with a steel edging tool, except where a cove finish is shown. Steel edging tool radius shall be 1/4 inch for slabs subject to wheeled traffic.
5. After curing as specified in Section 03370, CONCRETE CURING, and after applying the final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage due to other construction work.
6. Patch and repair *defective* areas and areas damaged by construction.

B. Type S-1 (Steel Troweled Finish):

1. Finish by screeding and floating with straightedges to bring surfaces to required finish elevation. Use evaporation retardant.
2. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to true, even plane with no coarse aggregate visible.
3. Use sufficient pressure on wood floats to bring moisture to surface.
4. After surface moisture has disappeared, hand trowel concrete to produce smooth, impervious surface, free from trowel marks.
5. Burnish surface with an additional troweling. Final troweling shall produce a ringing sound from trowel.
6. Do not use dry cement or additional water during troweling, nor will excessive troweling be permitted.
7. Power Finishing:
   a). An approved power machine may be used in lieu of hand finishing in accordance with directions of machine manufacturer.
   b). Do not use power machine when concrete has not attained the necessary set to allow finishing without introducing high and low spots in slab.
   c). Do first steel troweling for slab S-1 finish by hand.

C. Type S-2 (Wood Float Finish):

1. Finish slabs to receive fill and mortar setting beds by screeding with straightedges to bring surface to required finish plane.
2. Wood float finish to compact and seal surface.
3. Remove laitance and leave surface clean.
4. Coordinate with other finish procedures.

D. Type S-3 (Underside Elevated Slab Finish):
   1. When forming is removed, grind off projections on underside of slab and patch *defective* areas, including small shallow air pockets where schedule of concrete finishes requires:
   2. Leave surfaces ready for cementitious coating specified.

E. Type S-4 (Broomed Finish):
   1. Finish as specified for Type S-1 floor finish, except omit final troweling and finish surface by drawing a fine-hair broom lightly across the surface.
   2. Brooming: In same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to slope, except for round roof slab, broom surface in radial direction.

F. Type S-5 (Sidewalk Finish):
   1. Slope walks down 1/4 inch per foot away from structures, unless otherwise shown.
   2. Strike off surface by means of strike board and float with wood or cork float to a true plane, then flat steel trowel before brooming.
   3. Broom surface at right angles to direction of traffic or as shown.
   4. Lay out sidewalk surfaces in blocks, as shown or as directed by Engineer, with a grooving tool.

G. Concrete Curbs:
   1. Float top surface of curb smooth, and finish all discontinuous edges with steel edger.
   2. After concrete has taken its initial set, remove front form and give exposed vertical surface an ordinary wall finish, Type W-1.

3.7 BEAM AND COLUMN FINISHES

A. General: Inject cracks with crack repair epoxy. Patch and repair *defective* areas.

B. Type B-1: Match wall Type W-1.

C. Type B-2:
   1. Grind beams to remove form marks.
   2. Match wall Type W-2.

D. Type B-3:
   1. Repair rock pockets.
   2. Fill air voids.
   3. Match wall Type W-3.

E. Type C-1: Match wall Type W-1.

F. Type C-2:
   1. Grind column to remove form marks.
   2. Match wall Type W-2.

G. Type C-3:
   1. Fill air pockets.
   2. Match wall Type W-3.

3.8 BACKFILL AGAINST WALLS

A. Do not allow backfill against walls until concrete has obtained 28-day compressive strength.

B. Place backfill simultaneously on both sides of wall, where required, to prevent differential pressures.

3.9 FIELD QUALITY CONTROL

A. General:
   1. Contractor shall make or have tests made to determine compliance with Specifications.
   2. Contractor's Responsibilities:
      a). Provide adequate facilities for safe storage and proper curing of concrete test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.
      b). Provide concrete for testing of slump, air content, and for making cylinders from the point of discharge into forms. When concrete is pumped, Samples used shall be taken from discharge end of pump hose.
      c). Perform testing of slump, air content and make cylinders for testing at point of discharge. Report test results to Engineer no later than two working days from date of cylinder break.
   3. Evaluation will be in accordance with ACI Standard Building Code Requirements for Reinforced Concrete (ACI 318-05), Chapter 5 and these Specifications. Where the term "building official" is used, the term shall be redefined to "the County's representative".
   4. Specimens will be made, cured, and tested in accordance with ASTM C31/C31M-06 and ASTM C39/C39M-05e1.
   5. Frequency of testing may be changed at discretion of Engineer.
   6. Pumped Concrete: Take concrete Samples for slump (ASTM C143/C143M-05a) and test cylinders (ASTM C31/C31M-06 and C39/C39M-05e1) and shrinkage specimens (ASTM C157/C157M-06) at placement (discharge) end of line.

B. Admixture Segregation Test: Test each truck prior to use on job.
   1. Segregation Test Objective: Concrete with 5- to 9-inch slump must stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.

2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.
3. Reject concrete if mortar or moisture separates and flows out of mix.

C. Cold Weather Placement Tests:
1. During cold weather concreting, cast cylinders for field curing as follows. Use method that will produce greater number of specimens:
   a). Six extra test cylinders from the last 100 cubic yards of concrete.
   b). Minimum three specimens for each 2 hours of placing time or for each 100 cubic yards.
2. These specimens shall be in addition to those cast for lab testing.
3. Protect test cylinders from the weather until they can be placed under same protection provided for the concrete of the structure that they represent.
4. Keep field test cylinders in same protective environment as the parts of the structure they represent to determine if specified strength has been obtained.
5. Test cylinders in accordance with applicable sections of ASTM C31/C31M-06 and C39/C39M-05e1.
6. Use test results to determine specified strength gain required prior to false work removal or for prestressing.

D. Concrete Tolerances: Measure and inspect walls for compliance with tolerances specified in Section 03100, CONCRETE FORMWORK.
1. Slab Finish Tolerances and Slope Tolerances:
   a). Floor flatness measurements will be made the day after floor is finished and before shoring is removed, to eliminate effects of shrinkage, curing, and deflection.
   b). Support 10-foot long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.
   c). Compliance with designated limits in four of five consecutive measurements is satisfactory unless obvious faults are observed.
   d). A check for adequate slope and drainage will also be made.
   e). Floors shown to drain will be rejected when finish slope is inadequate to provide drainage.

E. Water Leakage Tests:
1. Purposes: Determine integrity, watertightness, and appearance of finished concrete wall surfaces.
2. Potable Water Supply Reservoirs: Clean and sterilize prior to conducting test.
3. All Water-Holding Structures:
   a). Perform leakage tests after concrete has cured and obtained its design strength, and before backfill, brick facing, or other work that will cover concrete wall surfaces is begun.
   b). Install other equipment, e.g., stop gates, sluice gates, and temporary bulkheads, prior to test.

c). As an alternative to having watertight bulkheads, gates, or valves, isolate and accurately measure the leakage through gates, valves, and bulkheads with methods acceptable to Engineer. An assumed leakage through gates and valves based on manufacturer's recommendations is not acceptable.

d). Fill with water to maximum liquid level shown and maintain level for 48 hours for moisture absorption by concrete.

e). Close all valves and gates to the structure and measure the change in water surface for a 24-hour period and record leakage through gates and valves.

f). During test period, examine exposed portions of structure for dampness or leaks and record visible leaks or damp spots.

g). Determine evaporation by floating an evaporation pan in structure during test period.

h). Determine precipitation from local weather records.

4. Acceptance Criteria:

a). Allowable 24-Hour Volume Loss: Less than 0.075 percent of volume of liquid contained in water-holding structure, accounting for evaporation and precipitation in open basins when basin is full as shown.

b). No damp spots or seepage visible on exposed surfaces.

5. Repairs When Test Fails: Drain water-holding structure; fill leaking cracks with crack repair epoxy, patch surface areas and damp spots previously recorded, and repeat water leakage tests.

F. Field Testing

1. Testing for concrete field quality control shall be performed by a Testing Laboratory selected and paid for by the County. The Contractor shall be responsible for scheduling the required tests. Engineer shall direct the number of slump tests and cylinder required. The testing laboratory shall make standard compression test cylinders entrained air tests as specified below, under the direct inspection by the Engineer. Contractor shall furnish all necessary assistance required by the Engineer. Contractor shall also furnish all labor, material and equipment required including an insulated storage box that is heated if necessary, and all other incidentals required. Above shall be subject to approval by Engineer.

G. Quality Control Testing During Construction:

1. Perform sampling and testing for field quality control during the placement of concrete, as follows:

a). Sampling Fresh Concrete: ASTM C 172. Take sampling point at end of discharge pipe.

b). Slump: ASTM C 143; one for each set of compressive strength test specimens.

1) Segregation Test Objective: concrete with 5-inch to 9-inch slump must stay together when slumped. Segregation is assumed to cause mortar flow out of mix even though aggregate may stay piled enough to meet slump test.

2) Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concreter.
3) Reject concrete if mortar or moisture separates and flows out of mix.

c). Air Content: ASTM C 231; one for each set of compression cylinders cast.

d). Compressive Strength Tests: ASTM C 39; one set of 4 compression cylinders for each 100 cubic yards or fraction thereof, of each mix design placed in any one day; 1 specimen tested at 7 days, and 2 specimens tested at 28 days, and 1 specimen held in reserve.
1) Adjust mix if test results are unsatisfactory and resubmit for Engineer's approval.
2) Concrete that does not meet the strength requirements is subject to rejection and removal from the Work, or to other such corrective measures as directed by the Engineer, at the expense of the Contractor.

e). Compression Test Specimens: ASTM C 31; make one set of 4 standard cylinders for each compressive strength test, unless otherwise directed.

f). Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens is made.

2. The testing laboratory shall submit certified copies of test results directly to the County, Engineer, and the Contractor within 24 hours after tests are made.

H. Evaluation of Quality Control Tests:

1. Do not use concrete delivered to the final point of placement that has slump temperature or total air content outside the specified values.
2. Compressive strength tests for laboratory-cured cylinders shall be considered satisfactory if the averages of all sets of four consecutive compressive strength tests equal or exceed the 28 day design compressive strength of the type or class of concrete; no individual strength test falls below the required compressive strength by more than 500 psi.

a). Where questionable field conditions may exist during placement of concrete or immediately thereafter, strength tests of specimens cured under field conditions shall required by the Engineer to check the adequacy of curing and protecting of the concrete placed. Specimens shall be molded at the same time and from the same samples as laboratory cured specimens.
1) Provide improved means and procedures for protecting concrete when the 28 day compressive strength field-cured cylinders is less than 85 percent of companion laboratory cured cylinders.
2) When laboratory-cured cylinder strengths are appreciably higher than the minimum required compressive strength, field-cured cylinder strengths need not exceed the minimum required compressive strength by more than 500 psi even though the 85 percent criterion is not met.

3) If individual tests of laboratory-cured specimens produce strengths more than 500 psi below the required minimum compressive strength, or if tests of field-cured cylinders indicate deficiencies in protection and curing, provide additional measures to assure that the load-bearing capacity of the structure is not jeopardized. If the likelihood of low-strength concrete is confirmed and computations indicate the load-bearing capacity may have been significantly reduced, tests of cores drilled from the area in question shall be required at the Contractor's expense.

b). If the compressive strength tests fail to meet the minimum requirements specified, the concrete represented by such tests shall be considered deficient in strength and subject to replacement, reconstruction or to other action approved by Engineer, and shall be done at the Contractor's expense.

I. Testing Concrete Structure for Strength:

1. When there is evidence that the strength of the in-place concrete does not meet specification requirements, Contractor shall employ at his expense the services of a concrete testing service to take cores drilled from hardened concrete for compressive strength determination. Tests shall comply with ASTM C 42 and the following:
   a). Take at least 3 representative cores from each member or suspect area at locations directed by Engineer.
   b). Strength of concrete for each series of cores shall be considered satisfactory if their average compressive strength is at least 85 percent and no single core is less than 75 percent of the 28 day required compressive strength, and at least 100% by 56 days.
   c). Report test results in writing to Engineer on the same day that tests are made. Include in test reports the Project identification name and number, date, name of Contractor, nab of concrete testing service, location of test core in the structure, type of class of concrete represented by core sample, nominal maximum size aggregate, design compressive strength, compression breaking strength and type of break (corrected for length-diameter ratio), direction of applied load to core with respect to horizontal plane of the concrete as placed, and the moisture condition of the core at time of testing.
2. Fill core holes solid with patching mortar, and finish to match adjacent concrete surfaces.
3. Conduct static load test and evaluations complying with ACl 318 if the results of the core tests are unsatisfactory, or if core tests are impractical to obtain, as directed by Engineer."

3.10 MANUFACTURER'S FIELD SERVICES

A. Provide manufacturer's representative at site in accordance with MANUFACTURERS' FIELD SERVICES, for installation assistance, inspection and certification of proper installation for concrete ingredients, mix design, mixing, and placement.

1. Batch Plant Representative: Provide to site on a regular basis to perform tasks as follows:
   a). Observe how concrete mixes are performing.
   b). Be present during first placement of each type of concrete mix.
   c). Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout the Project.
   d). Work with Contractor, admixture manufacturer, and site inspection and testing personnel to establish control limits on concrete mix designs.
2. Admixture Manufacturer's Representative: Provide to site on a regular basis to perform tasks as follows:
   a). Observe how concrete mixes are performing.
   b). Be present during the first placement of each type of concrete mix and write Field Service Report.
   c). Assist with concrete mix design, performance, placement, weather problems, and problems as may occur with concrete mix throughout the Project, including instructions for redosing.
   d). Provide the proper equipment for control of concrete redosing for air entrainment or superplasticizer at the site to maintain proper slump and air content if so needed.

3.11 SCHEDULE OF CONCRETE FINISHES

A. Form Tolerances: As specified in Section 03100, CONCRETE FORMWORK.

B. Provide concrete finishes as scheduled:

Area	Type of Finish	Required Form Tolerances
EXTERIOR WALL SURFACES		
Abovegrade/exposed (above a point 6" below finish grade)	W-3	W-B
Abovegrade/covered with brick veneer or the finish material	W-1	W-A
Backfilled/waterproofed (below a point 6" below finish grade)	W-2	W-A
Backfilled/not waterproofed (below a point 6" below final grade)	W-1	W-A
INTERIOR WALL SURFACES		
Open top water-holding tanks and basins/not painted or coated	W-3	W-A
Covered water-holding tanks and basins/not painted or coated	W-1	W-A
Water-holding tanks, channels, and basins/painted or coated	W-3	W-A
Buildings, pipe galleries, and other dry areas/painted or coated	W-3	W-A
EXTERIOR SLABS		
Roof slab/exposed	S-5	S-B
Water-Holding tanks and basins/top of wall	S-1	S-B
Other water-holding tanks and basins	S-1	S-A
Stairs and landings	S-5	S-B
Sidewalks	S-6	S-B
Other exterior slabs	S-1	S-A
INTERIOR SLABS		
Buildings, pipe galleries, and other dry areas	S-1	S-B
Hydraulic channels	S-1	S-A
Underside of elevated slabs	S-3	S-A
BEAMS AND COLUMNS		
Beams/coated	B-3	B-A
Beams/not coated	B-2	B-A
Columns/coated	C-3	C-A
Columns/not coated	C-2	C-A

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03310 – CAST-IN-PLACE STRUCTURES

PART 1: GENERAL

1.1 SUMMARY

A. This section describes the concrete cast in place structures to be constructed in this project. The structures include the concrete box culvert and discharge channel as detailed on plan sheets C13 – C17.

1.2 RELATED SECTIONS

A. Section 02220 – Excavation, Backfill, Fill and Grading for Structures

B. Section 02224 – Foundation Preparation

C. Section 03100 – Concrete Formwork

D. Section 03210 – Reinforcing Steel

E. Section 03251 – Expansion and Construction Joints

F. Section 03300 – Cast-In-Place Concrete

G. Section 03370 – Concrete Curing

H. Section 03600 – Grouting

1.3 SUBMITTALS

A. Submit composite drawing for each structure showing locations and method of attachment for all inserts, pass throughs and blockouts.

