

**SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR
CUMBERLAND COUNTY WATER DISTRICT
CUMBERLAND COUNTY, KENTUCKY**

2014 WATER SYSTEM IMPROVEMENTS

CONTRACT NO. 1

This project funded by:

**Commonwealth of Kentucky
Drinking Water State Revolving Fund F**

PROJECT NO. 1423

FEBRUARY 2015

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ADVERTISEMENT FOR BIDS

CUMBERLANDCOUNTY WATER DISTRICT, CUMBERLAND COUNTY, KENTUCKY

Separate Sealed BIDS for construction of 2014 WATER SYSTEM IMPROVEMENTS, CONTRACT NO.1, consisting of the construction of approximately 3,100 L.F. of 6-Inch water line, 4,100 L.F. of 4-Inch water line, 32,350 L.F. of 3-Inch water line, the renovation of two (2) existing booster pump stations and other associated appurtenances will be received by the Cumberland County Water District, 133 Lower River Street, Burkesville, KY 42717, until 11:00 a.m. local time, May 21, 2015 and then publicly opened and read aloud at the Cumberland County Water District, 133 Lower River Street, Burkesville, Kentucky.

The CONTRACT DOCUMENTS may be examined at the following locations:

CUMBERLAND COUNTY WATER DISTRICT, 133 Lower River Street, Burkesville, KY 42717
MONARCH ENGINEERING, INC., 556 Carlton Drive, Lawrenceburg, KY 40342

Copies of the CONTRACT DOCUMENTS may be obtained at the office of Monarch Engineering, Inc., 556 Carlton Drive, Lawrenceburg, KY 40342, upon request in writing and payment of \$125.00 non-refundable for each set. Bidders must purchase plans from the Engineer and payment shall be made via check in the name of the Bidder. Plans purchased by one party and bid by another party shall not be accepted. Plans will be available for purchase until 4:00 PM (E.D.T.), Tuesday, May 19, 2015.

Each Bidder must accompany his bid with a BID BOND in amount of not less than five (5) percent of the base bid. No Bidder may withdraw his bid for a period of 90 days. The Bidder awarded the CONTRACT shall execute a 100% PERFORMANCE BOND and a 100% PAYMENT BOND and shall furnish insurance as required, in the GENERAL CONDITIONS. CONTRACT shall be completed within 180 calendar days after date of authorization to start work. Liquidated damages will be \$1,000.00 per calendar day.

Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the contract, Title VI of the Civil Rights Act of 1964, the Anti-Kickback Act, and the Contract Work Hours Standard Act and 40 CFR 31.36 L (3, 4 & 6), Section 3, Segregated Facility, Section 109 and this project shall be in compliance with Executive Order 11246 (Equal Employment Opportunity) as amended. Contractors/Subcontractors shall comply with 41 CFR 60-4, in regard to affirmative action, to insure equal opportunity to females and minorities and will apply the time tables and goal set forth in 41 CFR 60-4 if applicable to the area of the project. Local firms, minority firms, small and female businesses are particularly encouraged to participate. Any bid that is obviously unbalanced may be rejected. The Cumberland County Water District reserves the right to reject any and all bids and waive informalities.

Federal law prohibits discrimination on the grounds of race, color, national origin, religion, age, handicap and sex in this project.

This project is being funded in part with a KIA Drinking Water SRF loan. Accordingly, the procurement will be subject to DOW Procurement Guidance including the Davis-Bacon Act. The award will be made to the lowest, responsive, responsible bidder.

CUMBERLAND COUNTY WATER DISTRICT, CUMBERLAND COUNTY, KENTUCKY

BY: _____
Alvin Pharis, Chairman

Instructions to Bidders

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ARTICLE 1 - DEFINED TERMS

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

- A. Issuing Office--The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement for Bids may be obtained from the Issuing Office.

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

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

ARTICLE 3 - QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

- A. Each Bidder must accompany his BID with a list of at least three projects, similar in scope and cost to this project, with references in which his company has performed work. The company, which performed the work as shown on the list of references must be the same company submitting the BID. The references shall include the name of the job, approximate date the job was completed, name of the utility company including contact person, and the name of the engineer including contact person.

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 is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

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 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, or 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 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 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 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 A pre-Bid conference will not be held.

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. 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 Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than five 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 5 % of Bidder's maximum Bid price and in the form of a certified check or a Bid bond (EJCDC No. C-430, 2002 Edition) issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions.

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 10 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 91 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. (Upon substantial completion, if necessary, a date for final completion and payment should be determined between the Owner, Contractor, and Engineer based on remaining work, market and weather conditions.)

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 "or-equal" materials and equipment as defined in paragraph 6.05 of the General Conditions, or those substitute materials and equipment approved by the 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 equal until after the bids have been opened and the contract has been awarded. The burden of proof of the merit of the proposed item, and cost for review of a proposed substitute item, is upon the Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. Bidders shall not rely upon approvals made in any other manner. Any reduction made in contract price due to approval of a substitute item or equal, will be subtracted from the bidders contract and placed into contingency funds for the project.

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, without an increase in the Bid.

- 12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest responsible 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 and 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.
- 12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 6.06.

ARTICLE 13 - PREPARATION OF BID

- 13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.
- 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 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. If required by State where work is to be performed, the corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporation business address and state of incorporation shall be provided on the Bid Form.
- 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 business address of the partnership shall be provided on the Bid Form.
- 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 business address of the firm must be provided on the Bid Form.
- 13.06 A Bid by an individual shall show the Bidder's name and business 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 business address of the joint venture must be provided on the Bid Form.

- 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 and dates of which shall be filled in on the Bid form.
- 13.10 The address and telephone number for communication 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 for the state of the Project, if any, shall also be shown on the Bid Form.

ARTICLE 14 - BASIS OF BID; COMPARSION 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 bid 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.

ARTICLE 15 - SUBMITTAL OF BID

- 15.01 Bidder shall submit one copy of Bid Form, Bid Bond and Bid Submittal Reference List.
- 15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids 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 shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED." When using the mail or other delivery system, the Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid. A mailed Bid shall be addressed to Owner.

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 or negotiated, that Bidder will be disqualified from further bidding on the Work. This provision to withdraw a Bid without forfeiting the Bid security does not apply to Bidder's errors in judgment in preparing the Bid.

ARTICLE 17 - OPENING OF BIDS

- 17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the 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 90 days.

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 be non-responsible. 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 responsible Bidder whose BBid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest in price and in the best interest of the Owner by considering other factors such as work history, recommendations, etc... In cases where the low bidder is not awarded the contract, submit an explanation of the selection process used, along with the recommendation for award, in order for all bidding requirements to be met for RD to concur in award of contract.

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 must 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 10 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.
- 21.02 This Contract is expected to be funded in part with funds provided by the United States Department of Agriculture, Rural Development (RD). Refer to Article 18 of the General Conditions for information on the Federal Requirements.
- 21.03 Concurrence by RD in the award of the Contract is required before the Contract is effective.

SPECIAL NOTES FOR CONTRACTORS

Each Bidder must accompany his bid with a list of at least three projects, similar in scope and cost to this project, with references in which his company has performed work. The company which performed the work as shown on the list of references must be the same company submitting the bid. The references shall include the name of the job, approximate date the job was completed, name of the utility company including contact person, and the name of the engineer including contact person.

The Contractor shall construct and make ready for service, including all tests, the water lines complete, in each area before working in another area. There is no exception to this requirement. The failure of the Contractor to abide by this requirement shall result in termination of the Contract. The Contractor may install roadway bores independent of this requirement.

The Contract Documents specify that the Contract shall be completed within 180 calendar days, but no work shall be performed on weekends and Federal holidays unless requested in writing at least seven days prior to any one weekend or holiday, and approved by the Engineer. This Contract is to be constructed during the weekdays of Monday through Friday and the period of 180 calendar days should allow the Contractor ample time to complete the project.

The Contractor shall not be allowed to maintain permanent residency for any employees on the construction site.

The Owner reserves the right to request and obtain information regarding the Contractor's financial status such as a financial statements or any other information relative to the financial capability of the Contractor to perform the work.

Included elsewhere within this specification is a Department of Transportation Encroachment Permit. The Contractor is required to comply with the requirements of this permit.

When performing work along or across any public roadway, the Contractor shall post warning signs painted orange and they shall be four feet by four feet mounted on posts in accordance with the Kentucky Transportation Department's Manual on Uniform Traffic Control Devices. The signs shall be as follows:

- 1) Caution Pipeline Construction 1500 Feet
- 2) Caution Pipeline Construction 1000 Feet
- 3) Caution Pipeline Construction 500 Feet

The Contractor shall maintain two flag men at all times where machinery is in operation when working where the flow of traffic will be disturbed. There is no exception to this requirement. The use of radios will be required when visual contact between the flagmen does not exist.

All signs, barricades, lights, and traffic control shall be installed in accordance with the Kentucky Transportation Department's Manual on Uniform Traffic Control Devices.

Contractor shall be responsible for keeping entire roadway free and clear at the end of each working day. No equipment shall be left on or parked along the road right of way. At the completion of each work day, the Contractor shall backfill all open trenches and install all traffic control signs, barricades, and lights in accordance with the Kentucky Transportation Department's Manual on Uniform Traffic Control Devices.

Underground utilities shown within the State Highway right of way shall be installed with a minimum depth of cover of 42-inches and all other cases shall have a minimum cover of depth of 30-inches. Flush hydrants or utility service boxes should be located within 2 feet from the edge of right-of-way line, or off right-of-way.

All necessary steps shall be taken to prevent erosion or siltation of the public right-of-way, adjoining property and waterways. All effected KYTC ditch lines shall remain free of excess silt or erosion and constructed to the normal typical section of the roadway with a minimum depth of 18 inches from the shoulder break point.

Contact the District Permits Engineer at KTC-DOH District #8, Somerset, Kentucky at (606) 677-4017 prior to beginning work.

The Contractor shall practice “Best Management Practices” (BMPs) that will minimize siltation and erosion in or near streams. Contractor shall provide adequate control of siltation and erosion by limiting unnecessary excavation, disturbing or uprooting trees and vegetation, dumping of soil or debris, or pumping silt-laden water into a nearby stream. See sheet SD-1 for typical soil erosion control devices. The Contractor shall be responsible for obtaining a Section 404 Permit from the Corps of Engineers if applicable.

The Contractor shall be responsible for complying with all requirements relating to the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Construction Activities (KYR10). This includes, but is not limited to, filing the Notice of Intent (NOI) with the Kentucky Division of Water and developing a Stormwater Pollution Prevention Plan (SWPPP) for the project. A copy of the Notice of Intent has been included in these documents for the Contractor’s use. However, it is recommended that the Contractor utilize the Division of Water’s e-permitting web site (<http://eppdepts01/eforms/depdefault.aspx>) as it greatly reduces the time required for acceptance of the Notice of Intent.

Pavement replacement shall be incidental to the cost of installing the water line. There is no pay item for pavement replacement.

All paved areas that are disturbed shall be backfilled with No. 9 stone, no exception. There is no pay item for stone backfill.

The minimum width of the pipe trench shall not be less than 24-Inches plus the diameter of the pipe being installed. Excavation of the pipe trench in rock areas shall be via the use of bucket and hoe type equipment and the use of any trencher type equipment shall not be allowed.

The Contractor shall comply with OSHA (P.L. 91-596) and the Contract Work Hours and Safety Standards Act (P.L. 91-54) as they relate to construction of the Project.

All proposed change orders to the construction contract must comply with DOW Procurement Guidance for Construction and Equipment Contracts. In addition, proposed change orders exceeding \$100,000 will require cost, pricing, and certification as required by DOW Procurement Guidance for Construction and Equipment Contracts.

The Contractor is required to employ the Six Good Faith Efforts as defined by the EPA to increase Disadvantaged Business Enterprise (DBE) awareness of all procurement opportunities which may result from the construction of the Project. Detailed information related to this requirement is included in Attachment No. 12 of the Supplemental General Conditions for DWSRF.

A complete bid package consist of the Bid Form, Bid Bond and the Bid Submittal Reference List. Any other documents or forms shall be requested at a later date.

The Owner reserves the right to increase, reduce, or eliminate any of the quantities of the Bid Items.

The Contract shall be awarded on the basis of the Base Bid.

**BID SUBMITTAL REFERENCE LIST
2014 WATER SYSTEM IMPROVMENTS
CONTRACT NO.1
CUMBERLAND COUNTY WATER DISTRICT
BID OPENING: MAY 21, 2015, @ 11:00 AM, LOCAL TIME**

JOB NAME	APPROXIMATE DATE OF COMPLETION	APPROXIMATE COST	NAME OF UTILITY & CONTACT PERSON	NAME OF ENGINEER & CONTACT PERSON
JOB NO. 1				
JOB NO. 2				
JOB NO. 3				

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 a Hazard Environmental Condition, if any, which has been identified in SC-4.06.
- 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 the 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 the 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 the 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 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BID SCHEDULE

Notes: BIDS shall include sales tax and all other applicable taxes and fees.

The CONTRACT shall be awarded to the lowest, responsive, responsible BIDDER.

The CONTRACT shall be awarded based on the lowest **BASE BID**

BASE BID CONTRACT

Item No.	Description	Quantity	Unit Price	Total Cost
1	6-Inch PVC SDR-21 Water Line	3,150 LF	\$ _____	\$ _____
2	4-Inch PVC SDR-21 Water Line	4,100 LF	\$ _____	\$ _____
3	3-Inch PVC SDR-21 Water Line	15,150 LF	\$ _____	\$ _____
4	2-Inch PVC SDR-21 Water Line	20 LF	\$ _____	\$ _____
5	Creek Crossing for 6-Inch Water Line	70 LF	\$ _____	\$ _____
6	Creek Crossing for 3-Inch Water Line	120 LF	\$ _____	\$ _____
7	Bore & Case for 3-Inch Water Line	30 LF	\$ _____	\$ _____
8	Free Bore & Case for 4-Inch Water Line	20 LF	\$ _____	\$ _____
9	Free Bore & Case for 3-Inch Water Line	90 LF	\$ _____	\$ _____
10	6-Inch Gate Valve	2 EA	\$ _____	\$ _____
11	4-Inch Gate Valve	1 EA	\$ _____	\$ _____
12	3-Inch Gate Valve	4 EA	\$ _____	\$ _____
13	2-Inch Gate Valve	1 EA	\$ _____	\$ _____
14	Blowoff Assembly	2 EA	\$ _____	\$ _____
15	Direct Connection	5 EA	\$ _____	\$ _____
16	Type I Connection	2 EA	\$ _____	\$ _____

BASE BID CONTRACT (Continued)

Item No.	Description	Quantity	Unit Price	Total Cost
17	Type II Connection	3 EA	\$ _____	\$ _____
18	Meter Setting	4 EA	\$ _____	\$ _____
19	Service Line Reconnection	3 EA	\$ _____	\$ _____
20	Meter Reconnection	44 EA	\$ _____	\$ _____
21	1-Inch PE Service Tubing	20 LF	\$ _____	\$ _____
22	3/4-Inch PE Service Tubing	720 LF	\$ _____	\$ _____
23	Exploration	36 HR	\$ _____	\$ _____
24	Hwy 1880 Booster Pump Station Rehabilitation			
24A	Demolition & Removal	1 LS	\$ _____	\$ _____
24B	Building Modification & Improvements	1 LS	\$ _____	\$ _____
24C	New Booster Pumps	1 LS	\$ _____	\$ _____
24D	New Piping & Appurtenances	1 LS	\$ _____	\$ _____
24E	Paint & Coatings	1 LS	\$ _____	\$ _____
24F	Electrical & Mechanical	1 LS	\$ _____	\$ _____
25	Hwy 449 Booster Pump Station Rehabilitation			
25A	Demolition & Removal	1 LS	\$ _____	\$ _____
25B	Building Modification & Improvements	1 LS	\$ _____	\$ _____
25C	New Booster Pumps	1 LS	\$ _____	\$ _____
25D	New Piping & Appurtenances	1 LS	\$ _____	\$ _____
25E	Paint & Coatings	1 LS	\$ _____	\$ _____
25F	Electrical & Mechanical	1 LS	\$ _____	\$ _____
TOTAL BASE BID			\$ _____	

ADDITIVE ALTERNATE NO. 1

Item No.	Description	Quantity	Unit Price	Total Cost
1	3-Inch PVC SDR-21 Water Line	5,850 LF	\$ _____	\$ _____
2	Bore & Case for 3-Inch Water Line	50 LF	\$ _____	\$ _____
3	3-Inch Gate Valve	2 EA	\$ _____	\$ _____
4	Direct Connection	1 EA	\$ _____	\$ _____
5	Type II Connection	1 EA	\$ _____	\$ _____
6	Meter Reconnection	7 EA	\$ _____	\$ _____
7	3/4-Inch PE Service Tubing	140 LF	\$ _____	\$ _____
8	Exploration	7 HR	\$ _____	\$ _____

TOTAL ADDITIVE ALTERNATE NO. 1 BID \$ _____

ADDITIVE ALTERNATE NO. 2

Item No.	Description	Quantity	Unit Price	Total Cost
1	3-Inch PVC SDR-21 Water Line	3,400 LF	\$ _____	\$ _____
2	2-Inch PVC SDR-21 Water Line	20 LF	\$ _____	\$ _____
3	3-Inch Gate Valve	1 EA	\$ _____	\$ _____
4	2-Inch Gate Valve	1 EA	\$ _____	\$ _____
5	Direct Connection	2 EA	\$ _____	\$ _____
6	Type II Connection	1 EA	\$ _____	\$ _____
7	Meter Reconnection	8 EA	\$ _____	\$ _____
8	3/4-Inch PE Service Tubing	60 LF	\$ _____	\$ _____
9	Exploration	8 HR	\$ _____	\$ _____

TOTAL ADDITIVE ALTERNATE NO. 2 BID \$ _____

ADDITIVE ALTERNATE NO. 3

Item No.	Description	Quantity	Unit Price	Total Cost
1	3-Inch PVC SDR-21 Water Line	8,750 LF	\$ _____	\$ _____
2	2-Inch PVC SDR-21 Water Line	20 LF	\$ _____	\$ _____
3	Creek Crossing for 3-Inch Water Line	100 LF	\$ _____	\$ _____
4	Bore & Case for 3-Inch Water Line	100 LF	\$ _____	\$ _____
5	Open Cut & Case for 3-Inch Water Line	60 LF	\$ _____	\$ _____
6	3-Inch Gate Valve	3 EA	\$ _____	\$ _____
7	2-Inch Gate Valve	1 EA	\$ _____	\$ _____
8	Blowoff Assembly	1 EA	\$ _____	\$ _____
9	Direct Connection	1 EA	\$ _____	\$ _____
10	Type II Connection	1 EA	\$ _____	\$ _____
11	Meter Reconnection	10 EA	\$ _____	\$ _____
12	1-Inch PE Service Tubing	100 LF	\$ _____	\$ _____
13	3/4-Inch PE Service Tubing	80 LF	\$ _____	\$ _____
14	Exploration	14 HR	\$ _____	\$ _____
TOTAL ADDITIVE ALTERNATE NO. 3 BID			\$ _____	

The CONTRACT shall be awarded based on the lowest **BASE BID**. Additive Alternates may also be awarded in conjunction with the Base Bid Contract at the discretion of the OWNER if adequate funding is available.