1.4 COMPENSATION

Bid Item No. 03310/01 – Spillway Structure

A. MEASUREMENT

1. Bid Item No. 03310/01 – Spillway Structure will not be measured for payment.

B. PAYMENT

1. The lump sum price bid for Bid Item No. 03310/01 – Spillway Structure shall be full compensation for furnishing all materials, labor and equipment necessary to construct the Spillway structure shown on plan sheets. Such price shall be deemed to include all costs for excavation, foundation preparation, furnishing base or sub-base material, backfill, compaction, concrete, formwork, ties, curing, finishing, reinforcing steel, metal inserts, handrails, miscellaneous metals, piping blockouts, and other incidentals necessary for a full and complete installation of the structure.

2. No separate or additional payment will be made for tie-ins or connections to piping to be constructed under this contract. All costs for accomplishing such tie-ins or connections to piping to be constructed under this contract shall be deemed to be included in the price bid for the structure to which the connection or tie-in is made.

PART 2: PRODUCTS (NOT USED)

PART 3: EXECUTION (NOT USED)

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03370 – CONCRETE CURING

PART 1: GENERAL

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM): C309-06, Liquid Membrane-Forming Compounds for Curing concrete.

1.2 SUBMITTALS

A. Shop Drawings:
   1. Curing methods proposed.
   2. Manufacturers' data for the following products:
      a). Evaporation retardant.
      b). Curing compound.
      c). Clear Sealer.
      d). Clear floor hardener.

B. Quality Control Submittals:
   1. Curing Compound: Manufacturer’s Certificate of Compliance showing moisture retention requirements.

1.3 COMPENSATION

A. MEASUREMENT
   1. The Work of this section will not be measured for payment.

B. PAYMENT
   1. All costs for curing concrete or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the concrete is incorporated. No separate or additional payment will be made for curing concrete incorporated in the Work.

PART 2: PRODUCTS

2.1 MATERIALS

A. Curing Compound:
   1. Solvent-based, high chlorinated rubber solids content curing compound meeting requirements at ASTM C309-06.
      a). Moisture Loss: 0.030 gm/square cm/72 hours maximum.
      b). Capable of meeting moisture retention with one coat.
   2. Manufacturers and Products:
      a). Master Builders Co., Cleveland, OH; Masterkure, CR.
      b). Euclid Chemical Co., Cleveland, OH; Euco Super Floor Coat.
      c). No "or-equal" or substitute products will be considered.

B. Evaporation Retardant:
   1. Optional: Fluorescent color tint that disappears completely upon drying.
   2. Manufacturers and Products:
      a). Master Builders Co., Cleveland, OH; CONFILM.
      b). Euclid Chemical Co., Cleveland, OH; Eucobar
      c). No "or-equal" or substitute products will be considered.

C. Clear Sealer (One-Component Penetrating Silane Sealer):
   1. Manufacturers and Products:
      a). Master Builders, Inc.: MASTERSEAL SL.
      b). Euclid Chemical Co.: Eucoguard 200.

D. Water: Clean and potable, containing less than 50 ppm of chlorides.

PART 3: EXECUTION

3.1 CURING OF CONCRETE

A. Use one of the following methods as approved by Engineer:
   1. Walls:
      a). General: Where walls are to receive coatings, painting, cementitious material, or other similar finishes, or where solvent-based coatings are not permitted, use only water curing procedures.
         1. Method 1: Leave concrete forms in place and keep entire surfaces of forms and concrete wet for 7 days.
         2. Method 2: Apply curing compound, where allowed, immediately after removal of forms.
         3. Method 3: Continuously sprinkle with water 100 percent of exposed surfaces for 7 days starting immediately after removal of forms.
   2. Slabs and Curbs:
      a). Method 1: Protect surface by water ponding for 7 days.
      b). Method 2: Cover with burlap or cotton mats and keep continuously wet for 7 days.
      c). Method 3: Cover with 1-inch layer of wet sand, earth, or sawdust, and keep continuously wet for 7 days.
      d). Method 4: Continuously sprinkle exposed surface for 7 days.
      e). Other agreed upon method that will keep moisture present and uniform at all times on surface of slabs. Do not use curing compounds.
      f). Where water curing for slabs during cold weather is not possible, use an Engineer approved curing compound at manufacturer's recommended coverage per gallon.
      g). Where curing compound cannot be used, special methods using moisture shall be agreed upon prior to placing the concrete slabs.
      h). Protect slabs during cold weather with plastic sheets or other material inside required heated enclosure if foot traffic is permitted on slabs.

B. Use only water curing on potable water structures.

C. Use only water curing methods where solvents in the curing compounds are prohibited by state or federal air quality laws.

D. Use only water curing where additional finishes such as clear sealer, hardeners, painting, and other special coatings are required.

3.2 EVAPORATION RETARDANT APPLICATION

A. Spray onto surface of fresh flatwork concrete immediately after screeding to react with surface moisture.

B. Reapply after smoothing surface with a bull float to ensure continuous, compacted monomolecular layer until final finishing is completed.

3.3 CLEAR SEALER APPLICATION

A. Apply where indicated in Finish Schedule.

B. Before application, water cure concrete walls and floors to receive sealer for a minimum of 28 days, keep clean, unpainted, free from membrane curing compounds, with Work above them completed.

C. Apply with stiff brush, short nap roller, squeegee, garden sprayer, or conventional paint spray equipment.

D. Apply at a coverage rate of 125 to 200 square feet per gallon and cure the sealer on slabs for the following minimum cure time at the ambient temperatures shown prior to allowing foot traffic:
1. 90 degrees F-2 hours.
2. 75 degrees F-4 hours.
3. 50 degrees F-8 hours
4. 35 degrees F-16 hours

3.4 CLEAR HARDENER APPLICATION

A. Before application, water cure floors to receive hardener for minimum 28 days, keep clean, unpainted, free from membrane curing compounds, and perfectly dry with all work above them completed.

B. Apply hardener evenly, using three coats, allowing 24 hours between coats:
1. First coat 1/3 strength, second coat 1/2 strength, and third coat 2/3 strength, mix with water.
2. Apply each coat so as to remain wet on surfaces for 15 minutes.
3. Apply approved hardeners in accordance with manufacturer's instructions.
4. After final coat is completed and dry, remove surplus hardener from surface by scrubbing and mopping with water.

3.5 MANUFACTURER'S SERVICES

A. Provide manufacturer's representative at site for installation assistance, inspection, and certification of proper installation for products specified.

B. Provide curing compound manufacturer's representative to demonstrate proper application of curing compound to show coverage in one coat.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03456 – PRECAST / DRAINAGE STRUCTURES

PART 1: GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install in the locations as shown on the Drawings, the drainage pipes, drop inlets, manholes, concrete culverts and headwalls, as specified herein.

B. All drainage structures shall be manufactured and installed in accordance with details included herein, and as shown on Drawings.

1.2 RELATED WORK NOT INCLUDED

A. Excavation and Backfill for pipe; Section 02221.

B. Excavation and Backfill for structures, Section 02220.

1.3 QUALIFICATIONS

A. All precast structures shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of items to be furnished. The structures shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications.

1.4 SUBMITTALS

A. Submit for approval six (6) sets shop drawings showing details of construction, reinforcing, joints and connections.

B. Submit Manufacturers certificates that pipe and fittings meet the requirements of the Specifications.

1.5 INSPECTION

A. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval of the Engineer. Such inspection may be made at the place of manufacture, or on the work after delivery, or at both places, and the sections shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample section may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to site shall be marked for identification and shall be removed from the site at once. All sections which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, entirely at the Contractor's expense.

B. At the time of inspection, the sections will be carefully examined for compliance with the ASTM designation specified below and these Specifications, and with the approved manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, crack, roughness, soundness, etc. The surface shall be dense and close-textured.

C. Imperfections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, when tested in 3" x 6" cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

1.6 COMPENSATION

Bid Item No. 03456/01 - Reinforced Concrete Valve Box

A. MEASUREMENT
   1. Bid Item No. 03456/01 - Valve Box will not be measured for payment

B. PAYMENT
   1. The lump sum price bid for Bid Item No. 03456/01 - Valve Box shall be full compensation for furnishing all materials, labor and equipment necessary to construct the temporary box shown on plan sheet C15 in place, an accepted by the Engineer. Such price shall de deemed to include all costs for excavation, foundation preparation, furnishing base or subbase material, backfill, compaction, concrete, formwork, ties, curing, finishing, reinforcing steel, ladder/safety cage, access door, piping blockouts and other incidentals necessary for a full and complete installation of the structure.

Bid Item No. 03456/02 – Concrete Headwalls at Outlet Pipes

A. MEASUREMENT
   1. Bid Item No. 03456/02 – Concrete Headwalls at Outlet Pipes will be measured by each unit installed and accepted, complete and in place.

B. PAYMENT
   1. The unit price bid for Bid Item No. 03456/02 – Concrete Headwalls at Outlet Pipes shall be full compensation per each unit installed and of the type specified on the plans. Such payment shall be deemed to include all costs for all material and labor necessary for a full and complete installation of the specified item.

Bid Item No. 03456/03 – Concrete Headwall

A. MEASUREMENT
   1. Bid Item No. 03456/03 – Concrete Headwall will not be measured for payment.

B. PAYMENT
   1. The lump sum price bid for Bid Item No. 03456/03 – Concrete Headwall shall be full compensation for the concrete headwall shown on the contract drawings, including metal fabrications for trash screen. Such payment shall be deemed to include all costs for all material and labor necessary for a full and complete installation of the specified item.

PART 2: PRODUCTS

2.2 MATERIALS AND DESIGN

A. Precast structures shall conform to ASTM Designation C478 and meet the following additional requirements:
   1. Type II cement shall be used except as otherwise approved.
   2. Holes to accommodate pipe shall be precast into the section at the foundry.
   3. All sections shall be cured by an approved method and shall not be shipped nor manhole rungs subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 6 days after fabrication and/or repair, whichever is the longer.
   4. Precast concrete top slabs shall be designed for an H-20 wheel loading.
   5. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside on each precast unit.

B. If the County speculates the precast sections do not meet the Specification, the County shall require the sections to be tested by a certified testing laboratory. The County shall pay for the test if the test shows the Specifications are met and the Contractor shall pay for the tests if the test shows the Specifications are not met.

C. Base unit, reducer slabs and flat top slabs shall have steel reinforcement as shown in details.

D. Openings for pipes larger than six (6) inches in diameter are to be precast. A minimum of six (6) inches between the circumference is to remain between any two holes.

E. The Contractor will furnish the fabricator with the angle of alignment and size of all pipes to enter manhole and the height of structure.

F. Base units shall have sufficient height to allow for minimum of six (6) inches of wall between top of highest opening for pipes and bottom of joint.

G. Pipes are to be extended into structure wall a minimum of four (4) inches, but should not extend beyond interior wall of structure.

2.3 REINFORCED CONCRETE PIPE

A. Reinforced concrete pipe shall meet the requirements of AASHTO: M170.

2.4 DROP INLETS AND MANHOLES

A. Construction of drop inlets and manholes shall meet the requirements of the Georgia DOT Standard Specifications Section 668 – MISCELLANEOUS DRAINAGE STRUCTURES and be constructed in accordance with plan details and notes shown on the Drawings.

B. For Drop Inlets and Manholes exceeding four feet six inches (4’-6”) in depth, provide imbedded metal steps to bottom of Drop Inlet and Manholes.

PART 3: EXECUTION

3.1 INSTALLATION

A. The trench shall be excavated carefully to depth in accordance with details shown on the Drawings.

B. Precast concrete sections shall be set so as to be vertical and with sections in true alignment with a 1/4" maximum tolerance to be allowed. The outside and inside joint shall be filled with a comparatively dry mortar (one part cement and two parts sand) and finished flush with the adjoining surfaces. Allow joints to set for 24 hours before backfilling. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. If any leaks appear in the catch basins, the inside joints shall be caulked with lead wool. The Contractor shall install the precast sections in a manner that will result in a watertight joint.

C. Holes in the concrete pipe sections required for handling or other purposes shall be plugged with a non-shrinking grout or by grout in combination with concrete plugs.

D. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done prior to setting them in place to prevent any subsequent jarring which may loosen the mortar joints.

E. The precast concrete base shall be placed on a bed of crusher-run gravel as shown on the Drawings to provide even bearing and grade control.

F. Cast iron frames specified and furnished under Division 5 shall be placed, shimmed and set in Portland Cement mortar to the required grade.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 03600 – GROUT

PART 1: GENERAL

1.1 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. C230/C230M-03, Standard Specification for Flow Table for Use in Tests of HydraulicCement.
2. C1399-04 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete.
3. C1107-05, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (non-shrink).

B. Corps of Engineers (COE):
1. CRD-C611-81, or equivalent standard, Flow of Grout for Preplaced Aggreagate Concrete.
2. CRD-C621-83 or equivalent standards, Specification for Nonshrink Grout.

1.2 SUBMITTALS

A. Shop Drawings:
1. Product data of grouts.
2. Sequencing schedule and curing methods for grout topping.
3. Proposed method for keeping existing concrete surfaces wet prior to placing grout.

B. Quality Control Submittals:
1. Manufacturer's Written Instructions:
   a). Adding fiber reinforcing to batching.
   b). Cement-water ratio of grout topping.
   c). Mixing of grout.
2. Manufacturer's proposed training schedule for grout work.
3. Manufacturer's Certificate of Compliance:
   a). Grout free from chlorides and other corrosion-causing chemicals.
   b). Nonshrink grout properties of Categories II and III, verifying expansion at 3 or 14 days will not exceed the 28-day expansion and nonshrink properties are not based on gas or gypsum expansion.
   c). Test samples, of fiber reinforced grout contain flexural toughness of 3.0 or greater, in accordance with ASTM C (1399-04 (Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete), performance Level I, toughness index 15.
4. Manufacturer's Certificate of Proper Installation.
5. Statements of Qualification: Nonshrink grout manufacturer's representative.

6. Test Reports:
   a). Test reports for 24-hour evaluation of nonshrink grout. Independent testing laboratory to certify that testing was conducted within the past 18 months.
   b). Test results and service report from the demonstration and training session, and from field tests.
   c). Field test reports and laboratory test results for field-drawn samples.

1.3 QUALITY ASSURANCE

A. Nonshrink Grout Manufacturer's Representative Qualifications: Authorized and trained representative of grout manufacturer. Minimum of 1-year experience that has resulted in successful installation of grouts similar to those for this Project.

1.4 GUARANTEE

A. Manufacturer's guarantee shall not contain disclaimer on the product data sheet, grout bag, or container limiting responsibility to only the purchase price of products and materials furnished.

B. Manufacturer guarantees participation with Contractor in replacing or repairing grout found defective due to faulty materials, as determined by industry standard test methods.

1.5 COMPENSATION

A. MEASUREMENT
   1. The Work of this section will not be measured for payment.

B. PAYMENT
   1. All costs for furnishing and installing grout or otherwise complying with the Work of this section shall be deemed to be included in the overall price bid for the structure in which the grout is incorporated. No separate or additional payment will be made for grouting incorporated in the Work.

PART 2: PRODUCTS

2.1 NONSHRINK GROUT SCHEDULE

A. Furnish nonshrink grout for applications in grout category in the following schedule:

Application	Temperature Range 40 to 100 deg F	Max. Placing Time 20 min.	Max. Placing Time Greater than 20 min
Filling tie holes	I	I	I
Blockouts for gate guides	I or II	I	II
Precast joints	I or II	I	II
Column baseplates single-story	I or II	I	II
Machine bases 25 hp or less	II	II	II
Through-bolt openings	II	II	II
Patching concrete walls	II	II	II
Machine bases 26 hp and up	III	III	III
Baseplates and/or soleplates with vibration, thermal movement, etc.	III	III	III

2.2 NONSHRINK GROUTS

A. Category I:
1. Nonmetallic and nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with ASTM C1107-05:
   a). Flowable consistency 140 percent, five drops in 30 seconds, in accordance with ASTM C230/C230M-03.
   b). Flowable for 15 minutes.
4. Grout shall not bleed at maximum allowed water.
5. Minimum strength of grout, 3,000 psi at 3 days, 5,000 psi at 7 days, and 7,000 psi at 28 days.
6. Manufacturers and Products:
   a). Master Builders Co., Cleveland, OH SET GROUT.
   b). Euclid Chemical Co., Cleveland, OH; Hi-flow Grout.
   c). Dayton Superior Corp., Miamisburge, OH; Sure-Grip High Performance Grout.

B. Category II:
1. Nonmetallic, nongas-liberating flowable fluid.
2. Prepackaged natural aggregate grout requiring only the addition of water.
3. Test in accordance with CRD-C621-83 and ASTM C1107-05, Grade B:
   a). Fluid consistency 20 to 30 seconds in accordance with CRD-C611-81.
   b). Temperatures of 45, 70, and 90 degrees F.

4. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
5. Minimum strength of grout, 2,500 psi at 1 day, 4,500 psi at 3 days, and 7,000 psi at 28 days.
6. Maintain fluid consistency when mixed in 1-to 9-yard loads in ready-mix truck.
7. Manufacturers and Products: Master Builders Co., Cleveland, OH; Master Flow 928.

C. Category III:
1. Metallic and nongas-liberating flowable fluid.
2. Prepackaged aggregate grout requiring only the addition of water.
3. Test in accordance with CRD-C621-83 and ASTM C1107-05, Grade B:
   a). Fluid consistency 20 to 30 seconds in accordance with CRD-C611-81.
   b). Temperatures of 45, 70, and 90 degrees F.
4. 1 hour after mixing, pass fluid grout through flow cone with continuous flow.
5. Minimum strength of grout, 4,000 psi at 1 day 5,000 psi at 3 days, and 9,000 psi at 28 days.
6. Maintain fluid consistency when mixed in 1- to 9-yard loads in ready-mix truck.
7. Manufacturers and Products: Master Builders Co., Cleveland, OH; EMBECO 885.

PART 3: EXECUTION

3.1 NONSHRINK GROUT

A. General: Mix, place, and cure nonshrink grout in accordance with grout manufacturer's representative training instructions.

B. Form Tie or Through-Bolt Holes: Provide nonshrink grout, Category I and II, fill space with dry pack dense grout hammered in with steel tool and hammer. Through-bolt holes, coordinate dry pack dense grout application with vinyl plug in Section 03100, CONCRETE FORMWORK and bonding agent in Section 03300, CAST-IN-PLACE CONCRETE.

C. Grouting Machinery Foundations:
1. Block out original concrete or finish off at distance shown below bottom of machinery base with grout. Prepare concrete surface by sandblasting, chipping, or by mechanical means to remove any soft material.
2. Set machinery in position and wedge to elevation with steel wedges, or use cast-in leveling bolts.
3. Form with watertight forms at least 2 inches higher than bottom of plate.
4. Fill space between bottom of machinery base and original concrete in accordance with manufacturer's representative training instructions.

3.2 HORIZONTAL CONSTRUCTION JOINTS IN REINFORCED CONCRETE WALLS

A. Use positive measuring device such as a bucket or other device that will contain only enough sand-cement grout, for depositing in one place in wall to ensure that portion of form does not receive too much grout. Limit grout placement to 2-inch maximum thickness.

B. Do not deposit grout from pump hoses or large concrete buckets unless inspection windows close to joint are available to allow visual measurement of grout thickness and means for excess grout removal are available.

3.3 FIELD QUALITY AND CONTROL

A. Evaluation and Acceptance of Nonshrink Grout
   1. Provide a flow cone and cube molds with restraining plates onsite. Continue tests during Project as demonstrated by grout manufacturer's representative.
   2. Perform flow cone and bleed tests, and make three 2-inch by 2-inch cubes for each 25 cubic feet of each type of nonshrink grout used. Restraining caps for cube molds in accordance with CRD-C-621-83.
   3. For large grout applications make three more cubes, one more flow cone test including bleed test for each additional 25 cubic feet of nonshrink grout placed.
   4. Consistency: As specified in Article NONSHRINK GROUTS. Reject grout with consistencies outside range requirements.
   5. Segregation: As specified in Article NONSHRINK GROUTS. Reject grout when aggregate separates.
   6. Nonshrink grout cubes shall test equal to or greater tan minimum strength.
   7. Strength Test Failures: Reject nonshrink grout work failing strength tests, remove and replace grout.
   8. Perform bleeding test to demonstrate grout will not bleed.
   9. Store cubes at 70 degrees F.
   10. Independent testing laboratory will prepare, store, cure, and test cubes in accordance with CRD-C621-83.

3.4 MANUFACTURER'S SERVICES

A. General:
   1. Coordinate demonstrations, training sessions, and applicable site visits with grout manufacturer's representative.
   2. Provide and conduct onsite, demonstration and training sessions for bleed tests, mixing, flow cone measurement, cube testing, application, and curing for each category and type of nonshrink grout.
   3. Coordinate necessary equipment and materials are available for demonstration.

B. Training:

1. Grout manufacturer's representative shall train Contractor to preform grout work.
2. Establish location at site and schedule time for grout manufacturer's demonstration and training session of proposed nonshrink grouts. Mix nonshrink grouts to required consistency, test, place, and cure on actual Project, e.g., baseplates and tie holes to provide actual on-the-job training.
3. Use minimum of five bags for each grout Category **II** and Category **III**. Mix grout to fluid consistency and conduct flow cone and two bleed tests, make a minimum of six cubes for testing of two cubes at 1, 3, and 28 days.
4. Use remaining grout for final Work. Training includes methods for curing grout.
5. Mix sufficient grout Category I for minimum of 15 tie holes.
6. Patching through-bolt holes and blockouts for gate guides, and similar items.
7. Transport test cubes to an independent test laboratory and obtain test reports.

3.5 SUPPLEMENTS

A. The supplement listed below, following " END OF SECTION", is part of this Specification.

1. 24-hour evaluation of nonshrink grout test form and grout testing procedures.

*** END OF SECTION ***

SUPPLEMENT 1

(Test Lab Name)

(Address)

(Phone No.)

24-HOUR EVALUATION OF NONSHRINK GROUT TEST FORM

OBJECTIVE: Define standard set of test procedures for an independent testing laboratory to perform and complete within a 24-hour period.

SCOPE: Utilize test procedures providing 24-hour results to duplicate field grouting demands. Intent of evaluation is establish grout manufacturer's qualifications.

PRIOR TO TEST: Obtain five bags of each type of grout.

1. From intended grout supplier for Project.
2. Five bags of grout shall be of same lot number.

ANSWER THE FOLLOWING QUESTIONS FOR GROUT BEING TESTED FROM LITERATURE, DATA, AND PRINTING ON BAG:

A. Product data and warranty information contained in company literature and data? Yes____NO____

B. Literature and bag information meet specified requirements? Yes____NO____

C. Manufacturer guarantees grout as specified in Article GUARANTEE? Yes____NO____

D. Guarantee extends beyond grout replacement value and allows participation with Contractor in replacing and repairing *defective* areas? Yes____No____

E. Water demands and limits printed on bag? Yes____No____

F. Mixing information printed on the bag? Yes____No____

G. Temperature restrictions printed on bag? Yes____No____

* Rejection of a grout will occur if one or more answers are noted NO.

GROUT TESTING PROCEDURES

A. Bagged Material:

1. List lot numbers.

2. List expiration date.

3. Weigh bags and record weight

Engineer will disqualify grout if bag weights have misstated measure plus or minus 2 pounds by more than one out of five bags. (Accuracy of weights is required to regulate amount of water used in mixing since this will affect properties).

B. Mixing and Consistency Determination:

1. Mix full bag of grout in 10-gallon pail.

2. Use electric drill with a paddle device to mix grout (jiffy or jiffler type paddle).

3. Use maximum water allowed per water requirements listed in bag instructions.

4. Mix grout to maximum water allowed per water requirements listed in bag instructions.

5. In accordance with CRD-C611-81 (flow cone) determine time of mixed grout through the flow cone.____ seconds.

6. Add water to attain 20- to 30-second flow in accordance with CRD-C611-81.

7. Record time of grout through cone at new water demand. _____seconds.

8. Record total water needed to attain 20- to 30-second flow. ____pounds.

9. Record percent of water. ____percent

C. When fluid grout is specified and additional water is required beyond grout manufacturer's listed maximum water, CRD-C621-83 will be run at new water per grout ratio to determine whether grout passes using actual water requirements to be fluid. Use new water per grout ratio on remaining tests.

D. Bleed Test:

1. Fill two gallon cans half full of freshly mixed grout at ambient temperatures for each category and at required consistency for each.

2. Place one can of grout in tub of ice water and leave one can at ambient temperature.

3. Cover top of both cans with glass or plastic plate preventing evaporation.

4. Maintain 38 to 42 degrees F temperature with grout placed in ice and maintain ambient temperature for second container for 1 hour.

5. Visually check for bleeding of water at 15-minute intervals for 2 hours.

6. Perform final observation at 24 hours.

If grout bleeds a small amount at temperatures specified, grout will be rejected.

E. Extended Time Flow Test (for Category II and III):

1. Leave grout in mix can and mix with drill mixer every 5 minutes for 20 seconds. Maintain process for 1 hour at ambient temperatures of 40, 80, and 100 degrees F.

2. Obtain CRD-C611-81 flow cone test of grout at 20, 40, and 60 minutes and record flow time.

a. 20 min____,sec. @ 40 degrees F.
b. 40 min____,sec. @ 40 degrees F.
c. 60 min____,sec. @ 40 degrees F.
d. 20 min____,sec. @ 80 degrees F.
e. 40 min____,sec. @ 80 degrees F.
f. 60 min____,sec. @ 80 degrees F.
g. 20 min____,sec. @ 100 degrees F.
h. 40 min____,sec. @ 100 degrees F.
i. 60 min____,sec. @ 100 degrees F.

Grout not able to go through flow cone with continuous flow after 60 minutes will be rejected. Grouts for high temperature environments not able to go through flow cone with continuous flow after 60 minutes at temperatures 40,80, and 100 degrees F will be rejected.

_____
Qualified Disqualified

F. 24-Hour Strength Test:

1. Using grout left in mixing cans in accordance with CRD-C621-83 for mixing and consistency determination test and for extended time flow test, make minimum of nine cube samples.

2. Store cubes at 70 degrees F for 24 hours.

3. Record average compressive strength of nine cubes at 24 hours.

Grout will be rejected if 24-hour compressive strengths are under 1,000 psi for grouts claiming fluid placement capabilities.

Grouts that have not been disqualified after these tests are qualified for use on the Project for the application indicated in Nonshrink Grout Schedule.

_____ _____Signature of Independent Date Test Conducted
Testing Laboratory

DIVISION 4

NOT USED

DIVISION 5

METALS

TECHNICAL SPECIFICATION

SECTION 05500 – METAL FABRICATIONS AND CASTINGS

PART 1: GENERAL

1.1 REFERENCES

A. Aluminum Association, Inc. (AA): Standards, Specifications, and Data.

B. American National Standards Institute (ANSI):
1. A14.3-84, Ladders, Fixed, Safety Requirements.
2. B1.1-89, Unified Inch Screw Threads (UN and UNR Thread Form.)

C. American Society for Testing and Materials (ASTM):
1. A36-90 Standard Specification for Structural Steel.
2. A48-83a Standard Specification for Gray Iron Castings (R 1990).
3. A53-90b Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
4. A123-89a Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
5. A153-82 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware (R 1987).
6. A167-91 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
7. A193-90a Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
8. A194-91 Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
9. A276-91 Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
10. A307-91 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
11. A325-91b Standard Specification for High-Strength Bolts for Structural Steel Joints.
12. A385-80 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip) (R 1986).
13. A395-88 Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
14. A489-90 Standard Specification for Carbon Steel Eyebolts.
15. A500-90a Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
16. A501-89 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel structural Tubing.
17. A525-91a Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
18. B209-90 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
19. B308-90a Standard Specification for Aluminum-Alloy 6061-T6 Standard Structural Shapes.

20. B429-90a Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
21. F436-91 Standard Specification for Hardened Steel Washers.
22. F468-90b Standard Specification for Nonferrous Nuts for General Use.
23. F844-90 Standard Specification for Washers, Steel, Plain (Flat) Unhardened for General Use.

D. American Welding Society (AWS):
1. ANSI/AWS D1.1-92, Structural Welding code-Steel.
2. ANSI/AWS D1.2-90, Structural Welding Code-Aluminum.

1.2 DEFINITIONS

A. Submerged: A location at or below a point 1 foot 6 inches above maximum water surface elevation in water-holding basins and channels.

1.3 SUBMITTALS

A. Shop Drawings: Metal fabrications, including welding and fastener information.

B. Anchoring Systems: Specific instructions for all phases of installation including hole size, preparation, placement, procedures, and instructions for safe handling.

C. Samples:
1. Epoxy Anchors: Two self-contained epoxy adhesive cartridges for each batch of epoxy delivered to site, for independent testing.
2. Color Samples of abrasive nosings.
3. Vinyl Ester Anchors: Two self-contained adhesive cartridges for each batch of adhesive delivered to site, for independent testing.

D. Quality Control Submittals:
1. Vinyl Ester and Epoxy Anchors:
   a). Manufacturer's Certificate of Compliance.
   b). Manufacturers past project experience data.
   c). Test reports for each batch of vinyl ester or epoxy delivered to site.
   d). Manufacturer's Certificate of Qualification for installers.
   e). Current test data indicating that cured adhesive anchors meet or exceed design loads.
   f). Ladders: Results of load tests.
   g). Welders: Evidence of certification.

1.4 QUALITY ASSURANCE

A. Qualifications:
   1. Welders: Certified in accordance with AWS D1.1, Chapter 5.
   2. Vinyl Ester and Epoxy Anchor Manufacturers: Experience on at least three similar projects within the last 3 years.
   3. Vinyl Ester and Epoxy Anchor Installers: Trained and certified by manufacturer.

B. Regulatory Requirements:
   1. Anchoring Systems:
      a). Current evaluation and acceptance reports by ICBO or other similar code organization.
      b). Acceptable for use in potable water structures by EPA and local health agencies or NSF.

C. Ladders, Load Test:
   1. Test assemblies with specified loads.
   2. Cycle load 200,000 times to demonstrate fatigue resistance, then check for defects.

D. Welding Procedures: Follow the requirements of AWS D1.1-92 and AWS D1.2-90.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Shipment:
   1. Insofar as practical, factory assemble items specified herein.
   2. Package and clearly tag parts and assemblies that are of necessity shipped unassembled, in a manner that will protect materials form damage, and facilitate identification and field assembly.

B. Storage of Epoxy Adhesive:
   1. Store epoxy cartridges on pallets or shelving in a covered storage area.
   2. Control temperature above 60 degrees F and dispose of cartridges if shelf life has expired.

C. Storage of Vinyl Ester Products:
   1. Store components on pallets or shelving in a covered storage area with locking door.
   2. Control temperature within 41 and 77 degrees F and dispose of product if shelf life has expired.

1.6 SPECIAL GUARANTEE

A. Manufacturer's extended guarantee or warranty, with OWNER named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the OWNER, removal and replacement of ladder found *defective* during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of *defective* Work as specified in the General Conditions.

1.7 COMPENSATION

A. MEASUREMENT
1. Metal fabrications and castings or other products described in this specification section will not be measured for payment.

B. PAYMENT
1. No separate or additional payment will be made for furnishing and installing materials and/or products described or called out in this specification section. All costs for furnishing and installing the materials and/or products described in this specification section shall be deemed to be included in the price bid for the structure in which material and/or product is embedded, attached or otherwise incorporated.