The above unit prices shall include all labor, materials, bailing, shoring, removal, overhead, profit, insurance, etc., to cover the finished work of the several kinds called for.

- A. Unit Prices have been computed in accordance with paragraph 11.03.A of the General Conditions.
- B. 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.

ARTICLE 6 - TIME OF COMPLETION

- 6.01 Bidder agrees that the Work will be substantially complete in accordance with paragraph 14.04 of the General Conditions on or before the contract date or within the number of calendar days indicated in the Agreement.
- 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 the Bid:
- A. Required Bid security in the form of a Bid Bond (EJCDC No. C-430) or Certified Check (circle type of security provided);
 - B. If Bid amount exceeds \$10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in paragraph 18.10 of the General Conditions;
 - C. If Bid amount exceeds \$25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);
 - D. If Bid amount exceeds \$100,000, signed RD Instruction 1940-Q, Exhibit A-1, Certification for Contracts, Grants, and Loans. Refer to paragraph 18.11 of the General Conditions;

ARTICLE 8 - DEFINED TERMS

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

ARTICLE 9 - BID SUBMITTAL

9.01 This Bid submitted by:

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

Bidder's Business address:

Business Phone No. (_____)_____

Business FAX No. (_____)_____

Business E-Mail Address

State Contractor License No. _____ (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:

9.02 Bid submitted on _____, 20__.

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

Bidder's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature and Title

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

Attest: _____
Signature and Title

Attest: _____
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 the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
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 fails 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, 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.

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

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 any 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 or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

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 or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," 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 contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transmission 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.

(Name)

(Date)

(Title)

U.S. DEPARTMENT OF AGRICULTURE

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY
AND VOLUNTARY EXCLUSION – LOWER TIER COVERD TRANSACTIONS**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, Federal Register (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

**(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON
REVERSE)**

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
4. The terms “covered transaction,” “debarred,” “suspended,” “ineligible,” “lower tier covered transaction,” “participant,” “person,” “primary covered transaction,” “principal,” “proposal,” and “voluntarily excluded,” as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled “Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions,” without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Non-procurement List.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

(Name of Borrower or Grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor. I represent that:

1. I have, have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.
2. If I have participated in such a contract or subcontract, I have, have not, filed all compliance reports that I have been required to file in connection with the contract or subcontract.

If the proposed contract is for \$50,000 or more and I have 50 or more employees, I also represent that:

3. I have, have not previously had contracts subject to the written affirmative action program requirements of the Secretary of Labor.
4. If I have participated in such a contract or subcontract, I have, have not, developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by

explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR
CERTIFICATIONS OF NON-SEGREGATED FACILITIES**

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date: _____

Signature of Bidder or Prospective Contractor

Address (including Zip Code)

CERTIFICATION FOR AMERICAN IRON & STEEL REQUIREMENT

The Contractor acknowledges to and for the benefit of the Cumberland County Water District (“Purchaser”) and the Commonwealth of Kentucky (the “State”) that it understands the goods and services under this Contract are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as “American Iron and Steel;” that requires all of the iron and steel products used in the project to be produced in the United States (“American Iron and Steel Requirement”) including iron and steel products provided by the Contractor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney’s fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

Contractor Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

NOTICE OF AWARD

TO: _____

PROJECT: 2014 Water System Improvements
Contract No.1

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated May 13, 2015, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of \$_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this ___ day of _____, 2015.

Cumberland County Water District
Owner

By: _____

Title: _____ *Chairman* _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

_____, this the ___ day of _____, 2015.
Contractor

By: _____

Title _____

**AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)
FUNDING AGENCY EDITION**

THIS AGREEMENT is by and between Cumberland County Water District (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:

2014 Water System Improvements
Contract No.1

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:

2014 Water System Improvements
Contract No.1

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by Monarch Engineering, Inc., 556 Carlton Drive, Lawrenceburg, KY 40342, telephone number 502/839-1310.

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 180 days after the date when the Contract Time commences to run as provided in Paragraph 2.03 of the General Conditions, and completed and ready for final payment at a date determined by Owner, Contractor, and Engineer after substantial completion, based on remaining work, weather and market conditions.

4.03 Liquidated Damages

- A. Contractor and Owner recognize that time is of the essence on this Project and that the Owner will suffer financial loss if the Work is not substantially completed within the times specified in Paragraph 4.02 above, plus any extensions allowed in accordance with Article 12 of the General Conditions. Accordingly, Contractor shall pay Owner \$1,000.00 for each day that expires after the time specified in Paragraph 4.02 until the work is substantially complete. After substantial completion, retainage may be reduced to an amount agreed upon by Owner, Contractor, and Engineer. It should be no less than 150% of the amount required for the completion and ready for final payment. Liquidated damages may not be assessed after substantial completion has been achieved.

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. All specific cash allowances are included in the prices and have been computed in accordance with Paragraph 11.02 of the General Conditions.

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.

- A. For all Work at the prices stated in Contractor’s Bid, included in Contract Documents.

Contract Amount _____ (\$ _____).

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 on or about the 15th 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. 95 percent of Work completed (with the balance being retainage); and
 - b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, plus any reduction in retainage that has been agreed upon by Owner, Contractor and Engineer.

6.03 Final Payment

- A. Upon receipt of the final Application for Payment accompanied by Engineer's recommendation of payment in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay Contractor as provided in Paragraph 14.07 of the General Conditions the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages.

ARTICLE 7 - INTEREST

- 7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the maximum legal rate.

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 obtained and carefully studied (or assumes responsibility for doing so) all 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.

- E. 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.
- F. 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.
- G. 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.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement
 - 2. Performance Bond
 - 3. Payment Bond
 - 4. Other bonds
 - 5. General Conditions
 - 6. Supplementary Conditions
 - 7. Specifications as listed in the table of contents of the Project Manual.
 - 8. Drawings consisting of 42 sheets.
 - 9. Addenda, if applicable
 - 10. Exhibits to this Agreement (enumerated as follows):
 - a. Notice to Proceed
 - b. Contractor's Bid
 - c. Documentation submitted by Contractor prior to Notice of Award
 - d. _____.

11. 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
 - 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.

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

This Agreement will be effective _____, 2015, (which is the Effective Date of the Agreement). This Agreement shall not be effective unless and until Agency's designated representative concurs.

OWNER:

CONTRACTOR:

Cumberland County Water District

By: _____

By: _____

Title: Chairman

Title: _____

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: _____

Attest: _____

Title: _____

Title: _____

Designated Representatives:

Designated Representatives:

Name: _____

Name: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

133 Lower River Street

Burkesville, KY 42717

Phone: 270-864-3133 FAX: 270-864-3865

Phone: _____ FAX: _____

(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.)

Agency Concurrence:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

Agency: _____

By: _____

Date: _____

Title: _____

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:

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 Representative (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

SURETY

Company:

Signature: _____ (Seal)

Name and Title:

(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

SURETY

Company:

Signature: _____ (Seal)

Name and Title:

(Seal)

Surety's Name and Corporate Seal

By: _____

Signature and Title

(Attach Power of Attorney)

Attest: _____

Signature and Title:

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):**

NOTICE TO PROCEED

TO: _____ DATE: _____

PROJECT: 2014 Water System Improvements
Contract No.1

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 2015, on or before _____, 2015, and you are to complete the WORK within 180 consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 20____.

Dated this ___ day of _____, 2015.

_____ Cumberland County Water District
Owner

By: _____

Title: _____ Chairman _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by

_____, this the ___ day of _____, 2015.
Contractor

By: _____

Title _____

Employer Identification Number: _____

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT FUNDING AGENCY EDITION

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By



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

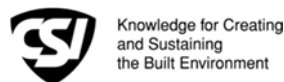
This document has been approved and endorsed by

The Associated General Contractors of America



and the

Construction Specification Institute



These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor Funding Agency Edition No. C-521 (2002 Edition). 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).

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GENERAL CONDITIONS

DEFINITIONS AND TERMINOLOGY

Defined Terms

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.

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.

Agency – The Federal or state agency named as such in the Agreement.

Agreement – The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

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.

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.

Bid – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder – The individual or entity who submits a Bid directly to Owner.

Bidding Documents – The Bidding Requirements and the proposed Contract Documents (including all Addenda).

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.

Change Order – A document recommended by Engineer which is signed by Contractor and Owner and Agency 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.

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.

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.

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.

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).

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.

Contractor – The individual or entity with whom Owner has entered into the Agreement.

Cost of the Work – See Paragraph 11.01.A for definition.

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.

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.

Engineer – The individual or entity named as such in the Agreement.

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.

General Requirements – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

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.

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.

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.

Liens – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

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.

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.

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.

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

PCBs – Polychlorinated biphenyls.

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.

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.

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

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.

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.

Related Entity – An officer, director, partner, employee, agent, consultant, or subcontractor.

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

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.

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.

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.

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.

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.

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.

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.

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.

Successful Bidder – The Bidder submitting a responsive Bid to whom Owner makes an award.

Supplementary Conditions – That part of the Contract Documents which amends or supplements these General Conditions.

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.

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.

Unit Price Work – Work to be paid for on the basis of unit prices.

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.

Work Change Directive – A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and Agency upon recommendation of the 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.

Terminology

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

Intent of Certain Terms or Adjectives

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.

Day

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

Defective

The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:

does not conform to the Contract Documents, or

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

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).

Furnish, Install, Perform, Provide

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.

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.

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.

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.

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.

PRELIMINARY MATTERS

Delivery of Bonds and Evidence of Insurance

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.

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.

Copies of Documents

Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

Commencement of Contract Times; Notice to Proceed

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.

Starting the Work

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.

Before Starting Construction

Preliminary Schedules: Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

a preliminary Progress Schedule;

a preliminary Schedule of Submittals; and

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.

Preconstruction Conference

Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, Agency, 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.

Initial Acceptance of Schedules

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.

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.

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

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.

CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent

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

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.

Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

Reference Standards

Standards, Specifications, Codes, Laws, and Regulations

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.

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.

Reporting and Resolving Discrepancies

Reporting Discrepancies

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.

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.

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.

Resolving Discrepancies

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:

the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

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).

Amending and Supplementing Contract Documents

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.

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:

A Field Order;

Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3)
or

Engineer's written interpretation or clarification.

Reuse of Documents

Contractor and any Subcontractor or Supplier shall not:

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

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.

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.

Electronic Data

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.

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.

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.

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

Availability of Lands

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.

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.

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

Subsurface and Physical Conditions

Reports and Drawings: The Supplementary Conditions identify:

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

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.

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:

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

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

any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

Differing Subsurface or Physical Conditions

Notice: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

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

is of such a nature as to require a change in the Contract Documents; or

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

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.

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.

Possible Price and Times Adjustments

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:

such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

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.

Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

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

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

Contractor failed to give the written notice as required by Paragraph 4.03.A.

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.

Underground Facilities

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:

Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

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

reviewing and checking all such information and data,

locating all Underground Facilities shown or indicated in the Contract Documents,

coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

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

Not Shown or Indicated

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.

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.

Reference Points

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.

Hazardous Environmental Condition at Site

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.

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:

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

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

any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

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.

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.

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.

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.

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.

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.

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.

BONDS AND INSURANCE

Performance, Payment, and Other Bonds

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.

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.

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.

Licensed Sureties and Insurers

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.

Certificates of Insurance

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.

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.

Contractor's Liability Insurance

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:

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

claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

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

claims for damages insured by reasonably available personal injury liability coverage which are sustained:

by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

by any other person for any other reason;

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

claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The policies of insurance required by this Paragraph 5.04 shall:

with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insureds (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;

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;

include completed operations insurance;

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

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);

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

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.

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.

Owner's Liability Insurance

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.

Property Insurance

Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (Contractor shall be responsible for any deductible or self-insured retention.). This insurance shall:

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 any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

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, falsework, 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;

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

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;

allow for partial utilization of the Work by Owner;

include testing and startup; and

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.

Contractor 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.

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.

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.

Waiver of Rights

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 Contractor as trustee or otherwise payable under any policy so issued.

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:

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

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.

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.

Receipt and Application of Insurance Proceeds

Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Contractor and made payable to Contractor 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. Contractor 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.

Contractor 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 Contractor's exercise of this power. If such objection be made, Contractor 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, Contractor as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Contractor as fiduciary shall give bond for the proper performance of such duties.

Acceptance of Bonds and Insurance; Option to Replace

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.

Partial Utilization, Acknowledgment of Property Insurer

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.

CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence

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.

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.

Labor; Working Hours

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.

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.

Services, Materials, and Equipment

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.

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.

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.

Progress Schedule

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.

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.

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.

Substitutes and "Or-Equals"

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.

"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:

in the exercise of reasonable judgment Engineer determines that:

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

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;

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

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

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

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

Substitute Items

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.

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.

The procedure 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.

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:

shall certify that the proposed substitute item will:

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

be similar in substance to that specified, and

be suited to the same use as that specified;

will state:

the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

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

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;

will identify:

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

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

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.

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.

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.

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

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.

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

Concerning Subcontractors, Suppliers, and Others

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.

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.

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:

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

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.

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.

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.

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.

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.

Patent Fees and Royalties

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.

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.

Permits

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.

Laws and Regulations

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.

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.

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.

Taxes

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.

Use of Site and Other Areas

Limitation on Use of Site and Other Areas

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.

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.

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.

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.

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.

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.

Record Documents

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.

Safety and Protection

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:

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

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

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.

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.

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).

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).

Safety Representative

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.

Hazard Communication Programs

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.

Emergencies

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.

Shop Drawings and Samples

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.

Shop Drawings

Submit number of copies specified in the General Requirements.

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.

Samples

Submit number of Samples specified in the Specifications.

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.

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.

Submittal Procedures

Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

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

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

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

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.

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.

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

Engineer's Review

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.

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.

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.

Resubmittal Procedures

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.

Continuing the Work

Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

Contractor's General Warranty and Guarantee

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.

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

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

normal wear and tear under normal usage.

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:

observations by Engineer;

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

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

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

any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

any inspection, test, or approval by others; or

any correction of defective Work by Owner.

Indemnification

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.

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.

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:

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

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

Delegation of Professional Design Services

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.

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.

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.

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.

Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

OTHER WORK AT THE SITE

Related Work at Site

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:

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

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.

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.

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.

Coordination

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:

the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

the specific matters to be covered by such authority and responsibility will be itemized; and

the extent of such authority and responsibilities will be provided.

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

Legal Relationships

Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

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.

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.

OWNER'S RESPONSIBILITIES

Communications to Contractor

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

Replacement of Engineer

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.

Furnish Data

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

Pay When Due

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

Lands and Easements; Reports and Tests

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.

Insurance

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

Change Orders

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

Inspections, Tests, and Approvals

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

Limitations on Owner's Responsibilities

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.

Undisclosed Hazardous Environmental Condition

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

Evidence of Financial Arrangements

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.

ENGINEER'S STATUS DURING CONSTRUCTION

Owner's Representative

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.

Visits to Site

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.

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.

Project Representative

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.

Authorized Variations in Work

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.

Rejecting Defective Work

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.

Shop Drawings, Change Orders and Payments

In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

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.

In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

In connection with Engineer's authority as to Applications for Payment, see Article 14.

Determinations for Unit Price Work

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.

Decisions on Requirements of Contract Documents and Acceptability of Work

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.

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.

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.

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.

Limitations on Engineer's Authority and Responsibilities

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.

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.

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.

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.

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.

CHANGES IN THE WORK; CLAIMS

Authorized Changes in the Work

Without invalidating the Contract and without notice to any surety, Owner may, subject to written approval by Agency 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).

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.

Unauthorized Changes in the Work

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.

Execution of Change Orders

Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

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;

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

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.

Notification to Surety

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.

Claims

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.

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).

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:

deny the Claim in whole or in part,

approve the Claim, or

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.

In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

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.

No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

Cost of the Work

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.

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.

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.

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.

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.

Supplemental costs including the following:

The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

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.

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.

Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

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.

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.

The cost of utilities, fuel, and sanitary facilities at the Site.

Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expressages, and similar petty cash items in connection with the Work.

The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

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

Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

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.

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.

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.

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.

Allowances

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.

Cash Allowances

Contractor agrees that:

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

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.

Contingency Allowance

Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

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.

Unit Price Work

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.

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.

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.

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

the Bid price of a particular item of Unit Price Work amounts to more than 5 percent of the Contract 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

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

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.

CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

Change of Contract Price

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.

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:

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

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

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).

Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:

a mutually acceptable fixed fee; or

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:

for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

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;

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;

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

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.

Change of Contract Times

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.

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.

Delays

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.

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.

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.B.

delays caused by or within the control of Contractor; or

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.

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.

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

Notice of Defects

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.

Access to Work

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.

Tests and Inspections

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.

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:

for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

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

as otherwise specifically provided in the Contract Documents.

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.

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.

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.

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.

Uncovering Work

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.

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.

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.

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.

Owner May Stop the Work

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.

Correction or Removal of Defective Work

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).

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.

Correction Period

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:

repair such defective land or areas; or

correct such defective Work; or

if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

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.

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.

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.

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.

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.

Acceptance of Defective Work

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.

Owner May Correct Defective Work

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.

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.

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.

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.

PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values

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.

Progress Payments

Applications for Payments

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.

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.

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

Review of Applications

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.

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:

the Work has progressed to the point indicated;

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

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.

By recommending any such payment Engineer will not thereby be deemed to have represented that:

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

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.

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:

to supervise, direct, or control the Work, or

for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

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:

the Work is defective, or completed Work has been damaged, requiring correction or replacement;

the Contract Price has been reduced by Change Orders;

Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

Payment Becomes Due

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.

Reduction in Payment

Owner may refuse to make payment of the full amount recommended by Engineer because:

claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

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;

the Contractor's performance or furnishing of the Work is inconsistent with funding Agency requirements;

there are other items entitling Owner to a set-off against the amount recommended; or

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.

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.

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.

Contractor's Warranty of Title

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.

Substantial Completion

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.

Promptly after Contractor's notification, Owner, Agency, Contractor, and Engineer shall make a prefinal 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.

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.

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.

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.

Partial Utilization

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.

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.

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.

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.

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.

Final Inspection

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, Agency, 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.

Final Payment

Application for Payment

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.

The final Application for Payment shall be accompanied (except as previously delivered) by:

all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

consent of the surety, if any, to final payment;

a list of all Claims against Owner that Contractor believes are unsettled; and

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.

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.

Engineer's Review of Application and Acceptance

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.

Payment Becomes Due

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.

Final Completion Delayed

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. The remaining balance of any sum included in the final Application for Payment but held by OWNER for Work not fully completed and accepted will become due when the Work is fully completed and accepted.

Waiver of Claims

The making and acceptance of final payment will constitute:

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

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.

SUSPENSION OF WORK AND TERMINATION

Owner May Suspend Work

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.