PART 2: PRODUCTS

2.1 MATERIALS

A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Specification
Steel Shapes and Plates	A36-90
Stainless Steel: Bars and Shapes	A276-91, AISI Type 316
Stainless Steel: Sheet and Strip	A167-91, AISI Type 316
Bolts and Threaded Rods	A193-90a, AISI Type 316, B8MN, B8M2, or B8M3
Steel Bolts and Nuts: Carbon Steel	A307-91 or A36-90
Steel Bolts and Nuts: High-Strength	A325-91b, Type 3
Steel Bolts and Nuts: Galvanized Steel Bolts	A307-91 or A36-90, with A153-82 Zinc Coating, and ANSI B1.1
Steel Bolts and Nuts: Eyebolts	A489-90
Threaded Rods	A36-90
Flat Washers (Hardened)	F436-91
Aluminum, Structural Shapes, and Plates	B209-90 and B308-90a, Alloy 6061-T6
Aluminum Bolts and Nuts	F468-90b, Alloy 2024-T4
Cast Iron	A48-83e, Class 35
Checkered Plates: Aluminum	ASTM B209-90, Alloy 6061-T6, tread plate, thickness minimum ¼ inch.

B. Anchor Bolts: As shown in FASTENER SCHEDULE at the end of this section and as specified in various equipment sections.
1. Anchor Bolt Sleeves:
a). High Density Polyethylene Plastic:
1) Single unit construction with deformed sidewalls such that the concrete and grout lock in place.

2) The top of the sleeve shall be self-threading to provide adjustment of the threaded anchor bolt projection.
3) Material requirements:
   (a) Plastic: High Density Polyethylene.
   (b) Density ASTM D1505-85e.
   (c) Vicat Softening Point: ASTM D1525-87.
   (d) Brittleness Temperature: ASTM D746-79.
4) Manufacturer: Sinco West, Simi Valley, CA.

b). Fabricated Steel Sleeve: A36-90 steel.

C. Anti-seizing Lubricant:
1. Lubricant shall contain substantial amounts of molybdebum disulfide, graphic, mica, talc, or copper. Use Loc Tite Co., Permatex.

2.2 ANCHORING SYSTEMS FOR CURED CONCRETE

A. Wedge Anchors: AISI Type 316 stainless steel throughout.
1. Manufacturers and Products:
   a). ITT Phillips, Drill Div., Michigan City, IN.
   b). Hilti, Inc., Tulsa, OK; Hilti Super Kwik-Bolt, stud type.
   c). Wej-It Corp., Broomfield, CO; Wej-It.
   d). Molly Division of Emhart Corp., Temple, PA; Parabolt Concrete Anchors.

B. Expansion Anchors:
1. Self-drilling anchors, snap-off type or flush type.
2. Furnish anchors for use with galvanized bolts.
3. Nondrilling Anchors: Flush type for use with bolt, or stud type with projecting threaded stud.
4. Manufacturers and Product:
   a). ITT Phillips Drill Div., Michigan City, IN.
   b). Hilti, Inc., Tulsa, OK; Hilti HDI Drop-In anchors.

C. Epoxy Anchors:
1. Anchor Rod: Stainless steel threaded rod free of grease, oil, or other deleterious material with a 45-degree chisel point.
2. Epoxy Adhesive:
   a). ASTM C881, Type 1, Grade 3, Class A, B, or C.
   b). Two-component, 100 percent solids, nonsag, paste, insensitive to moisture, designed to be used in adverse freeze/thaw environments and gray in color.
   c). Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.

3. Mixed Epoxy Adhesive:
   a). Nonsag paste consistency, with abiit to remain in a 1-inch diameter overhead drilled hole without run-out, having the following properties:
      1) Slant Shear Strength, ASTM C881-90, No Failure in Bond Line, Dry/Moist Conditions: 5,000 psi
      2) Compressive Strength, ASTM D695-90: 14,000 psi, minimum.
      3) Tensile Strength, ASTM D695-90: 4,500 psi.
      4) Heat Deflection Temperature, ASTM D648-90: 135 degrees F, minimum.
4. Epoxy Adhesive Packaging:
   a). Disposable, self-contained cartridge systems capable of dispensing both epoxy components in the proper mixing ratio, and fit into a manually or pneumatically operated caulking gun.
      1) Cartridge Markings: Include manufacturer's name, batch number, mix ratio by volume, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
5. Manufacturers and Products:
   a). Adhesives Technology Corp.: Anchor-It Fastening Systems HS 200 Epoxy Resin:
   b). ITW Ramset/Red Head: Epcon Ceramic 6 Epoxy Anchor System.
   c). Covert Operations: CIA Epoxy Anchors with viscosity to suit application.
   d). Rawplug Co., Inc.: Rawl/Sika Foil Fast Epoxy Injection Gel System.

D. Vinyl Ester Adhesive Anchor Systems: Two-component, insensitive to moisture, designed to be installed in adverse freeze/thaw environments.
1. Cure Temperature, Pot Life, and Workability: Compatible for intended use and anticipated environmental conditions.
2. Container Markings: Include manufacturer's name, product name, batch number, product expiration date, ANSI hazard classification, and appropriate ANSI handling precautions.
3. Anchor Rods: Stainless steel threaded rods, sized by adhesive manufacture for design loads required and adhesive system used.
4. Manufacturer and Product: Hilti, Inc., HIT Doweling Anchor System (HIT C-100).

2.3 LADDERS

A. Material: **Aluminum.**

B. Fabricate ladders with rails, rungs, landings, and cages to meet applicable requirements of OSHA, CFR Part 1910.27, and ANSI A14.3-84.
1. Concentrated load of 250 pounds plus 30 percent impact on rungs.
2. Maximum rung deflection of 1/360.
3. Concentrated load of 250 pounds plus 30 percent impact between consecutive attachments.
4. Self-closing gates at all landings.

C. Aluminum Ladders:
   1. Rungs: Aluminum extrusions of Alloy 6063-T6, with nonslip grip surface, 1-inch wide flat top, and semicircular bottom.
   2. Side Rails: ASTM B429-90a, Schedule 40, Alloy 6061-T6, 1-1/2-inch pipe.
   3. Use stainless steel fasteners for ladder attachments and cage assembly.
   4. Welded, pop riveted, or glued construction is not acceptable.
   5. Fabricate as long as practical but not to exceed 24 feet.

D. Ladder Safety Post: Equip ladders beneath sidewalk doors, roof hatches, skylights, or other floor or roof openings with telescoping tubular safety post, spring balanced and automatically locking in the raised position, with release lever for unlocking.
   1. Hot-dip galvanized post.
   2. Spring Mechanism: Corrosion-resistant steel alloy.
   3. Manufacturer and Products: Bilco Co., New Haven, CT; "Ladder Up" Model 2.

2.4 SAFETY CLIMB DEVICE

A. General:
   1. Furnish complete Saf-T-Climb System.
   2. Meet or exceed Federal Specification RR-S-001301 and OSHA Regulation No. 1910.27.
   3. Belts and harnesses shall withstand a minimum drop test of 250 pounds in a 6-foot free fall.
   4. Fall Prevention System Material: **Aluminum 6061-T6.**

B. Components and Accessories:
   1. Main Components: Saf-T-Lok Sleeve, the Saf-T-Belt, and the Saf-T-Notch Carrier Rail.
   2. Ladder rung clamps with **aluminum** mounting brackets and hardware.
   3. Removable extension kit and tie-down rod, mandrill, and carrier rail for ladders under manholes and hatches.
   4. Furnish additional accessories required to complete the system for each ladder.
   5. Furnish one harness for each ladder equipped with a safety climb device.
   6. Furnish pivot section at platforms, landings, and roofs.
   7. Furnish ladder gate climb preventive shield PN770-000-001, 8 feet long with angled sides to within 2 inches of the wall when closed, at locations shown.

C. Manufacturer: Norton Specialty Products Co., a Div. of SIEBE Inc., Brea, CA.

2.5 FABRICATION

A. General:
   1. Finish exposed surfaces smooth, sharp, and to well-defined lines.
   2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.
   3. Conceal fastenings where practical; where exposed, flush countersink.

4. Drill metalwork and countersink holes as required for attaching hardware or other materials.
5. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.
6. Material Thinner than 1/8 Inch: Either galvanize before fabrication in accordance with ASTM A525-91a, Coating Designation G210, or after fabrication in accordance with ASTM A123-89a, except the weight of zinc coating shall average minimum 1.2 ounces per square foot of actual surface area with no individual specimen having a weight of less than 1 ounce per square foot.

B. Materials: Use steel shapes unless otherwise noted.

C. Fabrication:
1. Fit and assemble in largest practical sections for delivery to site.
2. Fabricate as shown on Drawings and in accordance with ASTM A385-80.
3. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.
4. Use fasteners as shown or scheduled.
5. Grind cut edges smooth and straight.

D. Watertight: Where required or shown, furnish rubatex gaskets of a type that is satisfactory for use in contact with sewage. Cover full bearing surfaces.

E. Fitting: Where movement of fabrications is required or shown, cut, fit, and align items for smooth operation. Make corners square and opposite sides parallel.

F. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

G. Aluminum:
1. Fabricate in accordance with the Aluminum Association Standards and manufacturers' recommendations as approved.
2. Grind smooth sheared edges exposed in finished work.

2.6 WELDING

A. General:
1. Meet codes for Arc and Gas Welding in Building Construction of AWS and AISC for techniques of welding employed, appearance, quality of welds made, and the methods of correcting defective work.
2. Welding Surfaces: Free from loose scale, rust, grease, paint, and other foreign material, except mill scale which will withstand vigorous wire brushing may remain.
3. A light film of linseed oil may likewise be disregarded.
4. Do not weld when temperature of base metal is lower than zero degrees F.
5. Finished members shall be true to line and free from twists.
6. Prepare welds and adjacent areas such that there is:

a). No undercutting or reverse ridges on the weld bead.
b). No weld spatter on or adjacent to the weld or area to be painted.
c). No sharp peaks or ridges along the weld bead.

B. Aluminum:
1. Weld with Gas Metal Arc (MIG) or Gas Tungsten Arc (TIG) processes in accordance with manufacturer's written instructions as approved, and in accordance with recommendations of the American Welding Society contained in the Welding Handbook.
2. Grind smooth all exposed aluminum welds.

PART 3: EXECUTION

3.1 INSTALLATION OF METAL FABRICATIONS

A. General:
1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.
2. Install rigid, substantial, and neat in appearance.
3. Erect steel in accordance with applicable portions of AISC Code of Standard Practice, except as modified.
4. Install manufactured products in accordance with manufacturer's recommendations.
5. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
6. Field weld components indicated.
7. Perform field welding in accordance with AWS D1.1-92.
8. Obtain ENGINEER approval prior to sire cutting to welds, abrasions, and surfaces not in contact with concrete.

B. Erection Tolerances:
1. Maximum Variation from Plumb: 1/4 inch per story, noncumulative.
2. Maximum Offset from True Alignment: 1/4 inch.

C. Aluminum:
1. Erection: In accordance with the Aluminum Association specifications.
2. Do not remove mill markings from concealed surfaces.
3. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.

D. Pipe Sleeves:
1. Provide where pipes pass through concrete or masonry.
2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
3. Provide a center flanges for water stoppage on sleeves in exterior or water-bearing walls.
4. Provide a rubber caulking sealant or a modular mechanical unit to form a watertight seal in the annular space between pipes and sleeves.

3.2 SAFETY CLIMB DEVICE

A. Provide for each ladder over 16 feet.

B. Install in accordance with manufacturer's instructions in such a manner to enable worker to be attached to device at all times and to operate freely in a normal position during the climb and descent without having to remove worker's hands from ladder to operate the system effectively, and to be able to easily pivot onto and off of work platforms or landings while safely attached to device.

C. When installed to required height, fall prevention system shall be rigid and an integral part of the structure.

3.3 ANCHOR BOLTS

A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.

B. Use sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt. Minimum bolt size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

3.4 ANCHORING SYSTEMS FOR CONCRETE

A. Begin installation only after concrete or masonry receiving anchors have attained design strength.

B. Do not install an anchor closer than six times its diameter to either an edge of concrete or masonry, or to another anchor, unless specifically shown otherwise.

C. Install in accordance with manufacturer's specific quality control submittal instructions. Hole diameters are critical to installation, use only drills recommended by anchor manufacturer. Follow manufacturer's safe handling instructions.

D. Epoxy Anchors: Do not install when temperature of concrete is below 35 degrees F or above 110 degrees F.

E. Follow specific manufacturer safe handling practices when handing and installing concrete anchors.

3.5 ELECTROLYTIC PROTECTION

A. Aluminum:
   1. Where in contact with dissimilar metals, or embedded in masonry or concrete, protect surfaces as specified in Section 09900, PAINTING.
   2. Allow paint to dry before installation of the material.
   3. Protect painted surfaces during installation.
   4. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

3.6 MANUFACTURERS' SERVICES

A. Epoxy and Vinyl Ester Anchors: Conduct site training of installation personnel for safe and proper installation, handling, and storage of epoxy or vinyl ester adhesive system. Notify ENGINEER of time and place for sessions.

3.7 FASTENER SCHEDULE

A. Provide fasteners as follows:

Service Use and Location	Product	Remarks
Anchor Bolts Cast Into Concrete for Equipment Bases:		
Nonsubmerged	Stainless steel bolts, unless otherwise specified with equipment	
Submerged	Stainless steel bolts with fusion bond coating unless otherwise specified with equipment	See Section 09900, PAINTING
Anchor Bolts Cast Into Concrete for Metal Fabrications and Structural Components:		
Dry or Protected Areas	Carbon steel bolts	
Exterior, Wet, Washdown, and Chemical Handling Areas	Stainless steel bolts	
Anchors for Metal Components to Concrete: e.g., Electrical Panels and Equipment:		
Dry Areas	Expansion Anchors	
Wet and Damp Areas	Wedge anchors or stainless steel expansion anchors	
Submerged or Buried in Earth	Epoxy or adhesive anchors	
Connections for Steel Components and Fabrications:		
Exterior and Interior	High-strength steel bolts with hardended washers under head and nut	
Exterior and Interior	**Aluminum or Stainless-steel** bolts	
All Others:		
Exterior and Interior	Stainless steel fasteners	

B. Anti-seizing Lubricant: Use on all stainless steel threads.

C. Do not use epoxy anchors near fire or where ambient temperature will exceed 100 degrees F.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 05520 – HANDRAILS

PART 1: GENERAL

1.1 REFERENCES

A. Aluminum Association, Incorporated (AA): 45-80, Designation System for Aluminum Finishes.

B. American Iron and Steel Institute (AISI): SS306-84, Stainless Steel for Building Exteriors.

C. American Society for Testing and Materials (ASTM):
   1. A36, Standard Specification for Structural Steel.
   2. A53, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
   3. A123 E1, Standard Specification for Zinc (Hot-Galvanized) Coatings on Iron and Steel Products.
   4. A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   5. A193, Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service.
   6. A194. Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service.
   7. A501, Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
   8. A554, Standard Specification for Welded Stainless Steel Mechanical Tubing.
   9. E985, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.

D. Building Officials and Code Administrators International (BOCA): National Building Code (NBC).

E. International Conference of Building Officials (ICBO): 1997 Uniform Building Code (UBC).

F. Occupational Safety and Health Act (OSHA): 29 CFR 19.10-88, Code of Federal Regulations.

G. Southern Building Code Congress International (SBCCI): Standard Building Code (SBC).

1.2 DEFINITIONS

A. Handrails: Synonymous with terms; i.e., guardrail system, railing system, ramp-rail system, and stair-rail system. Handrails are comprised of a framework of vertical, horizontal, or inclined members, grillwork or panels, accessories, or combination thereof.

B. Toeboards: Vertical barrier at floor level usually erected on handrails along exposed edges of floor or wall openings, platforms, ramps, or stairs to prevent miscellaneous items from falling through.