Owner May Terminate for Cause

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

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);

Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

Contractor's disregard of the authority of Engineer; or

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

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:

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),

incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

complete the Work as Owner may deem expedient.

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.

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.

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.

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.

Owner May Terminate For Convenience

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):

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;

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;

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; and

reasonable expenses directly attributable to termination.

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.

Contractor May Stop Work or Terminate

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.

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.

DISPUTE RESOLUTION

Methods and Procedures

Owner and Contractor may mutually 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. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

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.

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:

elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

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

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

MISCELLANEOUS

Giving Notice

Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

Computation of Times

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.

Cumulative Remedies

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.

Survival of Obligations

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.

Controlling Law

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

Headings

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

FEDERAL REQUIREMENTS

Agency Not a Party

This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees is a party to this Contract.

Contract Approval

Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the following "Certificate of Owner's Attorney" (Exhibit GC-A) before Owner submits the executed Contract Documents to Agency for approval.

Concurrence by Agency in the award of the Contract is required before the Contract is effective.

Conflict of Interest

Contractor may not knowingly contract with a supplier or manufacturer if the individual or entity who prepared the plans and specifications has a corporate or financial affiliation with the supplier or manufacturer.

Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest in Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

Gratuities

If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding,

amending, or making any determinations related to the performance of this Contract, Owner may, by written notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

In the event this Contract is terminated as provided in paragraph 18.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

Audit and Access to Records

For all negotiated contracts and negotiated modifications (except those of \$10,000 or less), Owner, Agency, the Comptroller General, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor, which are pertinent to the Contract, for the purpose of making audits, examinations, excerpts and transcriptions. Contractor shall maintain all required records for three years after final payment is made and all other pending matters are closed.

Small, Minority and Women's Businesses

If Contractor intends to let any subcontracts for a portion of the work, Contractor shall take affirmative steps to assure that small, minority and women's businesses are used when possible as sources of supplies, equipment, construction, and services. Affirmative steps shall consist of: (1) including qualified small, minority and women's businesses on solicitation lists; (2) assuring that small, minority and women's businesses are solicited whenever they are potential sources; (3) dividing total requirements when economically feasible, into small tasks or quantities to permit maximum participation of small, minority, and women's businesses; (4) establishing delivery schedules, where the requirements of the work permit, which will encourage participation by small, minority and women's businesses; (5) using the services and assistance of the Small Business Administration and the Minority Business Development Agency of the U.S. Department of Commerce; (6) requiring each party to a subcontract to take the affirmative steps of this section; and (7) Contractor is encouraged to procure goods and services from labor surplus area firms.

Anti-Kickback

Contractor shall comply with the Copeland Anti-Kickback Act (18 USC 874 and 40 USC 276c) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

Clean Air and Pollution Control Acts

If this Contract exceeds \$100,000, Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 USC 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 USC 1251 *et seq.*). Contractor will report violations to the Agency and the Regional Office of the EPA.

State Energy Policy

Contractor shall comply with the Energy Policy and Conservation Act (P.L. 94-163). Mandatory standards and policies relating to energy efficiency, contained in any applicable State Energy Conservation Plan, shall be utilized.

Equal Opportunity Requirements

If this Contract exceeds \$10,000, Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

Contractor's compliance with Executive Order 11246 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4 and its efforts to meet the goals established for the geographical area where the Contract 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 Contractor shall make a good faith effort to employ minorities 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 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.

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 subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

Restrictions on Lobbying

Contractor and each subcontractor shall comply with Restrictions on Lobbying (Public Law 101-121, Section 319) as supplemented by applicable Agency regulations. This Law applies to the recipients of contracts and subcontracts that exceed \$100,000 at any tier under a Federal loan that exceeds \$150,000 or a Federal grant that exceeds \$100,000. If applicable, Contractor must complete a certification form on lobbying activities related to a specific Federal loan or grant that is a funding source for this Contract. 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, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 USC 1352. Each tier shall disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Certifications and disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

Environmental Requirements

When constructing a project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental constraints:

Wetlands – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

Floodplains – When disposing of excess, spoil, or other construction materials on public or private property, Contractor shall not fill in or otherwise convert 100 year floodplain areas delineated on the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, i.e., alluvial soils on NRCS Soil Survey Maps.

Historic Preservation – Any excavation by Contractor that uncovers an historical or archaeological artifact shall be immediately reported to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the State Historic Preservation Officer (SHPO).

Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

EXHIBIT GC-A

Certificate of Owner's Attorney

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

I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Date: _____

Supplementary Conditions

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract Funding Agency Edition (No. C-710, 2002 Edition) and other provisions of the Contract Documents as indicated below. All provisions not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

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SC-1.01.A.2. Add the following language to the end of Paragraph 1.01.A.2:

The Project is financed in whole or in part by USDA Rural Development pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). *{add other funding sources and modify when necessary.}*

SC-1.01.A.4. Add the following language to the end of Paragraph 1.01.A.4:

The Application for Payment form to be used on this Project is Form RD 1924-18. The Agency must approve all Applications for Payment before payment is made.

SC-1.01.A.10. Add the following language to the end of Paragraph 1.01.A.10:

The Change Order form to be used on this Project is Form RD1927-7. Agency approval is required before Change Orders are effective.

SC-1.01.A.15. Delete in it's entirety and replace with the following:

Contract Times: The number of days or date stated in the Agreement to achieve substantial completion. Final completion date will be determined by Contractor, Owner, and Engineer, after substantial completion, based on remaining work, weather and market conditions.

SC-2.03.A. Delete Paragraph 2.03.A in its entirety and insert the following in its place:

- A. The Contract Times will commence on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 10 days after the Effective Date of the Agreement.

{SC-4.02. Add the following new paragraphs immediately after Paragraph 4.02.B:

- C *In the preparation of Drawings and Specifications, Engineer relied upon the following reports of exploration and tests of subsurface conditions at the Site:*

1. See EJCDC No.C-800 for examples.

- D. *In the preparation of Drawings and Specifications, Engineer relied upon the following drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the Site:*

1. See EJCDC No. C-800 for examples.

- E. *Copies of reports and drawings itemized in SC-4.02.C and SC-4.02.D that are not included with Bidding Documents may be examined at _____ during regular business hours. These reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which the Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of the Drawings and Specifications.*

{OR}

SC-4.02. Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

- A. *No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.*

{SC-4.06. Add the following new paragraphs immediately after Paragraph 4.06.A:

1. *In the preparation of Drawings and Specifications, Engineer relied upon the following reports of Hazardous Environmental Conditions at the Site:*

a. See EJCDC No.C-800 for examples.

2. *In the preparation of Drawings and Specifications, Engineer relied upon the following drawings of Hazardous Environmental Conditions which are at or contiguous to the Site:*

a. See EJCDC No. C-800 for examples.

3. *Copies of reports and drawings itemized in SC-4.06.A.1 and SC-4.06.A.2 that are not included with Bidding Documents may be examined at _____ during regular business hours. These reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which the Contractor may rely as identified and established above are incorporated therein by reference. Contractor is not entitled to rely upon other information and data utilized by Engineer in the preparation of the Drawings and Specifications.*

{OR}

SC-4.06. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

- A. *No reports or explorations or tests of subsurface conditions at or contiguous to the Site are known to the Owner or Engineer.*
- B. *{Not used.}*

SC-5.03. Add the following new paragraph immediately after Paragraph 5.03.B:

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

{The amounts of coverage for each type of insurance under paragraph 5.04 are recommended amounts that should be used to provide the Owner adequate protection. These amounts should be reviewed in the context of the specific project and adjusted accordingly.}

SC-5.04. Add the following new paragraph immediately after Paragraph 5.04.B:

- C. The limits of liability for 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
- b. Applicable Federal (e.g., Longshoremen's) Statutory
- c. Employer's Liability *{ \$ 500,000 }*

- 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 the Contractor:

- a. General Aggregate *{ \$ 2,000,000 }*
- b. Products – Completed Operations Aggregate *{ \$ 1,000,000 }*
- c. Personal and Advertising Injury *{ \$ 1,000,000 }*
- d. Each Occurrence (Bodily Injury and Property Damage) *{ \$ 1,000,000 }*
- e. Property Damage liability insurance will provide Explosion, Collapse, and Underground coverages where applicable.
- f. Excess or Umbrella Liability
 - 1) General Aggregate *{ \$ 5,000,000 }*
 - 2) Each Occurrence *{ \$ 5,000,000 }*

3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
 - a. Bodily Injury:

Each Person	{ \$ 1,000,000 }
Each Accident	{ \$ 1,000,000 }
 - b. Property Damage:

Each Accident	{ \$ 1,000,000 }
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 - c. Combined Single Limit of

	{ \$ 1,000,000 }
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4. The Contractual Liability coverage required by paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
 - a. Bodily Injury:

Each Person	{ \$ 2,000,000 }
Each Accident	{ \$ 2,000,000 }
 - b. Property Damage:

Each Accident	{ \$ 2,000,000 }
Annual Aggregate	{ \$ 2,000,000 }

{5. List additional types and amounts of insurance that may be required by Owner.}

{6. List by name other persons or entities to be included on policy as additional insureds.}

{SC-5.06.A. In the case of multiple prime contractors on a single Site (multiple prime contractors for the Project may each need to provide property insurance), it is necessary to define the Contractor responsible for providing the Property Insurance. If there is only one contractor on the site, do not modify paragraph 5.06.A of the General Conditions.}

{SC-5.06.A.1. List by name other persons or entities to be included on policy as additional insureds.}

SC-6.06 Add a new paragraph immediately after Paragraph 6.06.G:

H. The Contractor shall not award work valued at more than fifty (50%) percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

{When multiple prime contractors are working on a single Site, the following modification should be made.}

SC-7.02.A.1. Delete paragraphs 7.02.A.1-3 in their entirety and insert the following:

1. The _____ Contractor shall have the authority and be responsible for coordination of the activities among the other prime contractors and subcontractors on the Site to ensure a safe, efficient working environment. This authority covers scheduling delivery of materials, storage of materials, sequencing of construction involving different crafts, resolving interface issues between crafts, scheduling testing, and all other aspects of the Work that do not impact the design or function of the Work.

SC-9.03.A. Add the following language at the end of paragraph 9.03.A:

The Engineer will provide Resident Project Representative services for this project. The Duties, Responsibilities, and Limitations of Authority of the Resident Project Representative will be as stated in Exhibit D of the Agreement Between Owner and Engineer, E-510, 2002 Edition, as amended and executed for this specific Project. *{If anyone other than the Engineer is providing the Resident Project Representative, this language must be modified.}*

SC-14.02.A.3 Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage prior to substantial completion, nor place in escrow any funds that are required for retainage, or invest the retainage for benefit.

SC-14.02.C.1. Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-18.08 Delete paragraph 18.08.A in its entirety and insert the following in its place:

- A. If this Contract exceeds \$100,000, the Contractor shall comply with all applicable standards, orders, or requirements issued under Section 306 of the Clean Air Act (42 USC §1857(h)), Section 508 of the Clean Water Act (33 USC §1368), Executive Order 11738, and Environmental Protection Agency regulations (40 CFR Part 15).

SUPPLEMENTAL GENERAL CONDITIONS

FOR

CLEAN WATER STATE REVOLVING FUND
&
DRINKING WATER STATE REVOLVING FUND

(Drinking Water and Wastewater)

Project Name: 2014 WATER SYSTEM IMPROVEMENTS

Project Number: DWSRF F15-001

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

	<u>Attachment No.</u>
SRF Special Provisions	1
Buy American Memo	2
KRS Chapter 45A-Kentucky Model Procurement Code	3
Equal Employment Opportunity (EEO) Documents:	
Notice of Requirement for Affirmative Action	4
Contract Specifications (Executive Order 11246)	5
EEO Goals for Region 4 Economic Areas	6
Special Notice #1 - Check List of EEO Documentation	7
Employer Information Report EEO-1 (SF 100)	8
Labor Standards Provisions for Federally Assisted Construction, EPA Form 5720-4	9
Certifications	
Debarment, Suspension and Other Responsibility Matters	10
Anti-lobbying	11
Region 4 Disadvantaged Business Enterprise (DBE)	12
Bonds and Insurance	13
Storm Water General Permit	14
Davis-Bacon Wage Rate Requirements under FY 2013 Continuing Resolution	15

SRF SPECIAL PROVISIONS

- (a) **Line crossings of all roads and streets shall be done in accordance with the Kentucky Transportation Cabinet requirements as may be set forth in the Special Conditions.**
- (b) **Construction is to be carried out so as to prevent by-passing of flows during construction unless a schedule has been approved by the State or EPA, whichever is applicable. Siltation and soil erosion must be minimized during construction. All construction projects with surface disturbance of more than 1 acre during the period of construction must have a KPDES Storm Water General Permit. The permit can be found at the following web address: <https://dep.gateway.ky.gov/eForms/default.aspx?FormID=7>.**

If you have any questions regarding the completion of this form call the Surface Water Permits Branch at (502) 564-3410.

- (c) **Restore disturbed areas to original or better condition.**
- (d) **Use of Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either DOW or EPA. Use of all such chemicals and disposal of residues shall be in conformance with instructions on the manufacturer's label.**
- (e) **The construction of the project, including the letting of contracts in connection therewith, shall conform to the applicable requirements of state, territorial, and local laws and ordinances to the extent that such requirements do not conflict with Federal laws and this subchapter.**
- (f) **The owner shall provide and maintain competent and adequate supervision and inspection.**
- (g) **The Kentucky Infrastructure Authority and Kentucky Division of Water shall have access to the site and the project work at all times.**
- (h) **In the event Archaeological materials (arrowheads, stone tools, stone axes, prehistoric and historic pottery, bottles, foundations, Civil War artifacts, and other types of artifacts) are uncovered during the construction of this project, work is to immediately cease at the location and the Kentucky Heritage Council shall be contacted. The telephone number is (502) 564-7005. Construction shall commence at this location until a written release is received from the Kentucky Heritage Council. Failure to report a find could result in legal action.**
- (i) **This procurement will be subject to DOW Procurement Guidance including the Davis-Bacon Act.**
- (j) **Reasonable care shall be taken during construction to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches to improve the appearance of the tree. Tree trunks receiving damage from equipment shall be treated with a tree dressing.**
- (k) **No wastewater bypassing will occur during construction unless a schedule has been approved by the Kentucky Division of Water.**
- (l) **Change orders to the construction contract (if required) must be negotiated pursuant to DOW/KIA Procurement Guidance for Construction and Equipment Contracts.**



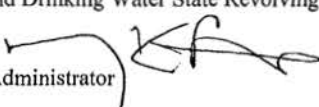
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 24 2014

OFFICE OF WATER

MEMORANDUM

SUBJECT: Application of Buy American Requirements to Fiscal Year 2014 Clean Water State Revolving Fund and Drinking Water State Revolving Fund Assistance Agreements

FROM: Nancy K. Stoner 
Acting Assistant Administrator

TO: Water Management Division Directors
Regions I- X

On January 17, 2014, H.R. 3547, "Consolidated Appropriations Act, 2014," (Appropriations Act) was enacted. This law provides appropriations for both the Clean Water State Revolving Fund (CWSRF) and the Drinking Water State Revolving Fund (DWSRF) for Fiscal Year 2014, while adding a Buy American requirement to these already existing programs. Application of this new requirement is the focus of this memorandum.

H.R. 3547 includes the following language in Division G, Title IV, under the heading, "Use of American Iron and Steel,"

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the "Administrator") finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

In order to comply with this provision, States must include in all assistance agreements, whether in the form of a loan, bond purchase, grant, or any other vehicle to provide financing for a project, executed on or after January 17, 2014 (date of enactment of H.R. 3547), and prior to October 1, 2014, for the construction, alteration, maintenance, or repair of treatment works under the CWSRF or for construction, alteration, maintenance, or repair of a public water system under the DWSRF, a provision requiring the application of Buy American requirements for the entirety of the construction activities financed by the assistance agreement through completion of construction, no matter when construction commences. The one exception to this requirement is if a project has approved engineering plans and specifications, by a State agency, prior to enactment of the Appropriations Act.

Application of the Buy American requirements extend not only to assistance agreements funded with Fiscal Year 2014 appropriations, but to all assistance agreements executed on or after January 17, 2014 and prior to October 1, 2014, whether the source of the funding is prior year's appropriations, state match, bond proceeds, interest earnings, principal repayments, or any other source of funding so long as the project is financed by an SRF assistance agreement. If a project began construction prior to January 17, 2014, but is financed or refinanced through an assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, Buy American requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a State agency prior to enactment of the Appropriations Act.

Notably, there is no application of the Buy American requirements where such a refinancing occurs for a project that has completed construction prior to January 17, 2014. This provision does not apply to any project for which an assistance agreement was executed prior to January 17, 2014, no matter when construction occurs.

Further information will be provided in the form of guidance as soon as possible.

We understand the complexity of this provision and the challenges involved in its application. If you have any questions, please contact Peter Grevatt or Andrew Sawyers, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 and Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134

KRS Chapter 45A
Kentucky Model Procurement Code

45A.075 Methods of awarding state contracts.

Except as otherwise authorized by law, all state contracts shall be awarded by:

- (1) Competitive sealed bidding, pursuant to KRS 45A.080; or
- (2) Competitive negotiation, pursuant to KRS 45A.085 and 45A.090 or 45A.180; or
- (3) Noncompetitive negotiation, pursuant to KRS 45A.095; or
- (4) Small purchase procedures, pursuant to KRS 45A.100.

Effective: June 24, 2003

History: Amended 2003 Ky. Acts ch. 98, sec. 4, effective June 24, 2003. -- Created 1978 Ky. Acts ch. 110, sec. 16, effective January 1, 1979.

45A.080 Competitive sealed bidding.

(1) Contracts exceeding the amount provided by KRS 45A.100 shall be awarded by competitive sealed bidding, which may include the use of a reverse auction, unless it is determined in writing that this method is not practicable. Factors to be considered in determining whether competitive sealed bidding is not practicable shall include:

- (a) Whether specifications can be prepared that permit award on the basis of best value; and
- (b) The available sources, the time and place of performance, and other relevant circumstances as are appropriate for the use of competitive sealed bidding.

(2) The invitation for bids shall state that awards shall be made on the basis of best value. In any contract which is awarded under an invitation to bid which requires delivery by a specified date and imposes a penalty for late delivery, if the delivery is late, the contractor shall be given the opportunity to present evidence that the cause of the delay was beyond his control. If it is the opinion of the purchasing officer that there is sufficient justification for delayed delivery, the purchasing officer may adjust or waive any penalty that is provided for in the contract.

(3) Adequate public notice of the invitation for bids and any reverse auction shall be given a sufficient time prior to the date set forth for the opening of bids or beginning of the reverse auction. The notice may include posting on the Internet or publication in a newspaper or newspapers of general circulation in the state as determined by the secretary of the Finance and Administration Cabinet not less than seven (7) days before the date set for the opening of the bids and any reverse auction. The provisions of this subsection shall also apply to price contracts and purchase contracts of state institutions of higher education.

(4) Bids shall be opened publicly or entered through a reverse auction at the time and place designated in the invitation for bids. At the time the bids are opened, or the reverse auction has ended, the purchasing agency shall announce the agency's engineer's estimate, if applicable, and make it a part of the agency records pertaining to the letting of any contract for which bids were received. Each written or reverse auction bid, together with the name of the bidder and the agency's engineer's estimate, shall be recorded and be open to public inspection. Electronic bid opening and posting of the required information for public viewing shall satisfy the requirements of this subsection.

(5) The contract shall be awarded by written notice to the responsive and responsible bidder whose bid offers the best value.

(6) Correction or withdrawal of written or reverse auction bids shall be allowed only to the extent permitted by regulations issued by the secretary.

Effective: July 15, 2010

History: Amended 2010 Ky. Acts ch. 63, sec. 3, effective July 15, 2010. -- Amended 2000 Ky. Acts ch. 509, sec. 1, effective July 14, 2000. -- Amended 1998 Ky. Acts ch. 120, sec. 10, effective July 15, 1998. -- Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 27, effective May 30, 1997. -- Amended 1996 Ky. Acts ch. 60, sec. 2, effective July 15, 1996. -- Amended 1994 Ky. Acts ch. 278, sec. 1, effective July 15, 1994. -- Amended 1982 Ky. Acts ch. 282, sec. 1, effective July 15, 1982. -- Amended 1979 (1st Extra. Sess.) Ky. Acts ch. 9, sec. 1, effective February 10, 1979. -- Created 1978 Ky. Acts ch. 110, sec. 17, effective January 1, 1979.

45A.085 Competitive negotiation.

(1) When, under administrative regulations promulgated by the secretary or under KRS 45A.180, the purchasing officer determines in writing that the use of competitive sealed bidding is not practicable, and except as provided in KRS 45A.095 and 45A.100, a contract may be awarded by competitive negotiation, which may include the use of a reverse auction.

(2) Adequate public notice of the request for proposals and any reverse auction shall be given in the same manner and circumstances as provided in KRS 45A.080(3).

(3) Contracts other than contracts for projects utilizing an alternative project delivery method under KRS 45A.180 may be competitively negotiated when it is determined in writing by the purchasing officer that the bids received by competitive sealed bidding either are unreasonable as to all or part of the requirements, or were not independently reached in open competition, and for which each competitive bidder has been notified of the intention to negotiate and is given reasonable opportunity to negotiate.

(4) Contracts for projects utilizing an alternative project delivery method shall be processed in accordance with KRS 45A.180.

(5) The request for proposals shall indicate the relative importance of price and other evaluation factors, and any reverse auction procedures.

(6) Award shall be made to the responsible and responsive offeror whose proposal is determined in writing to be the most advantageous to the Commonwealth, taking into consideration price and the evaluation factors set forth in the request for proposals and the reciprocal preference for resident bidders required under KRS 45A.494.

(7) Written or oral discussions shall be conducted with all responsible offerors who submit proposals determined in writing to be reasonably susceptible of being selected for award. Discussions shall not disclose any information derived from proposals submitted by competing offerors. Discussions need not be conducted:

(a) With respect to prices, where the prices are fixed by law, reverse auction, or administrative regulation, except that consideration shall be given to competitive terms and conditions;

(b) Where time of delivery or performance will not permit discussions; or

(c) Where it can be clearly demonstrated and documented from the existence of adequate competition or prior experience with the particular supply, service, or construction item, that acceptance of an initial offer without discussion would result in fair and reasonable best value procurement, and the request for proposals notifies all offerors of the possibility that award may be made on the basis of the initial offers.

Effective: July 15, 2010

History: Amended 2010 Ky. Acts ch. 63, sec. 4, effective July 15, 2010; and ch. 162, sec. 8, effective July 15, 2010. -- Amended 2003 Ky. Acts ch. 98, sec. 5, effective June 24, 2003. -- Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 28, effective May 30, 1997. -- Amended 1979 (1st Extra. Sess.) Ky. Acts ch. 9, sec. 2, effective February 10, 1979. -- Created 1978 Ky. Acts ch. 110, sec. 18, effective January 1, 1979.

45A.090 Negotiation after competitive sealed bidding when all bids exceed available funds.

(1) In the event that all bids submitted pursuant to competitive sealed bidding under KRS 45A.080 result in bid prices in excess of the funds available for the purchase, and the chief purchasing officer determines in writing:

- (a) That there are no additional funds available from any source so as to permit an award to the responsive and responsible bidder whose bid offers the best value; and
- (b) The best interest of the state will not permit the delay attendant to a resolicitation under revised specifications, or for revised quantities, under competitive sealed bidding as provided in KRS 45A.080, then a negotiated award may be made as set forth in subsections (2) or (3) of this section.

(2) Where there is more than one (1) bidder, competitive negotiations pursuant to KRS 45A.085(3) shall be conducted with the three (3) (two (2) if there are only two (2)) bidders determined in writing to be the most responsive and responsible bidders, based on criteria contained in the bid invitation and the reciprocal preference for resident bidders under KRS 45A.494. Such competitive negotiations shall be conducted under the following restrictions:

- (a) If discussions pertaining to the revision of the specifications or quantities are held with any potential offeror, all other potential offerors shall be afforded an opportunity to take part in such discussions; and
- (b) A request for proposals, based upon revised specifications or quantities, shall be issued as promptly as possible, shall provide for an expeditious response to the revised requirements, and shall be awarded upon the basis of best value.

(3) Where, after competitive sealed bidding, it is determined in writing that there is only one (1) responsive and responsible bidder, a noncompetitive negotiated award may be made with such bidder in accordance with KRS 45A.095.

Effective: July 15, 2010

History: Amended 2010 Ky. Acts ch. 162, sec. 9, effective July 15, 2010. -- Amended 2003 Ky. Acts ch. 98, sec. 6, effective June 24, 2003. -- Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 29, effective May 30, 1997. -- Created 1978 Ky. Acts ch. 110, sec. 19, effective January 1, 1979.

45A.095 Noncompetitive negotiation.

(1) A contract may be made by noncompetitive negotiation only for sole source purchases, or when competition is not feasible, as determined by the purchasing officer in writing prior to award, under administrative regulations promulgated by the secretary of the Finance and Administration Cabinet or the governing boards of universities operating under KRS Chapter 164A, or when emergency conditions exist. Sole source is a situation in which there is only one (1) known capable supplier of a commodity or service, occasioned by the unique nature of the requirement, the supplier, or market conditions. Insofar as it is practical, no less than three (3) suppliers shall be solicited to submit written or oral quotations whenever it is determined that competitive sealed bidding is not feasible. Award shall be made to the supplier offering the best value. The names of the suppliers submitting quotations and the date and amount of each quotation shall be placed in the procurement file and maintained as a public record. Competitive bids may not be required:

- (a) For contractual services where no competition exists, such as telephone service, electrical energy, and other public utility services;
- (b) Where rates are fixed by law or ordinance;
- (c) For library books;
- (d) For commercial items that are purchased for resale;
- (e) For interests in real property;

- (f) For visiting speakers, professors, expert witnesses, and performing artists;
 - (g) For personal service contracts executed pursuant to KRS 45A.690 to 45A.725; and
 - (h) For agricultural products in accordance with KRS 45A.645.
- (2) The chief procurement officer, the head of a using agency, or a person authorized in writing as the designee of either officer may make or authorize others to make emergency procurements when an emergency condition exists.
- (3) An emergency condition is a situation which creates a threat or impending threat to public health, welfare, or safety such as may arise by reason of fires, floods, tornadoes, other natural or man-caused disasters, epidemics, riots, enemy attack, sabotage, explosion, power failure, energy shortages, transportation emergencies, equipment failures, state or federal legislative mandates, or similar events. The existence of the emergency condition creates an immediate and serious need for services, construction, or items of tangible personal property that cannot be met through normal procurement methods and the lack of which would seriously threaten the functioning of government, the preservation or protection of property, or the health or safety of any person.
- (4) The Finance and Administration Cabinet may negotiate directly for the purchase of contractual services, supplies, materials, or equipment in bona fide emergencies regardless of estimated costs. The existence of the emergency shall be fully explained, in writing, by the head of the agency for which the purchase is to be made. The explanation shall be approved by the secretary of the Finance and Administration Cabinet and shall include the name of the vendor receiving the contract along with any other price quotations and a written determination for selection of the vendor receiving the contract. This information shall be filed with the record of all such purchases and made available to the public. Where practical, standard specifications shall be followed in making emergency purchases. In any event, every effort should be made to effect a competitively established price for purchases made by the state.

Effective: July 15, 2002

History: Amended 2002 Ky. Acts ch. 344, sec. 9, effective July 15, 2002. -- Amended 1997 (1st Extra. Sess.) Ky. Acts ch. 4, sec. 30, effective May 30, 1997. -- Amended 1990 Ky. Acts ch. 496, sec. 4, effective July 13, 1990. -- Created 1978 Ky. Acts ch. 110, sec. 20, effective January 1, 1979

45A.100 Small purchases by state governmental bodies.

- (1) Procurements may be made in accordance with small purchase administrative regulations promulgated by the secretary of the Finance and Administration Cabinet, pursuant to KRS Chapter 13A, as follows:
- (a) Up to ten thousand dollars (\$10,000) per project for construction and one thousand dollars (\$1,000) for purchases by any state governmental body, except for those state administrative bodies specified in paragraph (b) of this subsection; and
 - (b) Up to forty thousand dollars (\$40,000) per project for construction or purchases by the Finance and Administration Cabinet, state institutions of higher education, and the legislative branch of government.
- (2) Procurement requirements shall not be artificially divided so as to constitute a small purchase under this section. Reverse auctions may be used for small purchase procurements. At least every two (2) years, the secretary shall review the prevailing costs of labor and materials and may make recommendations to the next regular session of the General Assembly for the revision of the then current maximum small purchase amount as justified by intervening changes in the cost of labor and materials.
- (3) The secretary of the Finance and Administration Cabinet may grant to any state agency with a justifiable need a delegation of small purchasing authority which exceeds the agency's small purchase limit provided in subsection (1) of this section. Delegations of small purchasing authority shall be granted or revoked by the secretary of the Finance and Administration Cabinet, in accordance with administrative regulations promulgated by the cabinet pursuant to KRS

Chapter 13A. These administrative regulations shall establish, at a minimum, the criteria for granting and revoking delegations of small purchasing authority, including the requesting agency's past compliance with purchasing regulations, the level of training of the agency's purchasing staff, and the extent to which the agency utilizes the Kentucky Automated Purchasing System. The administrative regulations may permit the secretary of the Finance and Administration Cabinet to delegate small purchase procurements up to the maximum amount specified in subsection (1)(b) of this section.

Effective: July 15, 2010

History: Amended 2010 Ky. Acts ch. 63, sec. 5, effective July 15, 2010. -- Amended 2002 Ky. Acts ch. 320, sec. 2, effective July 15, 2002. -- Amended 2000 Ky. Acts ch. 225, sec. 1, effective July 14, 2000. -- Amended 1996 Ky. Acts ch. 60, sec. 1, effective July 15, 1996. -- Amended 1994 Ky. Acts ch. 323, sec. 1, effective July 15, 1994. -- Amended 1990 Ky. Acts ch. 496, sec. 5, effective July 13, 1990. -- Amended 1986 Ky. Acts ch. 384, sec. 1, effective July 15, 1986. -- Amended 1984 Ky. Acts ch. 384, sec. 1, effective July 13, 1984. -- Amended 1982 Ky. Acts ch. 282, sec. 2, effective July 15, 1982. -- Amended 1980 Ky. Acts ch. 242, sec. 1, effective July 15, 1980; and ch. 250, sec. 19, effective April 9, 1980. -- Created 1978 Ky. Acts ch. 110, sec. 21, effective January 1, 1979.

**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 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 non-federally 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 non-federally 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 minorities 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).

**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, or 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)

Kentucky:

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 Trousdale;	
TN Van Buren; TN Warren; TN Wayne; TN White.	
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 Bullitt; 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.	
059 Huntington, WV:	
SMSA Counties:	
3400 Huntington – Ashland, WV-KY-OH	2.9
KY Boyd; KY Greenup; OH Lawrence; WV Cabell; WV Wayne.	
Non-SMSA Counties	2.5
KY Carter; KY Elliott; KY Floyd; KY Johnson; KY Lawrence; KY Martin; KY Pike; KY Rowan;	
OH Gallia; WV Lincoln; WV Logan; WV Mason; WV Mingo.	
067 Cincinnati, OH:	
SMSA Counties:	
1640 Cincinnati, OH-KY-IN	11.0
IN Dearborn; KY Boone; KY Campbell; KY Kenton; OH Clermont;	
OH Hamilton; OH Warren.	

3200 Hamilton-Middletown, OH	5.0
OH Butler.	
Non-SMSA Counties	9.2
IN Franklin; IN Ohio; IN Ripley; IN Switzerland; KY Bracken; KY Carroll; KY Fleming; KY Gallatin; KY Grant; KY Lewis; KY Mason; KY Owen; KY Pendleton; KY Robertson; OH Adams; OH Brown; OH Clinton; OH Highland.	
080 Evansville, IN:	
SMSA Counties	
2440 Evansville, IN-KY	4.8
IN Gibson; IN Posey; IN Vanderburgh; IN Warrick; KY Henderson.	
5990 Owensboro, KY	4.7
KY Daviess.	
Non-SMSA Counties	3.5
IL Edwards; IL Gallatin; IL Hamilton; IL Lawrence; IL Saline; IL Wabash; IL White; IN Dubois; IN Knox; IN Perry; IN Pike; IN Spencer; KY Hancock; KY Hopkins; KY McLean; KY Muhlenberg; KY Ohio; KY Union; KY Webster.	

**CHECK LIST OF EEO DOCUMENTATION FOR BIDDERS
ON GRANT/LOAN CONSTRUCTION
(Required by Executive Order 11246 as amended)**

The low, responsive responsible bidder must forward the following items, in duplicate, to the owner no later than ten (10) days after bid opening. The owner 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. 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. The following information must be provided for all supplier contracts regardless of contract size: name of company, contact person, address, telephone number, dollar value of the contract, and a list of the materials to be supplied to the prime contractor.
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.

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 s 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 "Filing 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 laborers and mechanics 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) and submit to the owner with the bid proposal.

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 with the bid proposal.

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

**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.

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 sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients 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.

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.

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 its 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.

SPAP Requirements:

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

SRF Requirements:

Form	Requirement	Provided By:	Completed By:	Submitted To:
EPA Form 6100-2	Recipients required to have prime contractors provide form to Subcontractors	Prime Contractors	DBE Subcontractors	DOW Project Administrator
EPA Form 6100-3	Recipients required to have prime contractors provide form to Subcontractors	Prime Contractors	DBE Subcontractors	Dow Project Administrator w/ATA Package

EPA Form 6100-4	Recipients required to have prime contractors complete the form	Recipients	Prime Contractors	DOW Project Administrator w/ATA Package
Pay Request DBE Form	Recipients required to have prime contractors complete the form	Recipients	Prime Contractors	DOW Project Administrator w/EACH PAYMENT

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION POLICY

PROJECT NAME: _____

BID DATE: _____

1. Name, address and telephone number of contact person on all DBE matters:

Prime Contractor's Name: _____

Contact Person: _____

Address: _____

Phone: _____

Cell Phone: _____

Email: _____

Total Contract Amount: _____

2. Total dollar amount/percent of contract of MBE participation: _____

3. Total dollar amount/percent of contract of WBE participation: _____

4. Are certifications* for each MBE/WBE/DBE subcontractor enclosed; if no, please explain: Yes No

5. Are MBE/WBE/DBE subcontracts or letters of intent signed by both parties enclosed; if no, please explain: Yes No

6. List of MBE Subcontractors:

Name: _____

Contact Person: _____

Address: _____

Phone: _____

Cell Phone: _____

Email: _____

Type of Contract: _____

Work to be Done: _____

Amount: _____

7. List of WBE Subcontractors:

Name: _____

Contact Person: _____

Address: _____

Phone: _____

Cell Phone: _____

Email: _____

Type of Contract: _____

Work to be Done: _____

Amount: _____

Attach Additional Sheets, If Necessary

*Self-certification: Self certification of MBE/WBE/DBE firms will NOT be accepted as a valid form of certification of MBE/WBE/DBE status.

8. Information and documentation concerning efforts taken to comply with EPA's "six good faith efforts"

- (i). Ensure DBE construction firms or material suppliers are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities; including placing DBEs on solicitation lists and soliciting them whenever they are potential sources. A good source for a list of DBEs is the Kentucky Transportation's website: <http://transportation.ky.gov/Civil-Rights-and-Small-Business-Development/Pages/Certified-DBE-Directory.aspx>.
- The prime contractor certifies that a bidders list (see example sheet below) of qualified vendors, including DBEs, was developed for current and future solicitations and that the list will be maintained. *Submit a copy of the list as documentation.*
- (ii). Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process; including, whenever possible, posting solicitation for bids or proposals for a sufficient amount of time as to receive a competitive bid or proposal pool.
- The prime contractor certifies that every opportunity was provided to a number of DBEs to encourage their participation in the competitive process and that an adequate amount of time was provided for response.
- a. List each DBE construction firm or material supplier to which a solicitation was attempted. *Submit copies of letters, emails, faxes, telecommunication logs, certified mail receipts, returned envelopes, certified mail return receipts, etc. as documentation.*
- Company name and phone number: _____
Area of work expertise: _____
Date of any follow-ups and person spoke to: _____
- b. Advertisements, if applicable: List each publication in which an announcement or notification was placed. *Submit a tear sheet of each announcement from each publication as documentation.*
- Name of publication: _____
Date(s) of advertisement: _____
Specific subcontract areas announced: _____
- c. Other, if applicable: List each notification method in which an announcement or outreach was used; list serve, public meeting, etc. *Submit applicable information to document effort.*
- Method of notification: _____
Date(s) of notification: _____
- (iii). Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs; including dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
- The prime contractor certifies that the project was broken into its basic elements (i.e., dirt hauling, landscaping, painting, pipe installation, material supplies, etc.) and that a determination was made whether it's economically feasible to bid the elements separately and that the analysis of this effort was documented with a short memo to the project file.

- (iv). Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority business, and women’s business enterprises.
- The prime contractor certifies that they established delivery schedules which would allow DBEs to participate in the projects.
- (v). Use the services and assistance of the Small Business Administration (SBA) and the Minority Business Development Agency (MBDA) of the U.S. Department of Commerce. The easiest way to utilize the services of SBA and MBDA is to visit their websites: www.sba.gov and www.mbda.gov and use the electronic tools available there or you may send the nearest SBA and MBDA office a certified letter that generally describes the solicitation, the dates it will be open, the types of vendors you are seeking and applicable SIC or NAIC codes if known. You may also use the services and assistance of the Kentucky Procurement Assistance Program (KPAP). The easiest way to utilize the services of KPAP is to send an email: ced.kpap@ky.gov and provide information on forthcoming opportunities available to DBEs.
- The prime contractor certifies that the assistance of the SBA, MBDA, and/or KPAP was utilized. *Submit pages printed off the SBA and MBDA websites which evidence efforts to register a solicitation on those sites or submit copies of the letter sent and certified mail receipt as documentation; submit copies of emails with KPAP as documentation.*
- (vi). If a subcontractor awards any subcontracts, require the subcontractor to take the steps in numbers (i) through (v) above.
- The prime contractor certifies that subcontractors used for this project will be required to follow the steps of the “six good faith efforts” as listed above.