C. ICBO Reports: Published by ICBO for concrete anchor manufacturers.

D. Special Inspection: As governed by the ICBO UBC.

1.3 SUBMITTALS

A. Shop Drawings:
   1. Indicate handrail profiles, sizes, connections, anchorage, size and type of fasteners, and accessories. Project-specific scale plans and elevations of handrails.
   2. Manufacturer's literature and catalog data of handrail and components.
   3. Design Data: Calculations or test data using design performance loads and include the following:
      a). Bending stress in, and deflection of, posts in accordance with ASTM E985-87.
      b). Stress in post-base connection.
      c). Calculation of anchorage forces and comparison of these forces to ICBO Uniform Building Code recommendations regarding safe allowable design loads of anchorages.
      d). For concrete anchor spacing less than 12-anchor diameters and edge distances less then 6-anchor diameters, make a reduction in allowable pullout and shear values. Use published ICBO Report values for anchors without Special Inspection; or provide independent laboratory inspection service for ICBO Report values with Special Inspection.

B. Quality Control Submittals:
   1. Manufacturer's assembly and installation instructions.
   2. Special Inspection:
      a). Manufacturer's instructions for Special Inspection of concrete anchors.
   3. Submit Special Inspection report in accordance with Article 33 - TESTS AND INSPECTIONS, of this Specification.
   4. Manufacturer's Certificate of Proper Installation.
   5. Manufacturer's written recommendations describing procedures for maintaining handrails including cleaning materials, application methods, and precautions to be taken in the use of cleaning materials.
   6. Test Reports: Test data may supplement load calculations providing data covers the complete handrail system, including anchorage:
   7. Test data for handrail and components showing load and deflection due to load, in enough detail to prove handrail is strong enough and satisfies national, state, local standards, regulations, code requirements, and OSHA 29 CFR 19.10-88, using design loads specified. Include test data for the following:
      a). Railing and post connections.
      b). Railing wall connections.
      c). Post and base connections.

d). Railing expansion joint connections.
e). Railing gate assembly, including latch and gate stop. Both gate latch and stop to support required loads applied, independent of each other.
f). Railing gate hinges.

C. Deflection Criteria: In accordance with ASTM E985-87 and design load specified.
1. Aluminum Rail Piping: Test data showing yield strength of pipe as delivered equals or exceeds 35,000 psi.
2. Concrete Anchors: Calculations and test data for review prior to use, on anchors other than those specified.

1.4 QUALITY ASSURANCE

A. Qualifications: Calculations required for design data stamped by a registered engineer licensed in the state where the Project will be constructed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Handrails adequately packaged and wrap to prevent scratching and denting during shipment, storage, and installation. Maintain protective wrapping until railing is completely installed.

B. Aluminum Handrails:
1. Shop assemble into practical modules of lengths not exceeding 24 feet for shipment. Deliver toeboards loose for field assembly.
2. All clear anodized handrail pipe and posts delivered with protective plastic wrap.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Thermal Movements: Allow for thermal movement resulting from the following maximum range in ambient temperature in the design, fabrication, and installation of handrails to prevent buckling, opening up of joints, over stressing of components, connections and other detrimental effects. Base design calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss. The temperature change is the difference between high or low temperature and installation temperature.
1. Temperature Change Range: 70 degrees, F, ambient; 0 degrees F, material surfaces.

1.7 COMPENSATION

A. MEASUREMENT
1. Handrails will not be measured for payment.

B. PAYMENT
1. No separate or additional payment will be made for handrails. All costs for furnishing and installing handrails shall be deemed to be included in the structure in which the handrails are embedded, attached or otherwise incorporated.

PART 2: PRODUCTS

2.1 DESIGN PERFORMANCE

A. Structural Performance of Handrails: Design, test, fabricate, and install handrails to withstand the following structural loads without exceeding the allowable design working stress or allowable deflection. Apply each load to produce maximum stress and deflection in each of the respective components comprising handrails.
   1. Top Rail of Handrails: Capable of withstanding the following load cases applied:
      a). Concentrated load of 200 pounds applied at any point and in any direction in accordance with ICBO UBC.
      b). Uniform load of 50 pounds per linear foot applied horizontally and concurrently with uniform load of 100 pounds per linear foot applied vertically downward in accordance with SBCCI SBC and BOCA NBC.
      c). Concentrated load need not be assumed to act concurrently with uniform loads in accordance with ICBO UBC.
   2. In-Fill Area of Railing Systems:
      a). Capable of withstanding a horizontal concentrated load of 200 pounds applied to 1 square foot at any point in the system including panels, intermediate rails, balusters, or other elements composing the in-fill area.
      b). Horizontal concentrated load need not be assumed to act concurrently with loads on top rails of handrails.
      c). Mid-rails with corner returns to withstand a 300-pound concentrated vertical load applied at any point or direction without damage and loosening of pipe, fittings, or attachment hardware.
      d). Concrete Anchors for Handrail Wall Brackets: Anchors with a strength required by calculations with concrete strength assumed at 4,000 psi and not exceeding ICBO UBC allowable loads for actual spacing, edge distance, and embedment.
      e). Concrete Anchors: In accordance ICBO UBC allowable load values for size, length, embedment, spacing, and edge distance to match required loads shown in calculations.

2.2 ALUMINUM HANDRAILS

A. General:
   1. Furnish pre-engineered and prefabricated picket handrails as shown on drawings.
   2. Pop rivets and glued railing construction not permitted.

B. Manufacturers:
   1. Thompson Fabricating Co., Birmingham, AL.
   2. Alumaguard Denver, Co.
   3. Hollaender
   4. No "or equal" or substitute products will be considered.

C. Rails, Posts, and Formed Elbows: Extruded Alloy 6105-T5 or 6061-T6, minimum tensile strength of 38,000 psi and minimum yield strength of 35,000 psi.
   1. Miscellaneous Aluminum Parts: 6063-T6 or 6061-T6 extruded aluminum of adequate strength for all loads.
   2. Post and Railing: Nominal 1-1/2-inch diameter.
   3. Rails: 1.900-inch outside diameter by 0.145-inch wall thickness, Schedule 40.
   4. Posts: 1.900-inch outside diameter by 0.200-inch wall thickness, Schedule 80.
   5. Solid dowel interconnectors of 6105-T5 or 6061-T6 aluminum.

D. Fittings:
   1. Top Mount Post Base:
      a). Cast aluminum.
      b). Four holes in base for concrete anchors. For narrow walls or curbs, furnish two holes in base for concrete anchors with required edge distance.
      c). Manufacturer and Products: Thompson Fabricating Co.; Part No. TBF-3.4 and Part No. TBF 3.2 for narrow walls and curbs.
   2. Handrail and Post Fittings: Extruded, machined bar stock, permanent mold castings, or die castings of sufficient strength to meet load requirements. Fittings shall match color of pipe in handrails. Sand-cast parts not permitted.
   3. Side Mounted Handrail Bracket: Extruded aluminum, Alloy 6062-T6 with four holes for bolts or concrete anchors.
      a). Manufacturer and Product: Thompson Fabricating Co.; Part No. TSM-1.5.
   4. Concrete Anchors for Securing Bases and Brackets to Concrete: Type 304 or 316 stainless steel 1/2-inch concrete anchors.
   5. Handrail Connections for Metal Stairway Stringers:
      a). Extruded aluminum bracket. Alloy 6063-T6.
      b). Brackets bolts 1/2-inch diameter type 304 or 316 stainless steel bolts.
      c). Offset adjustable stair fitting of cast Al-mag, Part No. ASF.
      d). Manufacturer and Products: Thompson Fabricating Co.; Part Nos. SMB-2 or SMB-3, ASF, APF.
   6. Handrail Connections for Metal Beams:
      a). Extruded aluminum bracket. Alloy 6063-T6.
      b). Bracket bolts 1/2-inch diameter Type 304 stainless steel bolts.
      c). Manufacturer and Products: Thompson Fabricating Co.; Part Nos. SMB-2 or SMB-3. Use Part No. TSM-1.5 if bracket is attached to flat side of a channel.
   7. Handrail Wall Brackets: Cast Al-mag aluminum bracket, Part No. AWF adjustable wall fitting with provision for three 3/8-inch Type 304 stainless steel bolts or concrete anchors.
      a). Manufacturer and Product: Thompson Fabricating Co.; Part No. AWF.
   8. Miscellaneous Rail to Post Fittings:
      a). Cast Aluminum Tee Fittings: Part Nos. TF-1 and TX-1.
      b). Cast Aluminum Ell Fittings: Part Nos. TE-1, TE-2, and TE-3.
      c). Aluminum Splice Lock: Part No. SL-1.
      d). Aluminum Expansion Joint Splice: Part No. ES-1.
      e). Formed Aluminum Wall Flange: Part No. CF-2.
      f). Manufacturer: Thompson Fabricating Co.

9. Handrail Gate: Furnish 6063-T6, 6105-T5, or 6061-T6 extruded aluminum.
   a). Hardware Manufacturers and Products:
      1) Julius Blum & Co., Inc. (1986 or newer Sweets Catalog), Carlstadt, NJ; No. 782/3 gate hinges and springs, and No. 784 gate latch and stop.
      2) Craneveyor Corp., South El Monte, CA; No. C4370b gate hinges and spring, No. C4369 gate latch, and No. C4368 gate stop.
      3) Thompson Fabricating Co., Birmingham, AL.
10. Toeboards and Accessories:
   a). Material: Molded or extruded 6063 or 6061 aluminum.
   b). Manufacturer: Thompson Fabricating Co.
11. Castings for Handrails: Cast Al-mag with sufficient strength to meet load and test requirements. Anodizable grade finish with excellent resistance to corrosion when subject to exposure of sodium chloride solution intermittent spray and immersion.

E. Concrete Embedded Metal Anchorages: In accordance with Section 05500, METAL FABRICATION AND CASTINGS

F. Finishes:
   1. Handrail Pipe and Post: In accordance with AA 45, designation AA-M32-C22-A41.
   2. Cast Fittings and Toeboards: In accordance with AA 45-80, designation AA-M10-C22-A41.

2.3 ANCHOR BOLTS, FASTENERS, AND CONCRETE ANCHORS

A. Locknuts, Washers, and Screws:
   1. Elastic, Locknuts, Steel Flat Washers, RHMS Round Head Machine Screws:
      a). Type A 304 or A 316 stainless steel.
   2. Flat Washers: Molded nylon.
   3. Manufacturer: McMaster-Carr Supply Co., Los Angeles, CA.

B. Bolts and Nuts for Bolting Handrail to Metal Beams: ASTM A193-90 and ASTM A194-90, Type A 316 stainless steel with minimum yield strength for bolts of 95,000 psi, unless otherwise shown.

C. Concrete Anchors:
   1. Stainless steel Type 304 or 316.
   2. Use ICBO UBC approved service load allowable values for size, length, embedment, spacing, and edge distance to match required loads shown in calculations.

D. Epoxy Anchors: Heavy-duty 1/2-inch diameter, for exterior use only in accordance with Section 05500, METAL FABRICATIONS AND CASTINGS, as an alternative to mechanical concrete anchors. Design and provide the number required. Do not use where fire or elevated temperatures above 110 degrees F exist.

2.4 FABRICATION OF ALUMINUM HANDRAILS

A. Shop Assembly:
   1. Post Spacing: Maximum 6-foot horizontal spacing.
   2. Railing Posts Bolted to Metal or Concrete:
   3. In lieu of field cutting, provide an approved fitting with sufficient post overlap, containing provisions for vertical adjustment.

B. Field fit-up is required.
   1. Aluminum handrails free of burrs, nicks, and sharp edges when fabrication is complete. Welding is not permitted.

C. Shop/Factory Finishing: Use same alloy for uniform appearance throughout fabrication for railings.
   1. Handrail and Post Fittings: Match the fittings with the color of pipe in handrail.
   2. Sand cast parts not permitted.
   3. Tolerances:
      a). Shop assemble rails, posts, and formed elbows with a close tolerance for tight fit.
      b). Fit dowels tightly inside posts.

PART 3: EXECUTION

3.1 GENERAL

A. Provide railing posts longer than needed and field cut to exact dimensions required in order to satisfy vertical variations on the actual structure. Install railing with a base that provides plus or minus ¼ inch vertical adjustment inside the base fitting. If adjustment is required in the field and exceeds plus or minus ¼ inch, reduce post length not to exceed beyond bottom of lowest setscrew or bolt in base fitting.

B. Field fabrication of aluminum railing systems not permitted.

C. Modification to structure not permitted where handrail is attached.

D. Mount handrails only on completed walls. Do not support handrails temporarily by means not satisfying structural performance requirements.

3.2 HANDRAIL INSTALLATION

A. Assemble and Installation: Perform in accordance with manufacturer's written Recommendations for installation.

B. Protection From Entrapped Water:
   1. Make provisions in exterior and interior installations subject to high humidity to drain water from railing system.
   2. Posts mounted in concrete, bends and elbows occurring at low points, drill weep holes of 1/4-inch diameter at lowest possible elevations, one hole per post or rail.
   3. Drill hole in the plane of the rail.

C. Expansion Joints:
   1. Maximum intervals of 54 feet on center and at structural joints.
   2. Slip joint with internal sleeve extending 2 inches beyond each side of joint. Provide 1/2-inch slip joint gap to allow for expansion.
   3. Fasten to one side using 3/8-inch diameter setscrew. Place setscrew at bottom of pipe.
   4. Locate joints within 12 inches of posts. Locate expansion joints in rails that span expansion joints in structural walls and floors supporting the posts.

D. Setting Posts:
   1. Embedded:
      a). Clean dust and foreign matter from sleeves or blockouts.
      b). Moisten interior of hole and surrounding surface with clean water. Fill hole with nonshrink grout prior to installing post.
      c). Brace railing until grout sets.
      d). Posts installed outside and exposed to freezing temperatures, drill weep hole through post approximately ½ inch above the level of the grout inside the post and in plane of the rail to prevent entrapment and freezing of water inside post.
   2. Surface Mounted:
      a). Bolt post baseplate connectors firmly in place.
      b). Shims, wedges, grout, and similar devices for handrail post alignment not permitted.

E. Posts and Rails:
   1. Set posts plumb and aligned to within 1/8 inch in 12 feet.
   2. Set rails horizontal or parallel to slope of steps to within 1/8 inch in 12 feet.
   3. Install posts and rails in same plane. Remove projections or irregularities and provide a smooth surface for sliding hands continuously along top rail. Use offset rail for use on stairs and platforms if post is attached to web of stringers or structural platform supports.
   4. Support 1-1/2-inch rails directly above stairway stringers with offset fittings.

F. Handrail Wall Brackets:
   1. Support wall rails on brackets spaced maximum 5 feet for aluminum as measured on the horizontal projection.

G. Toeboard:
   1. Provide at all handrails except where 4-inch or higher concrete curbs are installed or at gates.
   2. Accurately measure in field for correct length, after handrail post installation, cut and secure to posts.
   3. Dimension between bottom of toeboard and walking surface not to exceed 1/4 inch.
   4. Aluminum Toeboards: Provide expansion and contraction connections betweeneach post.

H. Railing Gate: Install in accordance with manufacturer's installation instructions.

I. Corrosion Protection: Prevent galvanic action and other forms of corrosion caused from direct contact with concrete and dissimilar metals by coating metal surfaces as required.

3.3 TEST AND INSPECTIONS

A. Perform Special Inspection for anchors where ICBO Reports require them for anchor strength value used.

B. Provide and independent test laboratory to perform Special Inspection.

3.4 CLEANING

A. Wash railing system thoroughly using clean water and soap. Rinse with clean water.

B. Do not use acid solution, steel wool, or other harsh abrasive.

C. If stain remains after washing, restore in accordance with manufacturer's recommendations, or replace stained handrails.

*** END OF SECTION ***

DIVISIONS 6, 7, 8, 9, 10, 11, 12, 13 AND 14

NOT USED

DIVISION 15

PIPING

TECHNICAL SPECIFICATION

SECTION 15100 – VALVES AND APPURTENANCES

PART 1: GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves, drains and appurtenances as shown on the Drawings and as specified herein.

B. The equipment shall include, but not be limited to, the following:
   1. Butterfly valve and appurtenances for low level outlet pipeline

1.2 RELATED WORK

A. Excavation, Backfill, Fill and Grading for Pipe is included in Division 2.

B. Piping is included in the respective Sections of Division 15.

1.3 DESCRIPTION OF SYSTEMS

A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of water, air, or chemicals, depending on the applications.