9. Signature and date:

To the best of my knowledge and belief, all “six good faith efforts” have been met and the information contained in this document is true and correct; the document has been duly authorized by the legal representative.

Signature

Print name and title

Date

BIDDER'S LIST FORM

OWNER: _____

LOAN NO: _____

PROJECT TITLE: _____

BID DATE: _____

Instructions:

1. This list must include all firms that were solicited for participation, bid on, or quoted for a prime contract or subcontracts under EPA assisted projects, included both DBE's and non DBE's.
2. SRF loan participants must keep the Bidder's List until the project period for the identified loan has ended and no funds are remaining.
3. This list must be submitted to DOW in the ATA Package. Contract Award Approval cannot be given until this form has been received by DOW.
4. The following information must be obtained from all prime and subcontractors. Please complete the form below:

ENTITY'S NAME	MAILING ADDRESS	CONTACT PERSON	PHONE#	E-MAIL ADDRESS	M/WBE?

BONDS AND INSURANCE

The minimum requirements shall be as follows:

Bonding requirements for contracts of \$100,000 or less are contained in 40 CFR 31.36(h).

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.

NOTICE OF INTENT

All construction projects with surface disturbance of more than 1 acre during the period of construction must have a KPDES Storm Water General Permit. The permit can be found at the following web address:

<https://dep.gateway.ky.gov/eForms/default.aspx?FormID=7>.

If you have any questions regarding the completion of this form call the Surface Water Permits Branch, at (502) 564-3410.

Davis-Bacon Wage Rate Requirements

CWSRF: The recipient agrees to include in all agreements to provide assistance for the construction of treatment works carried out in whole or in part with such assistance made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.), or with such assistance made available under section 205(m) of that Act (33 U.S.C. 1285(m)), or both, a term and condition requiring compliance with the requirements of section 513 of that Act (33 U.S.C. 1372) in all procurement contracts and sub-grants, and require that loan recipients, procurement contractors and sub-grantees include such a term and condition in subcontracts and other lower tiered transactions. All contracts and subcontracts for the construction of treatment works carried out in whole or in part with assistance made available as stated herein shall insert in full in any contract in excess of \$2,000 the contract clauses as set forth below titled “Wage Rate Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6)”. This term and condition applies to all agreements to provide assistance under the authorities referenced herein, whether in the form of a loan, bond purchase, grant, or any other vehicle to provide financing for a project, where such agreements are executed on or after October 30, 2009.

DWSRF: The recipient agrees to include in all agreements to provide assistance for any construction project carried out in whole or in part with such assistance made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j-12), a term and condition requiring compliance with the requirements of section 1450(e) of the Safe Drinking Water Act (42 U.S.C.300j-9(e)) in all procurement contracts and sub-grants, and require that loan recipients, procurement contractors and sub-grantees include such a term and condition in subcontracts and other lower tiered transactions All contracts and subcontracts for any construction project carried out in whole or in part with assistance made available as stated herein shall insert in full in any contract in excess of \$2,000 the contract clauses as set forth below entitled “Wage Rate Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6)”. This term and condition applies to all agreements to provide assistance under the authorities referenced herein, whether in the form of a loan, bond purchase, grant, or any other vehicle to provide financing for a project, where such agreements are executed on or after October 30, 2009.

Wage Rate Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6)

Preamble

With respect to the Clean Water and Safe Drinking Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides subgrants or loans to eligible entities within the State. Typically, the subrecipients are municipal or other local governmental entities that manage the funds. For these types of recipients, the provisions set forth under Roman Numeral I, below, shall apply. Although EPA and the State remain responsible for ensuring subrecipients’ compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section 3(ii)(A), below and for compliance as described in Section I-5.

Occasionally, the subrecipient may be a private for profit or not for profit entity. For these types of recipients, the provisions set forth in Roman Numeral II, below, shall apply. Although EPA and the State remain responsible for ensuring subrecipients' compliance with the wage rate requirements set forth herein, those subrecipients shall have the primary responsibility to maintain payroll records as described in Section II-3(ii)(A), below and for compliance as described in Section II-5.

I. Requirements Under The Consolidated and Further Continuing Appropriations Act, 2013 (P.L. 113-6) For Subrecipients That Are Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the FY 2013 Continuing Resolution with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. The recipient or subrecipient may also obtain additional guidance from DOL's website at <http://www.dol.gov/whd/>

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2013 Continuing Resolution, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2013 Continuing Resolution, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's website, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all

interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that

the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at

<http://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will

no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(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.

(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.

(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 EPA determines may be appropriate, 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.

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

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29

CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of \$100,000.

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and 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 Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics 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 workweek in which he or she is employed on such work to work 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 (a)(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 liquidated 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 (a)(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 (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall 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 sums as may

be determined to be necessary to satisfy any 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 (a)(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 (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall 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 rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall 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 (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification.

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during

the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractor's use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/contacts/whd/america2.htm>.

II. Requirements Under The Consolidated and further Continuing Appropriations Act, 2013 (P.L. 113-6) For Subrecipients That Are Not Governmental Agencies

The following terms and conditions specify how recipients will assist EPA in meeting its DB responsibilities when DB applies to EPA awards of financial assistance under the FY2013 Continuing Resolution with respect to subrecipients that are not governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at <http://www.dol.gov/whd/>.

Under these terms and conditions, the subrecipient must submit its proposed DB wage determinations to the State recipient for approval prior to including the wage determination in any solicitation, contract task orders, work assignments, or similar instruments to existing contractors.

1. Applicability of the Davis- Bacon (DB) prevailing wage requirements.

Under the FY 2013 Continuing Resolution, Davis-Bacon prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. Obtaining Wage Determinations.

- (a) Subrecipients must obtain proposed wage determinations for specific localities at www.wdol.gov. After the Subrecipient obtains its proposed wage determination, it must submit the wage determination to (insert contact information for State recipient DB point of contact for wage determination) for approval prior to inserting the wage determination into a solicitation, contract or issuing task orders, work assignments or similar instruments to existing contractors

(b) (ordering instruments unless subsequently directed otherwise by the State recipient Award Official).

(b) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov on a weekly basis to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(c) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including

painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2013 Continuing Resolution, the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.dol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request, and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s) shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by

the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered

program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(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.

(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.

(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 EPA determines may be appropriate, 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.

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

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. Contract Provision for Contracts in Excess of \$100,000.

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and 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 Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics 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 workweek in which he or she is employed on such work to work 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 liquidated 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 subrecipient shall upon the request of the EPA Award Official or 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 sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (a)(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 Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall 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 rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall 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 (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. Compliance Verification.

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <http://www.dol.gov/whd/america2.htm> or its successor site.



Steven L. Beshear
Governor

KENTUCKY LABOR CABINET
DEPARTMENT OF WORKPLACE STANDARDS
DIVISION OF EMPLOYMENT STANDARDS,
APPRENTICESHIP & MEDIATION
1047 US Hwy 127 S - Suite 4
Frankfort, Kentucky 40601
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www.labor.ky.gov

Larry Roberts
Secretary

Anthony Russell
Commissioner

May 6, 2015

Jennifer Cummins
Monarch Engineering Inc.
556 Carlton Drive
Lawrenceburg KY 40342

Re: Cumberland County Water District, 2014 Water System Improvements - Contract 1

Advertising Date as Shown on Notification: May 13, 2015

Dear Jennifer Cummins:

This office is in receipt of your written notification on the above project as required by KRS 337.510 (1).

I am enclosing a copy of the current prevailing wage determination number CR 1-016, dated June 1, 2014 for CUMBERLAND County. This schedule of wages shall be attached to and made a part of the specifications for the work, printed on the bidding blanks, and made a part of the contract for the construction of the public works between the public authority and the successful bidder or bidders.

The determination number assigned to this project is based upon the advertising date contained in your notification. There may be modifications to this wage determination prior to the advertising date indicated. In addition, if the contract is not awarded within 90 days of this advertising date or if the advertising date is modified, a different set of prevailing rates of wages may be applicable. It will be the responsibility of the public authority to contact this office and verify the correct schedule of the prevailing rates of wages for use on the project. Your project number is as follows: 029-H-00051-14-1, Heavy/Highway

Sincerely,

Anthony Russell
Commissioner



An Equal Opportunity Employer M/F/D

SWD-1

KENTUCKY LABOR CABINET
PREVAILING WAGE DETERMINATION
CURRENT REVISION
LOCALITY NO. 016

ADAIR, CLINTON, CUMBERLAND, MCCREARY, RUSSELL, TAYLOR & WAYNE COUNTIES

Determination No. CR-1-016

Project No. 029-H-00051-14-1
Type: ___ Bldg _x_ HH

Date of Determination: June 1, 2014

This schedule of the prevailing rate of wages for Locality No. 016, which includes Adair, Clinton, Cumberland, McCreary, Russell, Taylor and Wayne Counties, has been determined in accordance with the provisions of KRS 337.505 to 337.550. This determination shall be referred to as Prevailing Wage Determination No. CR-1-016.

Apprentices shall be permitted to work as such subject to Administrative Regulations 803 KAR 1:010. Copies of these regulations will be furnished upon request to any interested person.

Overtime is to be computed at not less than one and one-half (1 1/2) times the indicated base rate for all hours worked in excess of eight (8) per day, or in excess of forty (40) per week. However, KRS 337.540 permits an employee and employer to agree, in writing, that the employee will be compensated at a straight time base rate for hours worked in excess of eight (8) hours in any one workday, but not more than ten (10) hours worked in any one workday, if such written agreement is prior to the over eight (8) hours in a workday actually being worked, or where provided for in a collective bargaining agreement. The fringe benefit rate is to be paid for each hour worked at a straight time rate for all hours worked. Fringe benefit amounts are applicable for all hours worked except when otherwise noted. Welders will receive rate for craft in which welding is incidental.

No laborer, workman or mechanic shall be paid at a rate less than that of the General Laborer except those classified as bona fide apprentices registered with the Kentucky State Apprenticeship Supervisor unless otherwise specified in this schedule of wage rates.

NOTE: The type of construction shall be determined by applying the following definitions.

BUILDING CONSTRUCTION

Building construction is the construction of sheltered enclosures with walk-in access for the purpose of housing persons, machinery, equipment, or supplies. It includes all construction of such structures, the installation of utilities and the installation of equipment, both above and below grade level, as well as incidental grading, utilities and paving.

HIGHWAY CONSTRUCTION

Highway construction includes the construction, alteration or repair of roads, streets, highways, runways, taxiways, alleys, trails, paths, parking areas, and other similar projects not incidental to building or heavy construction. It includes all incidental construction in conjunction with the highway construction project.

HEAVY CONSTRUCTION

Heavy projects are those projects that are not properly classified as either "building" or "highway". For example, dredging projects, water and sewer line projects, dams, flood control projects, sewage treatment plants and facilities, and water treatment plants and facilities are considered heavy.



Anthony Russell, Commissioner
Department of Workplace Standards
Kentucky Labor Cabinet

CLASSIFICATIONS RATE AND FRINGE BENEFITS

ASBESTOS/INSULATION WORKERS:	BASE RATE	\$24.92
	FRINGE BENEFITS	12.57

BOILERMAKERS:	BASE RATE	\$21.75
	FRINGE BENEFITS	8.81

BRICKLAYERS:	BASE RATE	\$18.30
	FRINGE BENEFITS	0.00

CARPENTERS:

Carpenters:	BUILDING	BASE RATE	\$21.98
		FRINGE BENEFITS	12.70

Piledrivermen:	BUILDING	BASE RATE	\$22.48
		FRINGE BENEFITS	12.70

Carpenters:	HEAVY & HIGHWAY	BASE RATE	\$18.35
		FRINGE BENEFITS	5.80

Divers:	HEAVY & HIGHWAY	BASE RATE	\$28.05
		FRINGE BENEFITS	4.93

Piledrivermen:	HEAVY & HIGHWAY	BASE RATE	\$18.70
		FRINGE BENEFITS	4.93

CEMENT MASONS:	BASE RATE	\$20.70
	FRINGE BENEFITS	9.70

ELECTRICIANS:	BASE RATE	\$29.32
	FRINGE BENEFITS	13.98

LINEMAN:	HEAVY & HIGHWAY	BASE RATE	\$32.98
		FRINGE BENEFITS	11.60

EQUIPMENT OPERATOR:	HEAVY & HIGHWAY	BASE RATE	\$29.48
		FRINGE BENEFITS	10.90

GROUNDMAN:	HEAVY & HIGHWAY	BASE RATE	\$19.53
		FRINGE BENEFITS	8.91

ELEVATOR CONSTRUCTORS:	BASE RATE	\$24.25
	FRINGE BENEFITS	7.76

CLASSIFICATIONS RATE AND FRINGE BENEFITS

GLAZIERS:	BASE RATE	\$7.29
	FRINGE BENEFITS	0.00

IRONWORKERS:	BASE RATE	\$26.97
	FRINGE BENEFITS	20.01

LABORERS/BUILDING:

GROUP 1

Laborers, general carpenter tenders, cement finisher tenders, placing of concrete, wrecking on building by Laborers, hand digging and hand backfilling of ditches where the signatory employer controls the work assignment, and the clearing of rights of way and building site, curing of concrete and application hardener, handling chemically treated lumber, installing of wood sheeting and shoring, signal laborers concrete bucket, cleaning and moving of general purpose materials, general clean up of all scrap and debris:

BUILDING	BASE RATE	\$18.42
	FRINGE BENEFITS	9.18

GROUP 2

Mason tender, side rail setter (metal), stackman, fork lift operators, masonry and plastering contractors only, power driven Georgia buggy, chain saw, vibrator operators, mesh handler, power tools (air, diesel, electric, gasoline), wagon drill, pipe layer, wall man treatment of exposed concrete (chip, bush, hammer & rub), concrete saw, gasoline tamper machine, walk behind trenching machine, burner man, joint maker, asphalt raker, mobile sweeper:

BUILDING	BASE RATE	\$18.62
	FRINGE BENEFITS	9.18

GROUP 3

Air track driller, intorflax burning rod, gunnite nozzle man operator, sewer tunnel laborers (free air), sand hog or mucker, (free air), welder:

BUILDING	BASE RATE	\$18.82
	FRINGE BENEFITS	9.18

GROUP 4

Holeman drilled piers, augured, caissons, sand miner (tunnel free air), caisson workers, powderman, construction specialist:

BUILDING	BASE RATE	\$19.42
	FRINGE BENEFITS	9.18

GROUP 5

Tunnel man and tunnel miners (pressure and free air) shall receive \$1.50 per hour premium above the General Laborers wage rate. Environment Worker, Toxic and Hazardous Waste, asbestos removal and lead abatement shall receive \$1.50 per hour premium above the General Laborers Group 1 wage rate. Any certification required whether actual skill is used by the Contractor will receive pay under Group 5:

BUILDING	BASE RATE	\$19.92
	FRINGE BENEFITS	9.18

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

LABORERS/HEAVY & HIGHWAY:

GROUP 1

Aging and curing of concrete (any mode or method), asbestos abatement worker, asphalt plant laborers, asphalt laborers; batch truck dumpers; carpenter tenders, cement mason tenders, cleaning of machines, concrete laborers, demolition laborers, dredging laborers, drill helper, environmental laborer - nuclear, radiation, toxic and hazardous waste – Level D, flagmen, grade checkers, all hand digging and hand back filling, highway marker placers, landscaping laborers, mesh handlers and placers, puddler, railroad laborers, rip-rap and grouters, right of way laborers, sign, guard rail and fence installers (all types), signalmen, sound barrier installer, storm and sanitary sewer laborers, swamper, truck spotters and dumpers, wrecking of concrete forms, general cleanup:

HEAVY & HIGHWAY	BASE RATE	\$21.61
	FRINGE BENEFITS	10.95

GROUP 2

Batter board men (sanitary and storm sewer), brickmason tenders, mortar mixer operator, scaffold builders, burner and welder, bushammers, chain saw operator, concrete saw operators, deckhand scow man, dry cement handlers, environmental laborers – nuclear, radiation, toxic and hazardous waste – Level C, forklift operators for masonry, form setters, green concrete cutting, hand operated grouter and grinder machine operator, jack hammers, lead paint abatement, pavement breakers, paving joint machine, pipe layers – laser operators (non-metallic), plastic pipe fusion, power driven Georgia buggy and wheel barrow, power post hole diggers, precast manhole setters, walk-behind tampers, walk-behind trenchers, sand blasters, concrete chippers, surface grinders, vibrator operators, wagon drillers:

HEAVY & HIGHWAY	BASE RATE	\$21.86
	FRINGE BENEFITS	10.95

GROUP 3

Air track driller (all types), asphalt luteman and rakers, gunnite nozzleman, gunnite operators and mixers, grout pump operator, powderman and blaster, side rail setters, rail paved ditches, screw operators, tunnel laborers (free air), and water blasters:

HEAVY & HIGHWAY	BASE RATE	\$21.91
	FRINGE BENEFITS	10.95

GROUP 4

Caisson workers (free air), cement finishers, environmental laborer – nuclear, radiation, toxic and hazardous waste – Level A and B, miners and drillers (free air), tunnel blasters, and tunnel mockers (free air), directional and horizontal boring, air track drillers (all types), powder man and blasters, troxler and concrete tester if laborer is utilized:

HEAVY & HIGHWAY	BASE RATE	\$22.51
	FRINGE BENEFITS	10.95

MARBLE, TILE & TERRAZZO SETTERS:

BASE RATE	\$22.64
FRINGE BENEFITS	6.10

MARBLE, TILE & TERRAZZO FINISHERS:

BASE RATE	\$15.42
FRINGE BENEFITS	5.41

CLASSIFICATIONS RATE AND FRINGE BENEFITS

MILLWRIGHTS:	BUILDING	BASE RATE	\$13.90
		FRINGE BENEFITS	1.85
	HEAVY & HIGHWAY	BASE RATE	\$12.41
		FRINGE BENEFITS	0.00

OPERATING ENGINEERS/BUILDING:

BUILDING CLASS A-1: (NCCCO or OECF CERTIFIED)

Crane, dragline, hoist (1 drum when used for stack or chimney construction or repair), hoisting engineer (2 or more drums), orangepeel bucket, overhead crane, piledriver, truck crane, tower crane, hydraulic crane:

BUILDING	BASE RATE	\$28.75
	FRINGE BENEFITS	14.15

BUILDING CLASS A:

Articulating Dump, Auto Patrol, Batcher Plant, Bituminous Paver, Cableway, Carrydeck Crane, Central Compressor Plant, Clamshell, Concrete Mixer (21 cu. ft. or over), Concrete Pump, Crane, Crusher Plant, Derrick, Derrick Boat, Directional Boring Machine, Ditching and Trenching Machine, Dragline, Dredge Operator, Dredge Engineer, Elevating Grader and all types of Loaders, Forklift (regardless of lift height), GPS Systems (on equipment within the classification), Hoe-Type Machine, Hoist (1 drum when used for stack or chimney construction or repair), Hoisting Engine (2 or more drums), Laser or Remote Controlled Equipment (within the classification), Locomotive, Motor Scraper, Carry-all Scoop, Bulldozer, Heavy Duty Welder, Mechanic, Orangepeel Bucket, Piledriver, Power Blade, Motor Grader, Roller (bituminous), Scarifier, Shovel, Tractor Shovel, Truck Crane, Winch Truck, Push Dozer, Highlift, All Types of Boom Cats, Self Contained Core Drill, Hopto, Tow or Push Boat, A-Frame Winch Truck, Concrete Paver, Gradeall, Hoist, Hyster, Pumpcrete, Ross Carrier, Boom, Tail Boom, Rotary Drill, Hydro Hammer, Mucking Machine, Rock Spreader attached to equipment, Scoopmobile, KeCal Loader, Tower

Cranes (French, German and other types), Hydrocrane, Backfiller, Gurries, Subgrader, Tunnel Mining Machines including Moles, Shields, or similar types of Tunnel Mining Equipment:

BUILDING	BASE RATE	\$27.66
	FRINGE BENEFITS	14.15

Operators on cranes with boom one-hundred fifty feet (150') and over including jib, shall receive seventy-five cents (\$.75) above base rate. All cranes with piling leads will receive \$.50 above base rate regardless of boom length

BUILDING CLASS B:

All Air Compressors (over 900 cfm), Bituminous Mixer, Joint Sealing Machine, Concrete Mixer (under 21 cu. ft), Form Grader, Roller (rock), Tractor (50 HP and over), Bull Float, Finish Machine, Outboard Motor Boat, Flexplane, Fireman, Boom Type Tamping Machine, Truck Crane Oiler, Greaser on Grease Facilities servicing Heavy Equipment, Switchman or Brakeman, Mechanic Helper, Whirley Oiler, Self-Propelled Compactor, Tractair and Road Widening Trencher and Farm Tractor with Attachments (except backhoe, highlift and endloader), Elevator (regardless of ownership when used for hoisting any building materials), Hoisting Engineer (1 drum or buck hoist), Firebrick (masonry excluded), Well Points, Grout Pump, Throttle-Valve Man, Tugger, Electric Vibrator Compactor, and Caisson Drill Helper:

BUILDING	BASE RATE	\$24.68
	FRINGE BENEFITS	14.15

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

OPERATING ENGINEERS (CONTINUED):

BUILDING CLASS C:

Bituminous Distributor, Cement Gun, Conveyor, Mud Jack, Paving Joint Machine, Roller (earth), Tamping Machine, Tractors (under 50 HP), Vibrator, Oiler, Concrete Saw, Burlap and Curing Machine, Hydro-Seeder, Power Form handling Equipment, Deckhand Steersman, Hydraulic Post Driver and Drill Helper:

BUILDING	BASE RATE	\$23.85
	FRINGE BENEFITS	14.15

All Building Operators assigned to work below ground level are to be paid ten percent (10%) above base wage rate. This does not apply to open cut work

OPERATING ENGINEERS/HEAVY HIGHWAY:

HEAVY HIGHWAY CLASS A-1: (NCCCO or OECP CERTIFIED)

Cableway, carry deck crane, cherry picker, clamshell, crane, derrick, derrick boat, dragline, hoist engine (2 or more drums), hydraulic boom truck, hydrocrane, orangepeel bucket, overhead crane, piledriver, rough terrain crane, tower cranes (French, German and other types), truck crane:

HEAVY HIGHWAY	BASE RATES	\$29.07
	FRINGE BENEFITS	13.90

HEAVY HIGHWAY CLASS A:

A-Frame Winch Truck, Auto Patrol, Backfiller, Batcher Plant, Bituminous Paver, Bituminous Transfer Machine, All types of Boom Cats, Bulldozer, Cableway, Carry-All Scoop, Carry Deck Crane, Central Compressor Plant Operator, Clamshell, Concrete Mixer (21 cu. ft. or over), Concrete Paver, Truck-Mounted Concrete Pump, Core Drills, Crane, Crusher Plant, Derrick, Derrick Boat, Ditching and Trenching Machine, Dragline, Dredge Operator, Dredge Engineer, Earth Movers, Elevating Grader and all types of Loaders, Grade-All, Gurries, Heavy Equipment Robotics Operator/Mechanic, Highlift, Hoe-Type Machine, Hoist (two or more drums), Hoisting Engine (two or more drums), Horizontal Directional Drill Operator, Hydraulic Boom Truck, Hydrocrane, Hyster, KeCal Loader, Letourneau, Locomotive, Mechanic, Mechanically Operated Laser Screed, Mechanic Welder, Mucking Machine, Motor Scraper, Orangepeel Bucket, Piledriver, Power Blade, Pumpcrete, Push Dozer, Rock Spreader attached to Equipment, All Rotary Drills, Roller (bituminous), Scarifier, Scoopmobile, Shovel, Side Boom, Subgrader, Tailboom, Telescoping Type Forklift, Tow or Push Boat, Tower Cranes (French, German and other types), Tractor Shovel, Truck Crane, Tunnel Mining Machines including Moles, Shields, or Similar types of Tunnel Mining Equipment:

HEAVY & HIGHWAY	BASE RATE	\$28.00
	FRINGE BENEFITS	13.90

Operators on cranes with booms one hundred fifty feet (150') and over including jib shall receive \$.50 above base rate.

CLASSIFICATIONS

RATE AND FRINGE BENEFITS

OPERATING ENGINEERS/HEAVY HIGHWAY: (Continued)

HEAVY HIGHWAY CLASS B:

All Air Compressors (over 900 cu. ft. per min.), Bituminous Mixer, Boom Type Tamping Machine, Bull Float, Concrete Mixer (under 21 cu. ft.), Electric Vibrator Compactor/Self-Propelled Compactor, Elevator (one drum or buck hoist), Elevator (regardless of ownership when used to hoist building material), Finish Machine, Firemen, Flex-Plane, Forklift (regardless of lift height), Form Grader, Hoist (one drum), Joint Sealing Machine, Mechanic Helper, Outboard Motor Boat, Power Sweeper (riding type), Roller (rock), Ross Carrier, Skid Mounted or Trailer Mounted Concrete Pumps, Switchman or Brakeman, Throttle Valve Man, Tractair and Road Widening Trencher, Tractor (50 HP and over), Truck Crane Oiler, Tugger, Welding Machine, Well Points, and Whirley Oiler:

HEAVY & HIGHWAY	BASE RATE	\$25.45
	FRINGE BENEFITS	13.90

HEAVY HIGHWAY CLASS B2:

Greaser on Grease Facilities servicing Heavy Equipment:

HEAVY & HIGHWAY	BASE RATE	\$25.85
	FRINGE BENEFITS	13.90

HEAVY HIGHWAY CLASS C:

Bituminous Distributor, Burlap and Curing Machine, Caisson Drill and Core Drill Helper (track or skid mounted), Cement Gun, Concrete Saw, Conveyor, Deckhand Oiler, Grout Pump, Hydraulic Post Driver, Hydro Seeder, Mud Jack, Oiler, Paving Joint Machine, Power Form Handling Equipment, Pump, Roller (earth), Steermen, Tamping Machine, Tractors (under 50 H.P.) and Vibrator:

HEAVY & HIGHWAY	BASE RATE	\$25.17
	FRINGE BENEFITS	13.90

All Heavy Highway above: Employees assigned to work below ground level are to be paid ten percent (10%) above base wage rate. This does not apply to open cut work.

PAINTERS:	BUILDING	BASE RATE	\$14.00
		FRINGE BENEFITS	0.00

HEAVY & HIGHWAY	BASE RATE	\$17.30
	FRINGE BENEFITS	3.80

PLASTERERS:		BASE RATE	\$13.30
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PLUMBERS/PIPEFITTERS:		BASE RATE	\$25.55
		FRINGE BENEFITS	11.70

ROOFERS:		BASE RATE	\$7.25
		FRINGE BENEFITS	0.00

CLASSIFICATIONS RATE AND FRINGE BENEFITS

SHEETMETAL WORKERS: (includes sheet metal roofs)	BASE RATE	\$29.05
	FRINGE BENEFITS	18.45

SPRINKLER FITTERS:	BASE RATE	\$30.74
	FRINGE BENEFITS	17.72

TRUCK DRIVERS/BUILDING:

Truckdrivers:	BUILDING	BASE RATE	\$8.04
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Truck helper& warehouseman:	HEAVY & HIGHWAY	BASE RATE	\$16.65
		FRINGE BENEFITS	5.80

Driver, winch truck and A-Frame when used in transporting materials:	BASE RATE	\$16.75
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Driver, (semi-trailer or pole trailer), driver (dump truck, tandem axle), driver of distributor:	BASE RATE	\$16.85
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Driver on mixer trucks (all types):	BASE RATE	\$16.90
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Truck mechanic:	HEAVY & HIGHWAY	BASE RATE	\$16.95
		FRINGE BENEFITS	5.80

Driver (3 tons and under), tire changer and truck mechanic helper:	BASE RATE	\$16.98
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Driver on pavement breakers:	HEAVY & HIGHWAY	BASE RATE	\$17.00
		FRINGE BENEFITS	5.80

Driver (over 3 tons), driver (truck mounted rotary drill):	BASE RATE	\$17.19
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Driver, Euclid and other heavy earth moving equipment and Low Boy:	BASE RATE	\$17.76
HEAVY & HIGHWAY	FRINGE BENEFITS	5.80

Greaser on greasing facilities:	HEAVY & HIGHWAY	BASE RATE	\$17.85
		FRINGE BENEFITS	5.80

General Decision Number: KY150137 05/01/2015 KY137

Superseded General Decision Number: KY20140137

State: Kentucky

Construction Type: Heavy

Counties: Adair, Barren, Casey, Clinton, Cumberland, Green, Hart, Knox, Laurel, Logan, Marion, McCreary, Metcalfe, Pulaski, Russell, Simpson, Taylor, Wayne and Whitley Counties in Kentucky.

HEAVY CONSTRUCTION PROJECTS (including sewer/water construction).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015
1	05/01/2015

CARP0064-007 04/01/2014

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 27.50	14.96

* ELEC0369-004 09/01/2014

	Rates	Fringes
LINE CONSTRUCTION		
Equipment Operator.....	\$ 30.51	11.25
Groundman.....	\$ 20.21	9.19
Lineman.....	\$ 34.13	13.02

ENGI0181-010 07/01/2014

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
GROUP 1.....	\$ 28.85	14.15
GROUP 2.....	\$ 26.24	14.15
GROUP 4.....	\$ 25.95	14.15

OPERATING ENGINEER CLASSIFICATIONS

GROUP 1 - Crane; Drill; Grader/Blade; Mechanic; Scraper

GROUP 2 - Bobcat/Skid Steer/Skid Loader; Forklift

GROUP 4 - Oiler

Operators on cranes with booms 150 feet and over (including jib) shall receive \$1.00 above Group 1 rate; 250 feet and over including jib shall receive \$1.50 above Class 1 rate. Combination Rate: All crane operators operating cranes, where the length of the boom in combination with the length of the piling leads equal or exceeds 150 feet, shall receive \$1.00 above the Group 1 rate.

Employees assigned to work below ground level are to be paid 10% above basic wage rate. This does not apply to open cut work.

IRON0782-010 05/01/2014

	Rates	Fringes
IRONWORKER (Reinforcing & Structural)		
Projects over		
\$20,000,000.00.....	\$ 27.09	20.66
Projects under		
\$20,000,000.00.....	\$ 25.50	19.02

LABO0189-014 07/01/2014

	Rates	Fringes
LABORER		
Concrete Saw (Hand Held/Walk Behind).....	\$ 22.05	11.96
Concrete Worker.....	\$ 21.80	11.96

SUKY2011-014 06/25/2014

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 21.60	10.35
ELECTRICIAN.....	\$ 32.35	2.18
LABORER: Common or General.....	\$ 20.60	9.39
LABORER: Flagger.....	\$ 18.31	8.89
LABORER: Pipelayer.....	\$ 20.13	8.63
OPERATOR:		
Backhoe/Excavator/Trackhoe.....	\$ 23.60	12.65
OPERATOR: Bulldozer.....	\$ 21.72	7.45
OPERATOR: Loader.....	\$ 30.35	0.00

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION

General Decision Number: KY150117 04/24/2015 KY117

Superseded General Decision Number: KY20140117

State: Kentucky

Construction Type: Building

Counties: Allen, Bell, Casey, Clay, Clinton, Cumberland, Garrard, Knox, Lincoln, Logan, Metcalfe, Monroe, Powell, Rockcastle, Wayne and Whitley Counties in Kentucky.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015
1	01/16/2015
2	01/23/2015
3	01/30/2015
4	02/20/2015
5	02/27/2015
6	03/20/2015
7	03/27/2015
8	04/03/2015
9	04/24/2015

ASBE0046-007 05/01/2014

BELL, CLAY, CLINTON, KNOX, ROCKCASTLE, WAYNE, & WHITLEY COUNTIES

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 24.63	11.98

* ASBE0051-002 04/01/2015

CASEY, GARRARD, LINCOLN, & METCALFE COUNTIES

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 25.11	13.16

ASBE0080-007 03/04/2013

POWELL COUNTY

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 31.04	18.33

ASBE0086-005 03/01/2015		

ALLEN, LOGAN, & MONROE COUNTIES

	Rates	Fringes
ASBESTOS WORKER/HEAT & FROST INSULATOR.....	\$ 27.05	11.96

CARP0064-009 01/01/2015		

ALLEN, LOGAN, METCALFE, & MONROE COUNTIES

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 23.50	15.29

CARP1650-008 06/01/2014		

BELL, CASEY, CLAY, CLINTON, CUMBERLAND, GARRARD, KNOX, LINCOLN,
POWELL, ROCKCASTLE, WAYNE, & WHITLEY COUNTIES

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 22.72	12.96

ELEC0369-017 05/28/2014		

BELL, CASEY, CLAY, GARRARD, KNOX, LINCOLN, LOGAN, METCALFE,
POWELL, ROCKCASTLE, WAYNE, & WHITLEY COUNTIES

	Rates	Fringes
ELECTRICIAN (Includes Low Voltage Wiring and Alarm Installation).....	\$ 29.88	14.78

ELEC0429-012 06/01/2014		

ALLEN, CLINTON, CUMBERLAND, & MONROE COUNTIES

	Rates	Fringes
ELECTRICIAN (Includes Low Voltage Wiring and Alarm Installation).....	\$ 24.44	10.15 + 5%

ENGI0181-073 06/01/2014		

CASEY, CLAY, CLINTON, GARRARD, KNOX, LINCOLN, POWELL,
ROCKCASTLE, WAYNE, & WHITLEY COUNTIES

	Rates	Fringes
--	-------	---------

POWER EQUIPMENT OPERATOR:

Cherry Picker, Crane,		
Forklift, Grader/Blade.....	\$ 27.66	14.15
Oiler.....	\$ 23.85	14.15

CRANE WITH BOOM 150 FEET & OVER, INCLUDING JIB SHALL RECEIVE
\$.75 ABOVE RATE

ALL CRANES WITH PILING LEADS WILL RECEIVE \$.50 ABOVE RATE
REGARDLESS OF BOOM LENGTH

ENGI0181-074 07/01/2014

LOGAN COUNTY

Rates Fringes

POWER EQUIPMENT OPERATOR

Cherry Picker, Crane,		
Forklift, Grader/Blade.....	\$ 28.13	14.15
Oiler.....	\$ 24.31	14.15

CRANE WITH BOOM 150 FEET & OVER, INCLUDING JIB SHALL RECEIVE
\$.75 ABOVE RATE

ALL CRANES WITH PILING LEADS WILL RECEIVE \$.50 ABOVE RATE
REGARDLESS OF BOOM LENGTH

ENGI0181-075 06/01/2014

ALLEN, CUMBERLAND, METCALFE, & MONROE COUNTIES

Rates Fringes

POWER EQUIPMENT OPERATOR:

Cherry Picker, Crane,		
Forklift, Grader/Blade.....	\$ 27.70	14.15
Oiler.....	\$ 22.28	14.15

CRANE WITH BOOM 150 FEET & OVER, INCLUDING JIB SHALL RECEIVE
\$.75 ABOVE RATE

ALL CRANES WITH PILING LEADS WILL RECEIVE \$.50 ABOVE RATE
REGARDLESS OF BOOM LENGTH

ENGI0181-076 06/01/2014

BELL COUNTY

Rates Fringes

POWER EQUIPMENT OPERATOR:

Cherry Picker, Crane,		
Forklift, Grader/Blade.....	\$ 30.46	14.15
Oiler.....	\$ 24.60	14.15

CRANE WITH BOOM 150 FEET & OVER, INCLUDING JIB SHALL RECEIVE
\$.75 ABOVE RATE

ALL CRANES WITH PILING LEADS WILL RECEIVE \$.50 ABOVE RATE
REGARDLESS OF BOOM LENGTH

IRON0070-010 06/01/2014

CASEY, CUMBERLAND, GARRARD, LINCOLN, METCALFE, & ROCKCASTLE
COUNTIES

	Rates	Fringes
IRONWORKER, ORNAMENTAL, REINFORCING, AND STRUCTURAL.....	\$ 26.97	19.75

IRON0384-007 05/01/2014

CLAY, CLINTON, KNOX, WAYNE, & WHITLEY COUNTIES

	Rates	Fringes
IRONWORKER, STRUCTURAL, REINFORCING AND ORNAMENTAL.....	\$ 24.32	10.97

IRON0492-012 05/01/2014

ALLEN, LOGAN, & MONROE COUNTIES

	Rates	Fringes
IRONWORKER, ORNAMENTAL, REINFORCING AND STRUCTURAL.....	\$ 24.33	11.48

IRON0769-010 06/01/2014

POWELL COUNTY

	Rates	Fringes
IRONWORKER, STRUCTURAL, REINFORCING AND ORNAMENTAL		
ZONE 1.....	\$ 31.33	21.33
ZONE 2.....	\$ 31.73	21.33
ZONE 3.....	\$ 33.33	21.33

ZONE 1 - Up to 10 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 2 - 10 to 50 mile radius of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

ZONE 3 - 50 mile radius & over of Union Hall, Ashland, Ky.,
1643 Greenup Ave.

PAIN0118-010 06/01/2014

CASEY, LINCOLN, & METCALFE COUNTIES

	Rates	Fringes
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PAINTER (Brush).....\$ 18.50 11.97

PAIN0238-004 05/01/2014

GARRARD, POWELL, & ROCKCASTLE COUNTIES

Rates Fringes

PAINTER (Brush).....\$ 23.39 8.71

PAIN0437-012 01/01/2007

BELL, CLAY, CLINTON, KNOX, WAYNE, & WHITLEY COUNTIES

Rates Fringes

PAINTER (Brush).....\$ 16.96 2.20

PAIN0456-012 01/01/2015

ALLEN, CUMBERLAND, LOGAN, & MONROE COUNTIES

Rates Fringes

PAINTER (Brush).....\$ 19.25 9.95

PLUM0248-008 06/01/2014

CLAY COUNTY

Rates Fringes

PIPEFITTER (Including HVAC
Pipe Installation).....\$ 33.00 18.95

PLUMBER (Excluding HVAC Pipe
Installation).....\$ 33.00 18.95

PLUM0452-005 11/01/2014

BELL, CASEY, CLINTON, GARRARD, KNOX, LINCOLN, POWELL,
ROCKCASTLE, WAYNE, & WHITLEY COUNTIES

Rates Fringes

PIPEFITTER (Including HVAC
Pipe Installation).....\$ 31.00 16.97

PLUMBER (Excluding HVAC Pipe
Installation).....\$ 31.00 16.97

PLUM0502-010 08/01/2013

ALLEN, CUMBERLAND, METCALFE, & MONROE COUNTIES

Rates Fringes

PIPEFITTER (Including HVAC
Pipe Installation).....\$ 32.00 17.17

PLUMBER (Excluding HVAC Pipe
Installation).....\$ 32.00 17.17

PLUM0633-008 08/01/2013

LOGAN COUNTY

	Rates	Fringes
PIPEFITTER (Including HVAC Pipe Installation).....	\$ 29.87	14.25
PLUMBER (Excluding HVAC Pipe Installation).....	\$ 29.87	14.25

SFKY0669-003 07/01/2013

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 30.14	17.12

SHEE0024-017 06/01/2010

BELL, KNOX, & WHITLEY COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Excluding HVAC Duct Installation).....	\$ 25.76	17.19

SHEE0110-019 12/01/2014

ALLEN, CASEY, CLAY, CLINTON, CUMBERLAND, GARRARD, LINCOLN,
LOGAN, METCALFE, MONROE, POWELL, ROCKCASTLE, & WAYNE COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Excluding HVAC Duct Installation).....	\$ 29.45	18.70

SUKY2010-179 07/30/2010

	Rates	Fringes
BRICKLAYER.....	\$ 23.03	2.06
CARPENTER (Drywall Hanging Only).....	\$ 13.85	0.00
CARPENTER (Hardwood and Carpet Installation).....	\$ 16.63	6.08
CARPENTER, Excludes Drywall Hanging, Form Work, and Hardwood and Carpet Installation.....	\$ 14.92	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 17.20	3.34
DRYWALL FINISHER/TAPER.....	\$ 13.75	0.00
LABORER: Carpenter Tender.....	\$ 9.00	0.00
LABORER: Common or General.....	\$ 12.59	4.01

LABORER: Mason Tender - Brick...	\$ 16.89	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 13.37	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 21.32	6.98
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 23.54	0.00
OPERATOR: Bulldozer.....	\$ 21.40	0.00
OPERATOR: Loader (Front End)....	\$ 23.94	9.15
PAINTER: Roller.....	\$ 14.72	2.92
ROOFER.....	\$ 16.42	1.50
SHEET METAL WORKER (HVAC Duct Installation Only).....	\$ 12.70	2.92

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial

contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL DEVELOPMENT AND
FARM SERVICE AGENCY

ORDER NO.	1
DATE	
STATE	KY
COUNTY	CUMBERLAND

CONTRACT CHANGE ORDER

CONTRACT FOR: 2014 WATER SYSTEM IMPROVEMENTS
CONTRACT NO.1

OWNER: CUMBERLAND COUNTY WATER DISTRICT

TO: _____
(Contractor)

You are hereby requested to comply with the following changes in the contract plans and specifications:

Description of Changes (Supplemental Plans and Specifications Attached)	DECREASE in Contract Price	INCREASE in Contract Price
TOTALS		
NET CHANGE IN CONTRACT PRICE		

JUSTIFICATION:

The amount of the Contract will be (Decreased) (Increased) By the Sum of: _____ Dollars

The Contract Total Including this and previous Change Orders will be: _____ Dollars

The Contract Period Provided for Completion will be (Increased) (Decreased) (Unchanged) by: _____ Days

This document will become a supplement to the contract and all provisions will apply hereto.

Requested _____ (Cumberland County Water District) _____ (Date)

Recommended _____ (Monarch Engineering, Inc.) _____ (Date)

Accepted _____ (Contractor) _____ (Date)

This information will be used as a record of any changes to the original construction contract.

MONARCH ENGINEERING, INC.
LAWRENCEBURG, KENTUCKY

PERIODIC ESTIMATE FOR PARTIAL PAYMENT
 SHEET 1 OF 1

PROJECT: 2014 Water System Improvements – Contract No. 1

OWNER: Cumberland County Water District

PROJECT NO.: 1423

CONTRACTOR:

ESTIMATE NO.

FOR PERIOD:

CONTRACT COMPLETION DATE:

Percent Complete:

CONTRACT ESTIMATE						PAY QUANTITIES			
Item No.	Item Description	Bid Quantity	Unit	Unit Price	Amount	Previous Estimate	Current Estimate	Total To Date	Total Amount
1	6-Inch PVC SDR-21 Water Line	3,100	LF	\$0.00	\$0.00	0	0	0	\$0.00
2	4-Inch PVC SDR-21 Water Line	4,100	LF	0.00	0.00	0	0	0	0.00
3	3-Inch PVC SDR-21 Water Line	32,350	LF	0.00	0.00	0	0	0	0.00
4	Creek Crossing for 6-Inch Water Line	70	LF	0.00	0.00	0	0	0	0.00
...
25	Booster Pump Station Rehabilitation								
	A) Demolition & Removal	1	LS	0.00	0.00	0%	0%	0%	0.00
	B) Building Modification & Improvements	1	LS	0.00	0.00	0%	0%	0%	0.00
	C) New Booster Pumps	1	LS	0.00	0.00	0%	0%	0%	0.00
	D) New Piping & Appurtenances	1	LS	0.00	0.00	0%	0%	0%	0.00
	E) Paint & Coatings	1	LS	0.00	0.00	0%	0%	0%	0.00
	F) Electrical & Mechanical	1	LS	0.00	0.00	0%	0%	0%	0.00
	TOTAL BASE BID								0.00

SUMMARY OF ALL ESTIMATES

Estimate No. 1

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of their knowledge, information and belief the work covered by this payment estimate has been completed in accordance with the contract documents, that all amounts have been paid by the contractor for work for which previous payment estimates was issued and payments received from the owner, and that current payment shown herein is now due.

(CONTRACTOR) By: _____ Date: _____

APPROVED BY RESIDENT INSPECTOR:

MONARCH ENGINEERING, INC. By: _____ Date: _____

ENGINEER'S CERTIFICATION:

The undersigned certifies that the work has been carefully inspected and to the best of their knowledge and belief, the quantities shown in this estimate are correct and the work has been performed in accordance with the contract documents.

MONARCH ENGINEERING, INC. By: _____ Date: _____

APPROVED BY OWNER:

CUMBERLAND COUNTY WATER DISTRICT By: _____ Date: _____

Total Work to Date	\$0.00
Stored Materials	\$0.00
Retainage @ 5%	\$0.00
Total Due Contractor to Date	\$0.00
Less Previous Payments	\$0.00
Amount Due From This Estimate	\$0.00

PPE-1



TRANSPORTATION CABINET

Department of Highways District 8 Office
1660 S. Highway 27
Somerset, KY 42502
(606) 677-4017

Steven L. Beshear
Governor

Michael W. Hancock, P.E.
Secretary

Cumberland County Water District
133 Lower River Street
Burkesville, KY 42717

Subject: Cumberland County
KY 90
MP 029-0090-0.984
Entrance: A08-2015-00032

Dear Sir:

The attached is your approved copy of the encroachment permit application. One copy is to be submitted to your contractor. This permit is to remain on the project until the permitted work is complete.

You are to shape and seed any disturbed areas on the State's right of way. All work and materials are to comply with the Department's Standard Specification for Road and Bridge Construction- 2012 Edition. Signs, barricades, lights, etc. if required, are to be installed in accordance with the Manual on Uniform Traffic Control Devices.

Please notify this office when permitted work begins. When work has been completed, the Notice of Completion of Encroachment Permit Work must be completed and returned so an inspection can be made by personnel from this office. If all work has been completed satisfactorily, your indemnity will then be released.

Yours truly,

Conley Moren, P.E.
Engineering Support TEBM
District 8- Somerset

4-8-2015
Date

BN/cm
Attachments



An Equal Opportunity Employer M/F/D



ENCROACHMENT PERMIT

KEPTS No.: A08-2015-00032

Permittee: Cumberland Water District

Latitude: 36.839088

Longitude: -85.558267

Completion Date: 6/1/2016

Coordinates provided on the TC 99-1(B) are the approved location for this permit

Indemnities		
Type	Amount Required	Tracking Number
Performance Bond	0	
Payment Bond	0	
Liability Insurance	0	

This permit has been:

APPROVED DENIED

Conley Moren _____ Engineer Branch Manager

NAME	TITLE
<i>Conley Moren</i>	
Conley Moren	4/8/2015

SIGNATURE	DATE
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The TC 99-1(B), including the application TC-99 1(A) and all related and accompanying documents and drawings make up the permit. It is not a permit unless both the TC 99-1(A) and TC 99-1(B) are both present.



Kentucky Transportation Cabinet
 Department of Highways
 Permits Branch

TC 99-1 (A)
 8/2012
 Page 1 of 4

APPLICATION FOR ENCROACHMENT PERMIT

Permittee Information		KYTC No. <u>08-2015-00032</u>	
Name Cumberland County Water District	Permit Information		
Address 133 Lower River Street	Address		
	City		
City Burkesville	State	Zip	
State Kentucky Zip 42717	County Cumberland		
Phone# (502) 864-3133	Route No. KY 90	Mile-Point	0.984
Contact Johnny Carter	Longitude (X) 85°33'29.55" W		
Phone (502) 864-3133 Cell (270) 459-2247	Latitude (Y) 36°50'20.69" N		
Email ccwateroffice@yahoo.com	<i>Information below to be filled out by KYTC</i>		
Contact James Lee Mudd Jr.	<input type="checkbox"/> Air Right	<input type="checkbox"/> Entrance	
Phone (502) 839-1310 Cell (502) 604-0847	<input checked="" type="checkbox"/> Utilities	<input type="checkbox"/> Other: _____	
Email lmudd@monarchengineering.net	<input type="checkbox"/> Left <input type="checkbox"/> Right <input checked="" type="checkbox"/> X-ing Access: <input type="checkbox"/> Full <input type="checkbox"/> Partial <input checked="" type="checkbox"/> by Permit		

General Description of Work:

M.P. 0.984 (X-ing) - Install approximately 100 L.F. of Bore & Case for 3" PVC water main below Kentucky Highway 90. Encasement pipe will be 8" steel.
 (See Applicant's Plans, Sheet 20)
Cumberland County Water
P.S.

THE UNDERSIGNED PERMITTEE(s) (being duly authorized representative(s) or owner(s)) DO AGREE TO ALL TERMS AND CONDITIONS ON THE TC 99-1 (A).

Johnny Carter *3-9-15*
 Signature Date

This is not a permit unless and until the permittee(s) receives an approved TC 99-1(B) from KYTC. This application will become void if not approved by the cancellation date. The cancellation date will be one year from the date the permittee submits their application.



APPLICATION FOR ENCROACHMENT PERMIT

TERMS AND CONDITIONS

1. The permit, including this application and all related and accompanying documents and drawings making up the permit, remains in effect and is binding upon the Applicant/Permittee, its successors and assigns, as long as the encroachment(s) exists and also until the permittee is finally relieved by the Department of Highways from all its obligations.
2. Applicant shall meet all requirements of the Clean Water Act if the project will disturb one acre or more, the applicant shall obtain a KPDES KYR10 Permit from the Kentucky Division of Water. All disturbed areas shall meet the requirements of the Department of Highway's Standard Specifications, Sections 212 and 213, as amended.
3. **INDEMNITY:**
 - A. **PERFORMANCE BOND:** The permittee shall provide to the Department a performance bond according to the Permits Manual, Section PE-203 as a guarantee of conformance with the Department's Encroachment Permit requirements.
 - B. **PAYMENT BOND:** At the discretion of the department, a payment bond will be required of the permittee to ensure payment of liquidated damages assessed to the permittee.
 - C. **LIABILITY INSURANCE:** Liability insurance will be required of the permittee (in an amount approved by the department) to cover all liabilities associated with the encroachment.
 - D. It shall be the responsibility of the permittee, its successors and assigns, to maintain all indemnities in full force and effect until the permittee is authorized to release the indemnity by the Department.
4. A copy of this application and all related documents making up the approved permit will be given to the applicant and shall be made readily available for review at the work site at all times.
5. Perpetual maintenance of the encroachment is the responsibility of the permittee, its successors and assigns, with the approval of the Department as required, unless otherwise stated.
6. Permittee, its successors and assigns, shall comply with and agrees to be bound by the requirements and terms of (a) this application and all related documents making up the approved permit, (b) by the Department's Permits Manual, and (c) by the Manual on Uniform Traffic Control Devices, both manuals as revised to and in effect on the date of issuance of the permit, all of which documents are made a part thereof by this reference. Compliance by the permittee, its successors and assigns, with subsequent revisions to applicable provisions of either manual or other policy of the Department may be made a condition of allowing the encroachment to persist under the permit.
7. Permittee agrees that this and any encroachment may be ordered removed by the Department at any time, and for any reason, upon thirty days written notice to the last known address of the applicant or to the address at the location of the encroachment. The permittee agrees that the cost of removing and of restoring the associated right-of-way is the responsibility of the permittee, its successors and assigns.
8. Permittee, its successors and assigns, agree that if the Department determines that motor vehicular safety deficiencies develop as a result of the installation or use of the encroachment, the permittee, its successors and assigns, shall provide and bear the expenses to adjust, relocate, or reconstruct the facilities, and/or add signs, auxiliary lanes, or other corrective measures reasonably deemed necessary by the Department within a reasonable time after receipt of a written notice of such deficiency. The period within which such adjustments, relocations, additions, modifications, and/or other corrective measures must be completed will be specified in the notice.



APPLICATION FOR ENCROACHMENT PERMIT

9. Where traffic signals are required as a condition of granting the requested permit or are thereafter required to correct motor vehicular safety deficiencies, as determined by the Department, the costs for signal equipment and installation(s) shall be borne by the permittee, its successors and assigns, and/or the Department in its reasonable discretion and only in accordance with the Department's current policy set forth in the Traffic Operations Manual and Permits Manual. Any modifications to the permittee's entrance necessary to accommodate signalization (including necessary easement(s) on private property) shall be the responsibility of the permittee, its successors and assigns, at no expense to the Department.

10. The requested encroachment shall not infringe on the frontage rights of an abutting owner without their written consent as hereinafter described. Each abutting owner shall express their consent, which shall be binding on their successors and assigns, by the submission of a notarized statement as follows, "I (we), _____, hereby consent to the granting of the permit requested by the applicant along Route _____, which permit does affect frontage rights along my (our) adjacent real property." By signature(s) _____, subscribed and sworn by _____, on this date _____.

11. The permit, if approved, is subject to the agreement that it shall not interfere with any similar rights or permit(s) previously granted to any other party, except as otherwise provided by law.

12. Permittee shall include documentation which describes the facilities to be constructed. Permittee, its successors and assigns, agrees as a condition of the granting of the permit to construct and maintain any and all permitted facilities or other encroachments in strict accordance with the submitted and approved permit documentation and the policies and procedures of the Department. Permittee, its successors and assigns, shall not use facilities authorized herein in any manner contrary to that prescribed by the approved permit. Only normal usage as contemplated by the parties and by this application and routine maintenance are authorized by the permit.

13. Permittee, its successors and assigns, at all times from the date permitted work is commenced until such time as all permitted facilities or other encroachments are removed from the right-of-way and the right-of-way restored, **shall defend, protect, indemnify and save harmless** the Department from any and all liability claims and demands arising out of the work, encroachment, maintenance, or other undertaking by the permittee, its successors and assigns, related or undertaken pursuant to the granted permit, due to any claimed act or omission by the permittee, its servants, agents, employees, or contractors. This provision shall not inure to the benefit of any third party nor operate to enlarge any liability of the Department beyond that existing at common law or otherwise if this right to indemnity did not exist.

14. Upon a violation of any provision of the permit, or otherwise in its reasonable discretion, the Department may require additional action by the permittee, its successors and assigns, up to and including the removal of the encroachment and restoration of the right-of-way. In the event additional actions required by the Department under the permit are not undertaken as ordered and within a reasonable time, the Department may in its discretion cause those or other additional corrective actions to be undertaken and the Department may and shall recover the reasonable costs of those corrective actions from the permittee, its successors and assigns.

15. Permittee, its successors and assigns, shall use the encroachment premises in compliance with all requirements of federal law and regulation, including those imposed pursuant to Title VI of the Civil Right Act of 1964 (42 U.S.C. § 2000d et seq.) and the related regulations of the U.S. Department of Transportation in Title 49 C.F.R. Part 21, all as amended.



APPLICATION FOR ENCROACHMENT PERMIT

16. Permittee, its successors and assigns, agree that if the Department determines it is necessary for the facilities or other encroachment authorized by the permit to be removed, relocated or reconstructed in connection with the reconstruction, relocation or improvement of a highway, the Department may revoke permission for the encroachment to remain under the permit and may order its removal, relocation or reconstruction by the permittee, its successors and assigns, at the expense of the permittee, except where the Department is required by law to pay any or all of those costs.

17. Permittee agrees that the authorized permit is personal to the permittee and shall remain in effect until such time as (a) the permittee's rights to the adjoining real property to have benefitted from the requested encroachment have been relinquished, (b) until all permit obligations have been assumed by appropriate successors and assigns, and (c) unless and until a written release from permit obligations has been granted by the Department. The permit and its requirements shall also bind the real property to have benefitted from the requested encroachment to the extent permitted by law. The permit and the related encroachment become the responsibility of the successors and assigns of the permittee and the successors and assigns of each property owner benefitting from the encroachment, or the encroachment may not otherwise permissibly continue to be maintained on the right-of-way. (Does not apply to utility encroachments serving the general public.)

18. If work authorized by the permit is within a highway construction project in the construction phase, it shall be the responsibility of the permittee to make personal contact with the Department's Engineer on the project in order to coordinate all permitted work with the Department's prime contractor on the project.

19. This permit is not intended to, nor shall it, affect, alter or alleviate any requirement imposed upon the permittee, its successors and assigns, by any other agency.

20. Permittee, its successors and assigns, agrees to contain and maintain all dirt, mud, and other debris emanating from the encroachment away from the surrounding right-of-way and the travel way of the highway hereafter and at all times that its obligations under the permit remain in effect.

KY Transportation Cabinet – District 8
Permit Number 08-2015-00032

Applicant to bore under KY 90 at mp 0.984 in Cumberland County with 100 feet of 8 inch steel casing for 3 inch PVC water line connecting to existing water line as shown on attached plans and typical section.