B. All valve and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.

C. All valve and appurtenances shall have the name of the manufacturer and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

1.4 QUALIFICATIONS

A. All of the types of valves and appurtenances shall be products of well established reputable firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

1.5 SUBMITTALS

A. Submit to the Engineer within 30 days after Notice to Proceed a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Submit product literature that includes information on the performance and operation of the valves, materials of construction, dimensions and weights, elastomer characteristic, headloss and flow data, and pressure ratings.

C. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer for approval in accordance with the requirements of the General Conditions.

1.6 TOOLS

A. Special tools, if required for normal operation and maintenance, shall be supplied with the equipment.

1.7 COMPENSATION

Bid Item No. 15100/01 - Butterfly Valve (24-inch Diameter)

A. MEASUREMENT
   1. Bid item No. 15100/01 – Butterfly Valve (24-inch diameter) will not be measured for payment.

B. PAYMENT
   1. The lump sum price bid for Bid Item No. 15100/01 – Butterfly Valve shall be full compensation for furnishing all materials, labor and equipment necessary to install the valve as shown on plan sheets. Such price shall be deemed to include all costs for valve installation, and other incidentals necessary for a full and complete installation.
   2. No separate or additional payment will be made for tie-ins or connections to piping to be constructed under this contract. All costs for accomplishing such tie-ins or connections to piping to be constructed under this contract shall be deemed to be included in the price bid for the structure to which the connection or tie-in is made.

PART 2: PRODUCTS

2.1 VALVE

A. BUTTERFLY VALVE FOR LOW LEVEL OUTLET PIPE
   1. Butterfly valve shall be of the tight closing rubber seated type, conforming fully to AWWA Standard C504, pressure class 75B. Valves shall be bubble-tight at rated pressures in either direction and shall be satisfactory for throttling service and actuation after long periods of inactivity. Valve disc shall rotate 90º from full open to tight shut position. Valve shall remain leak-proof and operable with an angular misposition of disc of up to 1º off of center.
   2. Valve Body: Cast iron, ASTM A126. Class B with ANSI B16.1 flanged ends.
   3. Valve Disc: Ducticle iron, ASTM A536 or Cast Iron, ASTM A48, Class 40. Seat mating surface of disc shall be stainless steel. Shat-to-disc connectors shall be stainless steel.
   4. Valve Shaft: Stainless Steel, ASTM A276, Type 304.
   5. Valve Seat: Buna-N synthetic rubber.
   6. Actuator: Provide AWWA C504 weatherproof worm gear actuators with handwheel operators and extensions, mounted as indicated on the drawings.

PART 3: EXECUTION

3.1 INSTALLATION

A. All valves shall be installed in accordance with the manufacturer's written Installation and Operation Manual.

B. All valves and appurtenances shall be installed in the location shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Engineer before they are installed.

C. After installation, all valves and appurtenances shall be tested at least 1 hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the Engineer.

D. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the Contractor shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

E. Buried flanged or mechanical joints shall be made with cadmium plated bolts. All exposed bolts shall be made with cadium plated bolts. All exposed bolts and nuts shall be heavily coated with two (2) coats of bituminous paint.

F. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing section then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension. Special care shall be taken in assembly of couplings in lines to be cleaned by hot water to provide the proper end clearance.

G. Prior to the installation of sleeve-type couplings, the pipe ends shall be cleaned thoroughly for a distance of 8-in. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6-in. from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferable by use of a torque wrench of the appropriate size and torque for the bolts.

3.2 SHOP PAINTING

A. Ferrous surfaces of valves and appurtenance shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.3 INSPECTION AND TESTING

A. Completed pipe shall be subjected to hydrostatic pressure test per Section 15120. All leaks shall be repaired and lines retested as approved by the Engineer. Prior to testing, the gravity pipelines shall be supported in an approved manner to prevent movement during tests.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 15120 – HDPE PIPE AND FITTINGS

PART 1: GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall supply all labor, equipment, materials and incidentals necessary to install and disinfect all piping and appurtenances located outside the buildings and structures and test as specified herein.

B. The Contractor will install pipeline of 24-inch in diameter using SDR 17 HDPE pipe for the low level outlet pipeline, in concrete encasement with 6-inch diameter drainline, as shown on the Drawings and in accordance with these Specifications.

C. The Low level Outlet pipe (the 24-inch diameter) shall be installed in a concrete encasement as shown on the drawings.

D. Furnish all excavation, backfilling, sheeting, slope protection, drainage, concrete work, grading and all other work necessary to complete the construction, installation of the piping..

1.2 SUBMITTALS

A. The Contractor shall submit complete product data from named vendor on all products proposed for use in the project.

B. Results from recording of each fuse on HDPE pipe shall be submitted to the Engineer as part of the installation record.

C. Submit shop drawings showing a complete laying plan of all pipe, including all fittings, adapters, valves and specials along with the manufacturer's drawings and specifications indicating complete details of all items. The above shall be submitted for approval before fabrication and shipment of these items. The locations of all pipes shall conform to the locations indicated in the drawings. In most cases, a certain amount of flexibility in positioning of pipes will be allowed, especially where new pipes will connect to structures.

1.3 INSPECTION

A. All pipe and fittings to be installed under this Contract may be inspected at the site of manufacture for compliance with these Specifications by an independent laboratory selected by the County.

1.4 APPROVAL OF MATERIALS

A. Submit to the Engineer for approval, within thirty (30) days after the Notice to Proceed, a listing, including materials to be furnished, the name of the suppliers, the date of delivery of materials to the job site, and a time schedule for the completion of the project.

1.5 QUALITY ASSURANCE

A. It is the CONTRACTOR's responsibility that all pipe units and all component parts of the line are manufactured and installed such that the maximum infiltration/exfiltration limit will not be exceeded, as determined by AWWA C906-99.

1.6 COMPENSATION

Bid Item No. 15120/01 - HDPE Low Level Outlet Pipe (24 - inch diameter)

A. MEASUREMENT

1. Bid Item No. 15120/01 - HDPE Pipe (24 - inch diameter) will be measured by the linear foot. Specials (Wyes, Tees, Bends, Flanges, Couplings) will not be measured separately, but will be included in the linear measurement of the pipe.
2. Concrete encasement for the pipe, including the 6-inch diameter drainline, as shown on the drawings or any other contract documents shall not be paid as a separate item. The encasement, drainline, downstream seepage filter including pipes and geotextile, and associated works such shall be included in the bid item 15120/01 – HDPE pipe (24-inch diameter).

B. PAYMENT

1. The unit price bid for Bid Item No. 15120/01 - HDPE Pipe (24 - inch diameter) shall be full compensation for furnishing and installing the HDPE pipe of the specified diameter. Such price shall be deemed to include all costs for excavation, shoring, bracing, bedding material, backfilling, compacting, trench excavation dewatering, excess material disposal, thrust blocks or pipe restraints as needed, pipe, fittings, connections, couplings, cutting, trimming, joint restraints, repair or replacement of damaged sections, downstream seepage filter including pipes and geotextile, hydrostatic pressure testing, disinfection, marking and incidentals necessary for a full and complete installation, in place and accepted by the Engineer.
2. No separate payment shall be made for concrete encasement, drainline, downstream seepage filter including pipes and geotextile, and associated works.
3. No separate or additional payment will be made for tie-ins or connections to existing, temporary or new structures.

PART 2: PRODUCTS

2.1 MATERIALS

A. HDPE Pipe:

1. Polyethylene pipe shall conform to ANSI/AWWA Standard C 906-99 and NSF 61. The pipe shall be PE 3408 with an SDR of 17. The carbon black content shall measure 2% to 3% by weight when tested according to ANSI/ASTM D 1603 or ASTM D4211. The pipe shall be produced by Rinker, J-M PE Corporation Pipe, or equal. All polyethylene pipe shall be blue PRISMA coated or shall have co extruded blue striping for identification.
2. The Owner at no additional cost may require quality audits. All pipe will be provided in standard straight lengths. No coiled pipe will be accepted for installation on the project.
3. Quality and Inspection: All pipe shall be smooth on both the interior and exterior surfaces; be free of noticeable imperfections such as cracks, blisters, or kinks in the pipe. The Owner, if he so chooses, shall be able to inspect the pipe at the pipe plant, trench, and other various storage sites. Based on these observations the Owner will have the right to reject any and all piping not conforming to these stated requirements, independent of laboratory tests. Field repair of any damaged piping shall not be permitted. The Owner reserves the right to require the removal of fused connections for destructive testing to verify the integrity of fused joints, etc.
4. Experience of Manufacturer: The pipe manufacturer shall provide evidence, if requested by the Owner, of having provided quality pipe and joints that have shown satisfactory results in service for a period of no less than two years. Evidence of completion of projects of similar size and timing for HDPE pipe will also be provided upon Owner request. All pipe within any given phase shall be from the same manufacturer.
5. Fittings: The fittings shall meet all of the requirements of the pipe to which they are to be fused. They shall be homogeneous throughout and essentially uniform in color, opacity, density and other properties. Fittings should also be free of such defects as cuts, cracks, or holes. Fabricated fittings will not be allowed where molded or machined fittings are available. All fittings will be manufactured in accordance with AWWA C906.
6. Markings: Markings shall be legible during usual handling of the pipe and be applied in a manner that will not damage the pipe. The following markings shall be provided as shown below:
   a). Nominal size and OD base
   b). Standard material code designation
   c). Dimension ratio
   d). Pressure class
   e). AWWA designation for this standard (AWWA C 906-99)
   f). Manufacturers production code
   g). Material test category of pipe
   h). NSF 61 approved

B. Electrofusion Couplings: Electrofusion couplings and saddles will not be used on this Project without written approval of Owner

C. Flange Assemblies: Flange assemblies shall consist of a metal back-up flange or ring and a polyethylene flange adapter. The back-up flange shall be slipped over the pipe profile flange adapter and then be fused into the plain end pipe.

PART 3: EXECUTION

3.1 HANDLING PIPE AND FITTINGS

A. Unloading: Equipment and facilities for unloading, hauling, distributing and storing materials shall be furnished by the Contractor and shall at all times be available for use in unloading materials. Delays in unloading railroad cars, unloading trucks, or hauling from freight terminal that incur demurrage, truck waiting charges or terminal charges shall be at the expense of the Contractor.

B. Handling: Pipe, fittings and other material shall be carefully handled so as to prevent breaking and/or damage. Pipe may be unloaded individually by hand but shall not be unloaded by rolling or dropping off of trucks or cars. Preferred unloading is in units using mechanical equipment, such as forklifts, cherry pickers or front end loaders with forks. If forklift equipment is not available units may be unloaded with use of spreader bar on top and nylon straps looped under the unit.

C. Distributing: Materials shall be distributed and placed so as to least interfere with traffic. No street or roadway may be closed without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for protection of traffic along highways, streets, and roadways upon which material is disturbed. No distributed material shall be placed in drainage ditches.

D. Storage: All pipe, fittings and other materials which cannot be distributed along the route of the work shall be stored for subsequent use when needed. The Contractor shall make his own arrangements for the use of storage areas; except that, with permission, he may make reasonable use of the Owner’s storage yards.

3.2 JOINING METHODS FOR HDPE PIPE

A. The pipe and fittings shall be joined by butt or saddle fusion, mechanical joint adapters, or by flange connections in accordance with manufacturer's recommendations. All joints shall be fused, not including connections to existing utilities, unless otherwise shown on Drawings or requested by the Owner

1. Fusion: The pipe shall be joined by heat fusion of the ends. Prior to fusion the pipe shall be clean and the ends shall be cut square. Fusion system operators shall be trained in the use of the equipment by the pipe supplier or manufacturer of the fusing machine and be experienced in the operation of the equipment. All fuses shall be recorded, the recording of the information must be provided to the Owner, and the recorded information must meet the standard requirements of the pipe manufacturer. All fusions failing to meet these requirements shall be removed and refused.
2. Flange: A flange assembly consists of a metal back-up flange or ring and a polyethylene flange adapter. The back-up flange is slipped over the pipe profile and the stub-end, or flange adapter, is then fused into the plain end pipe.
3. Connection to Valves: Connections to valves shall be by mechanical joints or flanges. All connections to valves must be restrained.
   a). Restrained Mechanical Joints: Restrained mechanical joints shall be made using mechanical joint adapters and shall incorporate a factory installed stiffener manufactured by Rinker, J-M PE Corporation Pipe, or equal.
   b). Flange: Flange connections shall be as described above in A(2).

3.3 BACKFILL AND BEDDING

A. Contractor will install pipe in accordance with ASTM D 2774 Standard Practice for Underground Installation of Thermoplastic Pipe, AWWA C906-99, and the Manufacturer's recommendations. Pipe shall be installed in a concrete cradle per the details in the Construction Drawings. Contractor shall ensure that the pipe does not float during placement of the concrete cradle. Contractor's methods shall be approved by the Engineer.

3.4 COLD (FIELD) BENDING

A. Contractor shall not bend the pipe to fit a trench more than that allowed by the pipe manufacturer.

3.5 INSTALLATION BY PULLING IN

A. Contractor will submit to Owner maximum proposed pull in length for the pressure class and diameter pipe proposed to be pulled into an open trench. Pull in lengths will not exceed the maximum lengths recommended by the manufacturer for the class and diameter pipe. Final tie-ins should be made one day after pulling in to allow the pipe to recover from the stress of the pulling.

3.6 PROTECTION OF PIPE OPENING

A. During installation, the Contractor will ensure that pipe ends that have not been fused will be protected against dirt, debris, animals, and other foreign materials. Plastic caps held in place with duct tape or other methods as approved by the Owner may be used.

3.7 BLOCKING AND RESTRAINING

A. Contractor shall fully restrain the pipe through the use of fully restrained joints by means of butt fusion, M-J adapters, or flange adapters. Do not use thrust blocks with HDPE pipe installations.

3.8 TESTING

A. Furnish all necessary equipment and labor for carrying out a pressure test and leakage test on the pipelines.

B. Make any traps and furnish all necessary caps, plugs, etc., as required in conjunction with testing a portion of the pipe between valves. Also, furnish a test pump, gauges, and any other equipment required with carrying out the hydrostatic tests.

C. The hydrostatic test will consist of an initial expansion phase and the test phase. The test pressure (1.5 times the working pressure of the pipe) will be applied to the water filled pipe for 3 hours with make-up water added at hourly intervals to maintain the test pressure. The test phase will then commence and shall not exceed 3 hours total duration. At the completion of the test phase, any water deficiency will be replaced and measured to return to the required test pressure. The maximum water deficiency for expansion under the test pressure allowed shall be 13.3 gallons per 100 ft of pipe.

D. At the direction of the Owner, Contractor will perform destructive strap testing on selected fuses to determine if the fuses meet with manufacturer's requirements. Pipe used in this testing will not be installed in the Project.

E. The testing of the HDPE pipe will be performed in accordance with AWWA C906-99 and the manufacturer's recommendations. Contractor will submit a test protocol to the Owner for approval prior to implementing any testing.

F. The Georgia Safe Dams Program shall be provided a minimum of two (2) weeks notice prior to hydrostatic pressure tests and shall approve test protocol prior to performance of testing.

*** END OF SECTION ***

3.2 SHOP PAINTING

A. Ferrous surfaces of valves and appurtenance shall receive a coating of rust-inhibitive primer. All pipe connection openings shall be capped to prevent the entry of foreign matter prior to installation.

3.3 INSPECTION AND TESTING

A. Completed pipe shall be subjected to hydrostatic pressure test per Section 15120. All leaks shall be repaired and lines retested as approved by the Engineer. Prior to testing, the gravity pipelines shall be supported in an approved manner to prevent movement during tests.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 15120 – HDPE PIPE AND FITTINGS

PART 1: GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall supply all labor, equipment, materials and incidentals necessary to install and disinfect all piping and appurtenances located outside the buildings and structures and test as specified herein.

B. The Contractor will install pipeline of 24-inch in diameter using SDR 17 HDPE pipe for the low level outlet pipeline, in concrete encasement with 6-inch diameter drainline, as shown on the Drawings and in accordance with these Specifications.

C. The Low level Outlet pipe (the 24-inch diameter) shall be installed in a concrete encasement as shown on the drawings.

D. Furnish all excavation, backfilling, sheeting, slope protection, drainage, concrete work, grading and all other work necessary to complete the construction, installation of the piping..

1.2 SUBMITTALS

A. The Contractor shall submit complete product data from named vendor on all products proposed for use in the project.

B. Results from recording of each fuse on HDPE pipe shall be submitted to the Engineer as part of the installation record.

C. Submit shop drawings showing a complete laying plan of all pipe, including all fittings, adapters, valves and specials along with the manufacturer's drawings and specifications indicating complete details of all items. The above shall be submitted for approval before fabrication and shipment of these items. The locations of all pipes shall conform to the locations indicated in the drawings. In most cases, a certain amount of flexibility in positioning of pipes will be allowed, especially where new pipes will connect to structures.

1.3 INSPECTION

A. All pipe and fittings to be installed under this Contract may be inspected at the site of manufacture for compliance with these Specifications by an independent laboratory selected by the County.

1.4 APPROVAL OF MATERIALS

A. Submit to the Engineer for approval, within thirty (30) days after the Notice to Proceed, a listing, including materials to be furnished, the name of the suppliers, the date of delivery of materials to the job site, and a time schedule for the completion of the project.

1.5 QUALITY ASSURANCE

A. It is the CONTRACTOR's responsibility that all pipe units and all component parts of the line are manufactured and installed such that the maximum infiltration/exfiltration limit will not be exceeded, as determined by AWWA C906-99.

1.6 COMPENSATION

Bid Item No. 15120/01 - HDPE Low Level Outlet Pipe (24 - inch diameter)

A. MEASUREMENT

1. Bid Item No. 15120/01 - HDPE Pipe (24 - inch diameter) will be measured by the linear foot. Specials (Wyes, Tees, Bends, Flanges, Couplings) will not be measured separately, but will be included in the linear measurement of the pipe.
2. Concrete encasement for the pipe, including the 6-inch diameter drainline, as shown on the drawings or any other contract documents shall not be paid as a separate item. The encasement, drainline, downstream seepage filter including pipes and geotextile, and associated works such shall be included in the bid item 15120/01 – HDPE pipe (24-inch diameter).

B. PAYMENT

1. The unit price bid for Bid Item No. 15120/01 - HDPE Pipe (24 - inch diameter) shall be full compensation for furnishing and installing the HDPE pipe of the specified diameter. Such price shall be deemed to include all costs for excavation, shoring, bracing, bedding material, backfilling, compacting, trench excavation dewatering, excess material disposal, thrust blocks or pipe restraints as needed, pipe, fittings, connections, couplings, cutting, trimming, joint restraints, repair or replacement of damaged sections, downstream seepage filter including pipes and geotextile, hydrostatic pressure testing, disinfection, marking and incidentals necessary for a full and complete installation, in place and accepted by the Engineer.
2. No separate payment shall be made for concrete encasement, drainline, downstream seepage filter including pipes and geotextile, and associated works.
3. No separate or additional payment will be made for tie-ins or connections to existing, temporary or new structures.

PART 2: PRODUCTS

2.1 MATERIALS

A. HDPE Pipe:

1. Polyethylene pipe shall conform to ANSI/AWWA Standard C 906-99 and NSF 61. The pipe shall be PE 3408 with an SDR of 17. The carbon black content shall measure 2% to 3% by weight when tested according to ANSI/ASTM D 1603 or ASTM D4211. The pipe shall be produced by Rinker, J-M PE Corporation Pipe, or equal. All polyethylene pipe shall be blue PRISMA coated or shall have co extruded blue striping for identification.
2. The Owner at no additional cost may require quality audits. All pipe will be provided in standard straight lengths. No coiled pipe will be accepted for installation on the project.
3. Quality and Inspection: All pipe shall be smooth on both the interior and exterior surfaces; be free of noticeable imperfections such as cracks, blisters, or kinks in the pipe. The Owner, if he so chooses, shall be able to inspect the pipe at the pipe plant, trench, and other various storage sites. Based on these observations the Owner will have the right to reject any and all piping not conforming to these stated requirements, independent of laboratory tests. Field repair of any damaged piping shall not be permitted. The Owner reserves the right to require the removal of fused connections for destructive testing to verify the integrity of fused joints, etc.
4. Experience of Manufacturer: The pipe manufacturer shall provide evidence, if requested by the Owner, of having provided quality pipe and joints that have shown satisfactory results in service for a period of no less than two years. Evidence of completion of projects of similar size and timing for HDPE pipe will also be provided upon Owner request. All pipe within any given phase shall be from the same manufacturer.
5. Fittings: The fittings shall meet all of the requirements of the pipe to which they are to be fused. They shall be homogeneous throughout and essentially uniform in color, opacity, density and other properties. Fittings should also be free of such defects as cuts, cracks, or holes. Fabricated fittings will not be allowed where molded or machined fittings are available. All fittings will be manufactured in accordance with AWWA C906.
6. Markings: Markings shall be legible during usual handling of the pipe and be applied in a manner that will not damage the pipe. The following markings shall be provided as shown below:
   a). Nominal size and OD base
   b). Standard material code designation
   c). Dimension ratio
   d). Pressure class
   e). AWWA designation for this standard (AWWA C 906-99)
   f). Manufacturers production code
   g). Material test category of pipe
   h). NSF 61 approved

B. Electrofusion Couplings: Electrofusion couplings and saddles will not be used on this Project without written approval of Owner

C. Flange Assemblies: Flange assemblies shall consist of a metal back-up flange or ring and a polyethylene flange adapter. The back-up flange shall be slipped over the pipe profile flange adapter and then be fused into the plain end pipe.

PART 3: EXECUTION

3.1 HANDLING PIPE AND FITTINGS

A. Unloading: Equipment and facilities for unloading, hauling, distributing and storing materials shall be furnished by the Contractor and shall at all times be available for use in unloading materials. Delays in unloading railroad cars, unloading trucks, or hauling from freight terminal that incur demurrage, truck waiting charges or terminal charges shall be at the expense of the Contractor.

B. Handling: Pipe, fittings and other material shall be carefully handled so as to prevent breaking and/or damage. Pipe may be unloaded individually by hand but shall not be unloaded by rolling or dropping off of trucks or cars. Preferred unloading is in units using mechanical equipment, such as forklifts, cherry pickers or front end loaders with forks. If forklift equipment is not available units may be unloaded with use of spreader bar on top and nylon straps looped under the unit.

C. Distributing: Materials shall be distributed and placed so as to least interfere with traffic. No street or roadway may be closed without first obtaining permission from the proper authorities. The Contractor shall furnish and maintain proper warning signs and obstruction lights for protection of traffic along highways, streets, and roadways upon which material is disturbed. No distributed material shall be placed in drainage ditches.

D. Storage: All pipe, fittings and other materials which cannot be distributed along the route of the work shall be stored for subsequent use when needed. The Contractor shall make his own arrangements for the use of storage areas; except that, with permission, he may make reasonable use of the Owner’s storage yards.

3.2 JOINING METHODS FOR HDPE PIPE

A. The pipe and fittings shall be joined by butt or saddle fusion, mechanical joint adapters, or by flange connections in accordance with manufacturer's recommendations. All joints shall be fused, not including connections to existing utilities, unless otherwise shown on Drawings or requested by the Owner

1. Fusion: The pipe shall be joined by heat fusion of the ends. Prior to fusion the pipe shall be clean and the ends shall be cut square. Fusion system operators shall be trained in the use of the equipment by the pipe supplier or manufacturer of the fusing machine and be experienced in the operation of the equipment. All fuses shall be recorded, the recording of the information must be provided to the Owner, and the recorded information must meet the standard requirements of the pipe manufacturer. All fusions failing to meet these requirements shall be removed and refused.
2. Flange: A flange assembly consists of a metal back-up flange or ring and a polyethylene flange adapter. The back-up flange is slipped over the pipe profile and the stub-end, or flange adapter, is then fused into the plain end pipe.
3. Connection to Valves: Connections to valves shall be by mechanical joints or flanges. All connections to valves must be restrained.
   a). Restrained Mechanical Joints: Restrained mechanical joints shall be made using mechanical joint adapters and shall incorporate a factory installed stiffener manufactured by Rinker, J-M PE Corporation Pipe, or equal.
   b). Flange: Flange connections shall be as described above in A(2).

3.3 BACKFILL AND BEDDING

A. Contractor will install pipe in accordance with ASTM D 2774 Standard Practice for Underground Installation of Thermoplastic Pipe, AWWA C906-99, and the Manufacturer's recommendations. Pipe shall be installed in a concrete cradle per the details in the Construction Drawings. Contractor shall ensure that the pipe does not float during placement of the concrete cradle. Contractor's methods shall be approved by the Engineer.

3.4 COLD (FIELD) BENDING

A. Contractor shall not bend the pipe to fit a trench more than that allowed by the pipe manufacturer.

3.5 INSTALLATION BY PULLING IN

A. Contractor will submit to Owner maximum proposed pull in length for the pressure class and diameter pipe proposed to be pulled into an open trench. Pull in lengths will not exceed the maximum lengths recommended by the manufacturer for the class and diameter pipe. Final tie-ins should be made one day after pulling in to allow the pipe to recover from the stress of the pulling.

3.6 PROTECTION OF PIPE OPENING

A. During installation, the Contractor will ensure that pipe ends that have not been fused will be protected against dirt, debris, animals, and other foreign materials. Plastic caps held in place with duct tape or other methods as approved by the Owner may be used.

3.7 BLOCKING AND RESTRAINING

A. Contractor shall fully restrain the pipe through the use of fully restrained joints by means of butt fusion, M-J adapters, or flange adapters. Do not use thrust blocks with HDPE pipe installations.

3.8 TESTING

A. Furnish all necessary equipment and labor for carrying out a pressure test and leakage test on the pipelines.

B. Make any traps and furnish all necessary caps, plugs, etc., as required in conjunction with testing a portion of the pipe between valves. Also, furnish a test pump, gauges, and any other equipment required with carrying out the hydrostatic tests.

C. The hydrostatic test will consist of an initial expansion phase and the test phase. The test pressure (1.5 times the working pressure of the pipe) will be applied to the water filled pipe for 3 hours with make-up water added at hourly intervals to maintain the test pressure. The test phase will then commence and shall not exceed 3 hours total duration. At the completion of the test phase, any water deficiency will be replaced and measured to return to the required test pressure. The maximum water deficiency for expansion under the test pressure allowed shall be 13.3 gallons per 100 ft of pipe.

D. At the direction of the Owner, Contractor will perform destructive strap testing on selected fuses to determine if the fuses meet with manufacturer's requirements. Pipe used in this testing will not be installed in the Project.

E. The testing of the HDPE pipe will be performed in accordance with AWWA C906-99 and the manufacturer's recommendations. Contractor will submit a test protocol to the Owner for approval prior to implementing any testing.

F. The Georgia Safe Dams Program shall be provided a minimum of two (2) weeks notice prior to hydrostatic pressure tests and shall approve test protocol prior to performance of testing.

*** END OF SECTION ***

TECHNICAL SPECIFICATION

SECTION 15140 – SANITARY SEWER RELOCATION

PART 1: GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall supply all labor, equipment, materials and incidentals necessary to install new sanitary sewer and abandon existing sanitary sewer sections at the locations indicated on the Drawings.

B. Furnish all clearing and grubbing, excavation, backfilling, sheeting, slope protection, drainage, concrete work, grading, erosion and sedimentation controls and all other work necessary to complete the sanitary sewer relocation.

C. Furnish all work necessary to complete the demolition of the odor control building and equipment.

D. Supply all products and perform all work in accordance with applicable American Society for Testing and Material (ASTM), American Water Works Association (AWWA), American National Standards Institute (ANSI), or other recognized standards. Latest revisions of all standards are applicable.

1.2 SUBMITTALS

A. The Contractor will submit product data on products proposed to complete this portion of the work.

B. Submit shop drawings showing a complete laying plan of all pipe, including all fittings, adapters, and specials along with the manufacturer's drawings and specifications indicating complete details of all items. The above shall be submitted for approval before fabrication and shipment of these items. The locations of all pipes shall conform to the locations indicated in the drawings. In most cases, a certain amount of flexibility in positioning of pipes will be allowed, especially where new pipes will connect to existing piping.

1.3 RELATED DOCUMENTS

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

B. The Contractor shall carry out the sanitary sewer relocation shown on the Drawings in accordance with the most current edition of the Rockdale Water Resources Wastewater System Standards and Specifications.

C. The Contractor shall carry out the demolition of the odor control building and equipment in coordination with Rockdale Water Resources personnel.

1.4 INSPECTION

A. All pipe and fittings to be installed under this Contract may be inspected at the site of manufacture for compliance with these Specifications by an independent laboratory selected by the County.

1.5 APPROVAL OF MATERIALS

A. Submit to the Engineer for approval, within thirty (30) days after the Notice to Proceed, a listing, including materials to be furnished, the name of the suppliers, the date of delivery of materials to the job site, and a time schedule for the completion of the project.

1.6 QUALITY ASSURANCE

A. It is the CONTRACTOR's responsibility that all pipe units and all component parts of the line are manufactured and installed such that the maximum infiltration/exfiltration limit will not be exceeded, as determined by AWWA C906-99 and AWWA C600

1.7 COMPENSATION

Bid Item No. 15140/01 – Sanitary Sewer Relocation

A. MEASUREMENT
   1. Bid Item No. 15140/01 – Sanitary Sewer Relocation will not be measured for payment.

B. PAYMENT
   1. The lump sum bid price for Bid Item No. 15140/01 – Sanitary Sewer Relocation shall be full compensation for furnishing and installing all components necessary to complete the work of this Section. Such price shall be deemed to include all costs for demolition of the odor control structure, clearing and grubbing, excavation, pipe, pipe bedding, manholes, backfill, grading and incidentals necessary for a full and complete installation.

PART 2: PRODUCTS

2.1 MATERIALS

A. **Ductile Iron Pipe**: Ductile iron pipe shall be utilized as shown on the Drawings. All pipe shall be furnished in nominal lengths of at least 18 to 20 feet.

1. Pipe and Fittings: Ductile iron pipe shall conform to AWWA C151 and shall be Pressure Class 350 unless shown otherwise on the Drawings. Pipe and fittings shall be cement lined in accordance with AWWA C104. Fittings shall conform to AWWA C110 with rated working pressure of 150 psi. Pipe and fittings shall be furnished with a bituminous outside coating. Tapping saddles shall be ductile iron.
2. Joints: Unless shown or specified otherwise, joints shall be push-on type for pipe and standard mechanical joints for fittings. Joints shall conform to AWWA C111. Restrained joints shall be American "LOK-FAST", FLEX-RING" or "LOK-RING", Clow "SUPER-LOCK", or U.S. "TR FLEX" or "LOK TYTE".
3. Acceptance: Acceptance will be on the basis of the County's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

B. **Polyvinyl Chloride (PVC) Gravity Sewer Pipe:** PVC gravity sewer pipe shall be supplied in nominal lengths of 13 to 20 feet.

1. Pipe: PVC gravity sewer pipe and fittings shall be manufactured in accordance with ASTM D 3034, SDR 26. Fittings for pipe 8-inches and less in diameter shall be one piece with no solvent-welded joints. No field fabrication of fittings will be allowed. All such fabrication shall be performed at the factory and the fittings delivered ready for use.
2. Joints: Joints for pipe and fittings shall be of the integral bell and spigot type with a confined elastomeric gasket having the capability of absorbing expansion and contraction without leakage. Joints shall meet the requirements of ASTM D 3212; gaskets shall meet the requirements of ASTM F 477. The joint system shall be identical for pipe and fittings.
3. Detection Tape: Detectable mylar encased aluminum foil marking tape will be installed over all sewers. Tape will be green in color, at least 1-1/2-inches wide, and shall bear the printed identification "Caution: Buried Sewer Line Below" (reverse printed), so as to be readable through the mylar. Surface printing on the tape shall be equal to Lineguard Type II Detectable.
4. Acceptance: Acceptance will be on the basis of the County's inspection and the manufacturer's written certification that the pipe was manufactured and tested in accordance with the applicable standards.

C. **Material for Manholes:** Provide materials for construction of manholes in accordance with the following:

1. Precast Concrete Sections: Precast concrete sections shall meet the requirements of ASTM C 478. The minimum compressive strength of the concrete in precast sections shall be 4,000 psi. The minimum wall thickness shall be one twelfth of the inside diameter of the riser of the largest cone diameter plus 1-inch or wall thickness suitable for use of rubber boot. Seal joints between precast sections by means of rubber O-ring gaskets or flexible butyl rubber sealant. Butyl rubber sealants shall meet the requirements of AASHTO M-198. Sealant shall be pre-formed type with a minimum nominal diameter of 1-inch. Butyl rubber sealant shall be equal to Kent Seal No. 2 or Concrete Sealant CS 202.
2. Brick and Mortar: Brick shall be whole and hardburned conforming to ASTM C 32 Grade MS. Mortar shall be made of 1 part Portland cement and 2 parts clean sharp sand. Cement shall be Type 1 and shall conform to ASTM C 150. Sand shall meet ASTM C 53.
3. Iron Castings: Cast iron manhole frames, covers and steps shall meet the requirements of ASTM A 48 for Class 30 gray iron and all applicable local standards. All castings shall be tough, close grained, smooth and free from blow holes, blisters, shrinkage, strains, cracks, cold shots and other imperfections. No casting will be accepted which weights less than 95 percent of the design weight. Shop drawings must indicate the design weight and provide sufficient dimensions to permit checking. All castings shall be thoroughly cleaned in the shop and given two coats of approved bituminous paint before rusting begins.

   Manhole frames and covers shall have a design weight of 270 lbs and shall be Neenah R-1695 or Vulcan V-1349 or equivalent.

   All frames and covers shall have machined horizontal bearing surfaces.

   Covers shall have the legend “Sanitary Sewer” cast into the face.

   Bolt-down covers shall be equipped with four ½-inch stainless steel bolts and a 1/8-inch red rubber or rubber O-ring gasket. Covers shall be rotatable and interchangeable. Bolt holes shall be bored through so that debris entering the bolt hole will fall into the manhole. Bolt holes shall have the full 360 degree circle within the cover’s radius when bored through the cover.
4. Plastic Steps: Manhole step of polypropolene molded around a steel rod equal to products of M.A. industries may be used.
5. Rubber Boots: Provide preformed rubber boots and fasteners equal to those manufactured by Kor-N-Seal or Press Seal Gasket Corporation.

PART 3: EXECUTION

3.1 SEQUENCING

A. Sanitary sewer service shall be maintained at all times during relocation of the sewer lines and odor control facility. All work shall be coordinated with Rockdale Water Resources.

3.2 LOCATION AND GRADE

A. The Drawings show the alignment and the slope of the sewer and the location of manholes. The slope shown on the drawings is the slope of the invert.

B. Temporary bench marks shall be provided at intervals along the sewer route and hubs will mark the center line of each manhole. The Contractor shall be responsible for any damage to reference points, base lines, center lines, and temporary bench marks, and shall be responsible for the cost of re-establishment of same.

C. Construction shall begin at the low end of the sewer and proceed upstream without interruption.

3.3 EXISTING UNDERGROUND UTILITIES AND OBSTRUCTIONS

A. Underground utilities or obstructions that are known to exist are indicated on the Drawings. The Contractor, as required by Georgia law, shall call the Utilities Protection Center (UPC) (404-325-5000 or 1-800-282-7411) and those utilities, agencies or departments that own and/or operate utilities in the vicinity of the site to verify the location of existing utilities and make arrangements to locate and avoid interference with said utilities. Where these or unforeseen underground utilities are encountered, the location and alignment may be changed, upon written approval of the Owner and/or Engineer, to avoid interference.

3.4 EROSION AND SEDIMENTATION CONTROLS

A. The Contractor shall comply with the Phase I Erosion and Sedimentation Control Plan included in the Drawing and the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit No. GAR 1000001.

B. The sewer relocation shall not commence until the Land Disturbance Permit is issued.

C. Specified grassing shall be performed as soon as practical.

3.5 CLEARING AND GRUBBING

A. Clear and grub the permanent easement 10 feet on each side of the pipeline before excavating. Remove all trees, growth, debris, stumps and other objectionable matter.

B. Refuse resulting from clearing and grubbing operations shall be hauled to a disposal site by the Contractor and shall be disposed of in accordance with all federal, state, county, and municipal regulations. No debris of any kind shall be deposited in any stream or body of water. No debris shall be deposited upon any private property except with the written consent of the property owner. In no case shall any material be left on the project, shoved onto abutting private properties, or be buried on the project.

3.6 HANDLING MATERIALS

A. Unloading: Equipment and facilities for unloading, hauling, distributing and storing materials shall be furnished by the Contractor and shall at all times be available for use in unloading materials. Any materials dropped or dumped will be subject to rejection without additional justification.

B. All materials shall be examined before installing, and no piece shall be installed which is found to be defective.

C. Handling: Pipe, fittings and other material shall be carefully handled so as to prevent shock or damage. Pipe may be unloaded individually by hand but shall not be unloaded by rolling or dropping off of trucks or cars. Preferred unloading is in units using mechanical equipment, such as forklifts, cherry pickers or front end loaders with forks. If forklift equipment is not available units may be unloaded with use of spreader bar on top and nylon straps looped under the unit.

D. Distributing: No distributed material shall be placed in drainage ditches.

E. Storage: All pipe, fittings and other materials which cannot be distributed along the route of the work shall be stored for subsequent use when needed. The Contractor shall make arrangements for the use of storage areas.

F. Any defective material discovered after it has been installed shall be removed and replaced in a satisfactory manner at no additional expense to the County.

3.7 TRENCH EXCAVATION

A. Excavate trenches by open cut. Perform all excavation in accordance with the Occupational Safety and Health Act of 1970 (PL 91-596) as amended.

B. Excavate trenches to the depths shown on the Standard Details for each class of bedding and for manholes and other structures.

C. Excavate the top portion of the trench to any width within the construction easement which will not cause unnecessary damage to adjoining structures, trees, or private property.

D. Excavate the lower portion of the trench to a width no greater than the outside diameter of the pipe plus 18 inches. Maintain this width up to two feet above the pipe.

E. If excavations are made to excessive depth, backfill with compacted bedding material to the required grade.

3.8 DEWATERING TRENCHES

A. Dewater excavation continuously to maintain a water level below the bottom of the trench. Dewater running sand be well pointing. Where soil conditions do not permit use of well points, construct french drains of crushed stone or gravel to conduct water to sumps.

3.9 ROCK EXCAVATION

A. Definition of Rock: Any material which cannot be excavated with a backhoe having a bucket curling force rated at not less than 18,300 pounds (comparable to Caterpillar Model 215), and occupying an original volume of at least one-half cubic yard.

B. Excavation: Where rock is encountered in trenches, excavate to the minimum depth which will provide clearance below the pipe barrel of 8 inches. Remove boulders and stones to provide a minimum of 6-inches of clearance between the rock and any part of the pipe or manhole. The minimum width of trenches in rock shall be 36 inches.

C. Blasting: Provide experienced workmen to perform blasting. Conduct blasting operations in accordance with all existing ordinances and regulations. Protect all structures from the effects of the blast. Repair any resulting damage.

D. Removal of Rock: Dispose of rock which is surplus or not suitable for use as rip rap or backfill.

3.10 BACKFILL AND BEDDING

A. Bed pipelines in accordance with the Standard Details and the following Specifications.

1. Materials: Bedding materials shall be crushed stone unless shown or specified otherwise. Crushed stone bedding material shall meet the requirements of Georgia Department of Transportation Specification 800.01 for No. 57 stone, Group II (quartzite granite). Earth bedding material shall be suitable materials selected from materials excavated from the trench. Materials shall be clean and free of rock, organics, and other unsuitable material.
2. General: Compact stone bedding material by tamping or slicing with a flatblade shovel. Prepare the trench bottom to support the pipe uniformly throughout its length. Provide bell holes to relieve the pipe bells of all load.

3. Gravity Sewers: Lay PVC pipe with minimum Class "B" bedding. PVC pipe installation shall conform to the requirements of ASTM D 2321. Lay all other pipe with Class "C" bedding unless shown or specified otherwise.
   a) Class "A": Excavate the trench to a depth of one-fourth the nominal diameter of the pipe below grade and lay the pipe to line and grade on concrete block. Place concrete to the full width of the trench and to a height of one-fourth the outside diameter of the pipe above the invert.
   b) Class "B": Excavate the bottom of the trench flat at a minimum depth shown on the Standard Details below the bottom of the pipe barrel. Place and compact bedding material to the proper grade. Bedding shall then be carefully placed by hand and compacted to provide full support under and up to the centerline of the pipe.
   c) Class "C": Excavate the bottom of the trench flat at a minimum depth shown on the Standard Details below the bottom of the pipe barrel. Place and compact bedding material to the proper grade. Bedding shall then be carefully placed by hand and compacted to provide full support under and up to a height of one-fourth the outside diameter of the pipe above the invert.
4. Manholes: Excavate to a minimum of 12 inches below the planned elevation of the base of the manhole. Place and compact crushed stone bedding material to the required grade before constructing the manhole.
5. Compaction: Bedding under pipe and manholes shall be compacted to a minimum of 85 percent of the maximum Standard Proctor maximum dry density, unless shown or specified otherwise.

3.11 INSTALLING PIPE

A. Install the pipe to conform to the alignment and grade shown on the Drawings.

B. Examine all pipe for cracks and other defects as it is laid. Do not lay pipe or other materials which are known to be defective. If any pipe or other material is discovered to be defective or damaged after being laid, remove and replace it.

C. Sequence: Excavate, lay the pipe, and backfill as closely together as possible. Do not leave unjointed pipe in the trench overnight. Cover the exposed end of the installed pipe each day at the close of work and at all other times when work is not in progress. If necessary to backfill over the end of an uncompleted pipe, close the end with a plug.

D. Placing and Jointing: Clean pipe and fittings thoroughly before laying. Before making the joint, clean the sealing surfaces of dust, dirt, gravel and other foreign substances. Apply joint lubricant recommended by the pipe manufacturer. Center the spigot end in the bell of the preceding pipe and shove home, following manufacturer's recommendations. Apply moderate force to ensure proper seating. Complete jointing no later than five minutes after application of the lubricant. Immediately after jointing bring the pipe to final alignment and grade.

3.12 BACKFILLING

A. Backfill carefully to restore the ground surface to its original condition. Dispose of surplus material.

B. Detection Tape: Detection tap shall be buried 4 to 6 inches beneath the ground surface directly over the top of the pipe. The tape will be installed according to the manufacturer's recommendations in a manner acceptable to the County.

C. Initial: Place initial backfill material carefully around the pipe above bedding in uniform 6-inch layers to a depth of at least 18 inches above the pipe bell. Compact each layer thoroughly with suitable hand tools. Do not disturb or damage the pipe. Backfill on both sides of the pipe simultaneously to prevent side pressures. Initial backfill material is earth material excavated from the trench which is clean and free of rock, stumps, limbs, man-made waste and other unsuitable material. If material excavated from the trench is not suitable for use as initial backfill, obtain suitable material elsewhere.

D. Final: After initial backfill material has been placed and compacted, backfill with general excavated material. Final backfill material shall not contain more than 1/3 broken rock, of which no single stone or boulder shall weigh more than 50 pounds. Place backfill material in uniform layers, compacting each layer thoroughly with heavy, power tamping tools.

E. Settlement: If trenches settle, re-fill and grade the surface to conform to the adjacent surfaces.

F. Compaction and Testing: Backfill shall be compacted to at least 95 percent of the Standard Proctor maximum dry density (ASTM D 698). A minimum of two density tests shall be performed at least every 100 feet.

3.13 MANHOLES

A. Construct manholes as shown on the Standard Details.

B. Precast Concrete: Handle sections carefully to prevent cracking or chipping. Provide uniform bedding of the bottom section to prevent uneven loading. If preformed openings must be enlarged or altered, or if new openings must be made in the field, minimize the amount of material removed to provide closely matched surfaces for grouting. Install gaskets and joint sealants in accordance with the manufacturer's recommendations to produce a watertight structure.

C. Brick: Bed the bottom and sides of every brick in mortar. Apply a smooth coat of mortar, 3/4 inches thick, on the inside and outside.

D. Pipe Connections: Connect pipe to manhole utilizing rubber boots installed in a cored or cast hole.

E. Inverts: Form channels as shown on the Standard Details, rounded, and troweled smooth. Maintain consistent grade through the invert.

F. Top Elevations: Build manholes to 18 inches above finished grade unless shown otherwise on the Drawings or directed by the County.

G. Frames and Covers: Unless frame and cover is at grade, the frame shall be cast into the cone section.

3.14 CONCRETE ENCASEMENT COLLARS

A. Concrete: Concrete shall have a compressive strength of not less than 3,000 psi, with not less than 5.5 bags of cement per cubic yard and a slump between 3 and 5 inches.

B. Encasement: Excavate the trench to provide a minimum of 6 inches clearance from the bell of the pipe. Lay the pipe to line and grade on concrete block. Pour concrete to the full width of the trench, and to a height of not less than 6 inches above the top of the pipe bell. Do not backfill the trench for a period of at least 24 hours after concrete is poured.

3.15 INSPECTION AND TESTING

A. Clean and test lines before requesting final acceptance. Where any obstruction is met, clean the sewers by means of rods, swabs, or other instruments. When directed by the County, flush out lines and manholes before final inspection.

B. Furnish all necessary equipment and labor for carrying out a pressure test and leakage test on the pipelines.

C. Pipe lines shall be straight and show a uniform grade between manholes. Correct any discrepancies discovered during the inspection.

D. Tests shall include Infiltration Tests, Exfiltration Tests, and Low-Pressure Air Tests. The Contractor shall keep records of all tests made and copies shall be provided to the County. Records shall show date, line number and stations, operator, and such other pertinent information as required by the County.

3.16 ODOR CONTROL FACILITY RELOCATION

A. The existing odor control facility shall be demolished as indicated on the Drawings.

B. The Contractor shall remove the equipment within the existing facility.

C. The Contractor shall fully coordinate the demolition of the odor control facility with Rockdale Water Resources.

3.17 PROTECTION AND RESTORATION OF WORK AREA

A. General: Return all items and all areas disturbed, directly or indirectly by work under these Specifications, to their original condition or better, as quickly as possible after work is started.

B. Cutting of Trees: Do not cut trees for the performance of the work except as absolutely necessary. Protect trees that remain in the vicinity of the work from damage from equipment. Do not store spoil from excavation against the trunks. Remove excavated material stored over the root system within 30 days to allow proper natural watering of the root system.

C. Grassing: Plant disturbed area in rye, fescue, Bermuda, clover or other suitable ground cover on completion of work in any area. In all areas, promptly establish successful stands of grass. Grassing activities shall comply with the Manual for Erosion and Sediment Control in Georgia, specifically, selection of species, planting dates, and application rates for seeding, fertilizer, and mulching. Where permanent grassing cannot be immediately established, the Contractor shall provide temporary vegetative cover.

D. Erosion Control: Plan excavation work to prevent erosion and the washing of soil into adjacent streams. Limit the amount of open excavation at any one time. Place spoil in the proper place and keep natural water routes open. All Contractor activities shall comply with Georgia's NPDES General Permit for Construction Activities.

*** END OF SECTION ***

DIVISION 16

NOT USED

DIVISION 17

NOT USED