Valves, taps, and additional hardware shall be constructed between back slope of ditch line or toe of slope and right of way line and shall have a minimum of 42 inch cover. All water meters are to be placed off Kentucky Transportation Cabinet right of way.

Note: Actual length of encasement pipe for each road bore shall be determined in the field to meet the requirements of the attached typical section.

The boring pit and tail ditch shall extend past the existing toe of slope or bottom of ditch line and shall be a minimum of 42 inches deep. The encasement and utility line shall be 42 inches from the lowest point of the ditch line to the top of the encasement.

The end of all encasement pipes shall be left uncovered until the Department of Highways is notified and field inspection is made. The encasement pipe shall be welded at all joints and be one continuous run of pipe.

All work and materials shall meet or exceed the state specifications. Work area within the state's right of way shall be signed and flagged in accordance to the Manual on Uniform Traffic Control Devices before any work is to begin on the Kentucky Transportation Cabinet right of way.

No changes shall be made by the contractor contrary to this permit and the applicant's plans without first notifying and being approved by the Permit engineer.

Construction of the utility shall not interfere with any construction or maintenance operations on KY 90 by the Transportation Cabinet.

Roadway drainage shall be maintained at all times, with silt checks placed in the roadway ditch where needed and near the inlet of all culvert and entrance pipe to control erosion and prevent silt from settling inside of pipe.

The applicant shall provide all necessary steps to contain all silting within the work area as specified in Section 212 and Section 213, Department's Standard Specifications for Road and Bridge Construction.

All disturbed portions of the right-of-way are to be restored to grass as per Kentucky Department of Highways Standard Specifications for Road and Bridge Construction, 2012 edition. A satisfactory turf, as determined by the Department, is to be established by the permittee prior to release of indemnity.

The minimum rate of application for seeding and protection method II per 1,000 square feet shall be applied as follows:

2 lbs. of seed mixture
23 lbs. of 10-20-20 fertilizer
150 lbs. of agricultural limestone

Applicant will be responsible to contact the Department of Highways D-8 Permits Office at 606-677-4017 a minimum of 2 working days prior to beginning of permitted work.

This permit will be terminated and work will stop immediately at any time the Department of Highways discovers or is notified of any unsafe or hazardous conditions until corrections have been made.



ENCROACHMENT PERMIT GENERAL NOTES & SPECIFICATIONS

Permit No. 08-2015-00032

I. SAFETY

A. General Provisions

- All signs and control of traffic shall be in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition, Part VI, and safety requirements shall comply with the Permits Manual.
- All work necessary in shoulder or ditch line areas of a state highway shall be scheduled to be promptly completed so that hazards adjacent to the traveled way are kept to an absolute minimum.
- No more than one (1) traveled-lane shall be blocked or obstructed during normal working hours. All signs and flaggers during lane closure shall conform to the Manual on Uniform Traffic Control Devices.
- When necessary to block one (1) traveled-lane of a state highway, the normal working hours shall be as directed by the Department. No lanes shall be blocked or obstructed during adverse weather conditions (rain, snow, fog, etc.) without specific permission from the Department. Working hours shall be between 8:30 AM and 4:00 PM.
- The traveled-way and shoulders shall be kept clear of mud and other construction debris at all times during construction of the permitted facility.
- No nonconstruction equipment or vehicles or office trailers shall be allowed on the right of way during working hours.
- The right of way shall be left free and clear of equipment, material, and vehicles during non-working hours.

B. Explosives

- No explosive devices or explosive material shall be used within state right of way without proper license and approval of the Kentucky Department of Mines and Minerals, Explosive Division.

C. Other Safety Requirements

- All workers must wear OSHA conforming personal protection items at all times when work is performed on the KYTC right of way. All traffic control must conform to the latest edition of the Manual on Uniform Traffic Control Devices

II. UTILITIES * Applies to Fully Controlled Access Highways ONLY

- *All work necessary within the right of way shall be performed behind a temporary fence erected prior to a boring operation.
- *The temporary woven wire fence shall be removed immediately upon completion of work on the right of way, and the control of access immediately restored to original condition, in accordance with applicable Kentucky Department of Highways Standard Drawings.
- *All vents, valves, manholes, etc., shall be located outside of the right-of-way.
- *Encasement pipe shall extend from right-of-way line to right-of-way line and shall be one continuous run of pipe. The encasement pipe shall be welded at all joints.
- The boring pit and tail ditch shall extend past the existing toe of slope or bottom of ditch line and shall be a minimum of 42 inches deep.

Permit No. _____

II. UTILITIES (Continued)

- Encasement pipe shall conform to current standards for highway crossings in accordance with the Permits Manual.
- Parallel lines shall be constructed between back slope of ditch line and right-of-way line and shall have a minimum of 42-inch cover above top of pipe or conduit.
- All pavement cuts shall be restored per Kentucky Transportation Cabinet form TC 99-13.
- Aerial crossing of this utility line shall have a minimum clearance of _____ feet from the high point of the roadway to the low point of the line (calculated at the coefficient for expansion of 120 degrees Fahrenheit).
- The 30-foot clear zone requirement shall be met to the extent possible in accordance with the Permits Manual.
- Special requirements:

III. GENERAL

A. OSHA

- Kentucky Occupational Safety and Health Standards for the construction industry, which has the effect of law, states in part: (Page 52, 1926.651, Specific Excavation Requirements) "Prior to opening an excavation, effort shall be made to determine whether underground installations, (sewer, telephone, water, fuel, electric lines, etc.) will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation."

B. Archaeological

- Whenever materials of an archaeological nature are discovered during the course of construction work or maintenance operations, contact shall be made immediately with the Division of Environmental Analysis, which maintains an archaeologist on staff, or with the Office of the State Archaeologist located at the University of Kentucky. Following this consultation, further action shall be decided on a case-by-case basis by the State Highway Engineer or the Transportation Planning Engineer or their designated representative.

C. Utilities in the Work Areas

- The permittee shall be responsible for any damage to existing utilities, and any utility modifications or relocations within state right of way necessary, as determined by the Department or by the owner of the utility, shall be at the expense of the permittee and subject to the approval of the Department.
- All existing manholes and valve boxes shall be adjusted to be flush with finished grade.

D. Environmental

- If the activity to which this permit relates disturbs one acre or more of land, you must obtain a KPDES KYR10 permit.

Websites

<http://www.water.ky.gov/permitting/wastewaterpermitting/KPDES/storm/>

Inspectors for KPDES KYR10 at www.KEPSC.org

Permit No. _____

IV. RIGHT OF WAY RESTORATION

- All disturbed portions of the right of way shall be restored to grass as per Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition). A satisfactory turf, as determined by the Department, shall be established by the permittee prior to release of indemnity. Sodding or seeding shall be as follows:

Lawn or High Maintenance Situation	70% Lawn Fescue (e.g., variety - Falcon) 30% Bluegrass or
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70% Lawn Rye (e.g., variety - Derby) 30% Bluegrass

Right of Way Lawn Maintenance Situation	70% KY 31 Fescue 30% Perennial Rye Grass or
---	---

100% KY Fescue

- Two tons of clean straw mulch per acre of seeding.
- Prior to seeding, the ground shall be prepared in accordance with Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).
- Substitutes for sod such as artificial turf, rocked mulch, or paved areas may be acceptable if they are aesthetically pleasing.
- All ditch-flow lines and all ditch-side slopes shall be sodded.
- Existing concrete right of way markers shall not be disturbed, but if damaged in any way, they shall be entirely replaced by the permittee, with new concrete markers to match the original markers, in accordance with Kentucky Department of Highways Standard Drawings. Markers that are entirely removed shall be re-established in the proper locations by the permittee and to the satisfaction of the Department.
- Other right of way restoration requirements are as follows:

V. DRAINAGE

- All pipe shall be laid in a straight alignment, to proper grades, and with all materials and methods of installation including bedding and joint seating in accordance with Department Standard Specifications for Road and Bridge Construction (latest edition). Pipe shall not be covered until inspected by the Department and express permission obtained to make backfill.
- All gutter lines at the base of new curbs shall be on continuous grades, and pockets of water along with curbs or in entrance areas or other paved areas within the right of way shall not be acceptable.
- All drainage structures and appurtenances (manholes, catch basins, curbing, inlet basins, etc.) shall conform to Department specifications and shall be constructed in accordance with the Department Standard Drawings. Type required:

Permit No. _____

VI. Paving

- No bituminous pavement shall be installed within the right of way between November 15 and April 1, nor when the temperature is below 40 degrees Farenheit, without the express consent of the Department. No bituminous pavement shall be installed when the underlying course is wet.
- Paving within the right of way shall be as follows:
 - Base (Type) _____ (Thickness) _____
 - Surface Base (Type) _____ (Thickness) _____
 - Finished Surface (Type) _____ (Thickness) _____
- Existing pavement and shoulder material shall be removed to accommodate the above paving specifications.
- The finished surface of all new pavement within the right of way shall be true to the required slope and grade, uniform in density and texture, free of irregularities, and equivalent in riding qualities to the adjacent highway pavement or as determined by the Department of Highways.
- All materials and methods of construction, including base and subgrade preparation, shall be in accordance with Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).
- 24 hours notice to the Department is required prior to beginning paving operations.
Phone: _____ Name: _____
- To ensure proper surface drainage, the new pavement shall be flush with the edge of existing highway pavement and shall slope away from the existing edge of the pavement as specified in drawings.
- Existing edge of pavement shall be saw-cut to provide a straight and uniform joint for new pavement. An approved joint sealer, in accordance with Kentucky Department of Highways Standard Specifications (latest edition), shall be applied between new and existing pavements.

VII. SIDEWALKS SPECIFICATIONS *This dimension should be equal to the width of the sidewalk.

A. New Sidewalks

- Sidewalks shall be constructed of Class A concrete (3,500 p.s.i. test), shall be *_____ feet in width, 6 inches in thickness across the bituminous entrance, and 4 inches in thickness across the remaining sections.
- Sidewalks shall have tooled joints not less than 1 inch in depth at four foot intervals*, and 1/2 premolded expansion joints extending entirely through the sidewalk at intervals not to exceed 50 feet.
- All materials and methods of construction, including curing, shall be in accordance with the Kentucky Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).

B. Existing Sidewalks

- (**Applicable if existing sidewalks are being relocated**) Use of the sidewalk shall not be blocked or obstructed, and a usable walkway shall be maintained across the construction area at all times.
- All damaged sections of the sidewalks shall be entirely replaced to match existing sections.

Permit No. _____

VIII. DENSE GRADED SHOULDERS

- Any existing dense-graded aggregate shoulders in the entire frontage within the construction area, which have been disturbed or damaged or on which dirt has been placed or mud has been deposited or tracked, shall be restored to original condition by removal of all contaminated material and replaced to proper grade with new dense-graded aggregate.
- All new aggregate shoulders as specified in the plan shall consist of 5 inches of compacted dense-graded aggregate, 2^{1/2} pounds per square yard of calcium chloride.
- All dense-graded aggregate shoulders shall slope away from the new edge of pavement at the rate of 3/4 inch per foot.

IX. CURBING

A. Bituminous Curbs

- Bituminous concrete curbs shall be given a paint coat of asphalt emulsion.
- The surface under the bituminous concrete curb shall be tacked with asphalt emulsion.
- All bituminous concrete curbs shall be constructed of a Class I bituminous concrete mixture as specified by official Department of Highways specifications.
- All bituminous curbs shall be rolled curb, with a minimum base width of 8 inches and a minimum height of _____ inches. The top of the curb shall be constructed in such a manner as to guarantee a uniform rolled effect throughout the entire run.

B. Concrete Curbs

- All curbs or curb and gutter shall be constructed of Class A concrete (3,500 p.s.i. test) and shall be uniform in height, width, and alignment, true to grade, and satisfactory in finish and appearance as determined by the Department. All materials and methods of construction, including curing, shall be in accordance with Department of Highways Standard Specifications for Road and Bridge Construction (latest edition).
- All concrete curbs shall be 6 inches in width, extend _____ inches above finished grade and 12 inches below finished grade, with all visible edge rounded to 1/2 inch radii.
- All concrete curbs shall have expansion joints constructed at intervals of not more than 30 feet, and 1/2 inch premolded expansion joint material (cut to conform to the curb or to the curb and gutter section) shall be used in each expansion joint.
- The last _____ feet of all concrete curbs are to be tapered down to finished grade.

Permit No. _____

X. RIGHT-OF-WAY FENCE REPLACEMENT

- The replacement fence shall be a height of at least 48 inches and shall be of sufficient density to contain all animals (if applicable).
- The replacement fence shall be a minimum of 1 foot and a maximum of 2 feet outside the right-of-way line.
- The fence materials and design shall meet accepted industry standards and be treated as paintable.
- The permittee shall be required to maintain the fence in a high state of repair.
- The existing fence shall be removed by permittee and stored at the Department's maintenance storage yard for future reuse by the Department.
- The control of access shall not be diminished as a result of replacement of the fence.
- Miscellaneous:

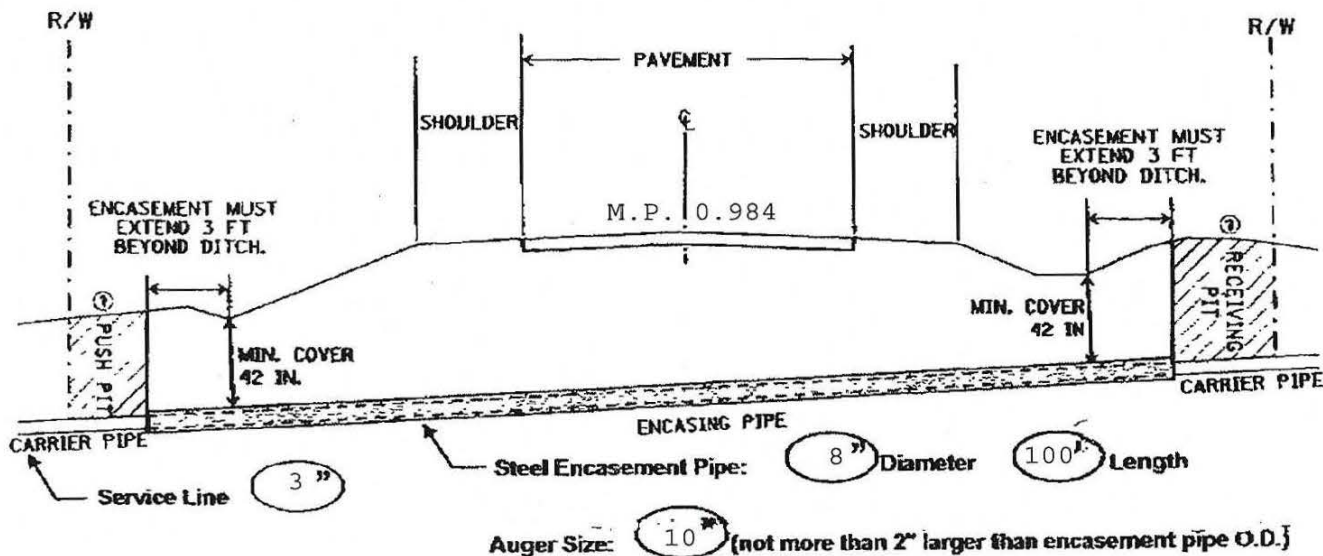
NOTICE TO PERMITTEE

THE PERMITTEE AGREES THAT ALL WORK WITHIN THE EXISTING RIGHT OF WAY SHALL BE DONE IN ACCORDANCE WITH THE PLANS AS APPROVED AND PERMITTED BY AN ENCROACHMENT PERMIT. ANY CHANGES OR VARIANCES MADE AT THE TIME OF CONSTRUCTION WITHOUT WRITTEN APPROVAL FROM THE DEPARTMENT OF HIGHWAYS SHALL BE REMOVED BY THE PERMITTEE AT NO EXPENSE TO THE DEPARTMENT OF HIGHWAYS AND SHALL BE REDONE BY THE PERMITTEE TO CONFORM WITH THE APPROVED PLANS.

Route Number: KY 90

Pavement Width: 50 LF

Failure to place bore at 42" depth will result in re-boring at applicant's expense, and may result in forfeiture of bond or other indemnity.



- ① Push pit and receiving pit shall be backfilled and thoroughly compacted.
2. All ditch lines shall be restored to original condition.
3. Shape, seed, and straw all disturbed areas.
4. Services over 2" shall be steel encased unless exempt under Chapter Two of the KYTC Permits Guidance Manual.

KENTUCKY DEPARTMENT OF HIGHWAYS
TYPICAL HIGHWAY BORING CROSSING DETAIL
TC99-10 Rev. 04/06 Dist. 4

NOTICE OF COMPLETION OF ENCROACHMENT PERMIT WORK

Please return this form to the District Office when work is completed and ready for final inspection.

Application Identification

Name: Cumberland Co. Water

Contact Person:

Address: 133 Lower River St.

City: Burkesville

State: KY

Telephone:

Project Identification

Permit Number: A08-2015-00032

County: Cumberland

Road Name: KY 90

Milepoint: 0.984

I wish to notify the Department of Highways that the above mentioned permits work and any necessary right of way restoration have been completed and are ready for final inspection.

Applicant Signature

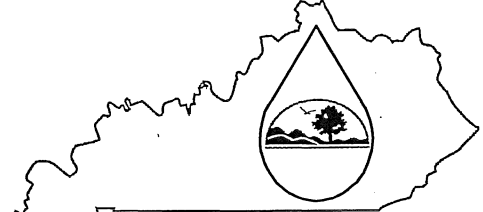
Please Return To:

Department of Highways
District 8 Somerset
P.O. Box 780
Somerset, Ky. 42502

Attention:

Conley Moren

FORM NOI-SWCA

	<p>KENTUCKY POLLUTION DISCHARGE ELIMINATION SYSTEM (KPDES)</p> <p>Notice of Intent (NOI) for coverage of Storm Water Discharges Associated with Construction Activities Under the KPDES Storm Water General Permit KYR100000</p>
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This is an application for:

New construction activity.
 Modification of coverage for additional area in same watershed.
 Modification of coverage for additional area in different watershed.

If Modification is checked, state reason for Modification:

For Agency Use	Permit No. (Leave Blank)	K	Y	R	1	0				
For Agency Use	AI ID (Leave Blank)									

SECTION I – FACILITY OPERATOR INFORMATION

Operator Name(s)*:	Phone*:
Mailing Address*:	Status of Owner/Operator: <input type="checkbox"/> Private <input type="checkbox"/> State <input type="checkbox"/> Federal <input type="checkbox"/> Public (other than state or federal)
City*:	State* Zip Code*:

SECTION II – FACILITY/SITE LOCATION INFORMATION

Name of Project*:	Physical Address*:	City*:
State*:	Zip Code*:	County*:
Latitude (decimal degrees)*:	Longitude (decimal degrees)*:	SIC Code*:

SECTION III – SITE ACTIVITY INFORMATION

For single projects provide the following information

Total Number of acres in project*:	Total Number of acres to be disturbed*:	Start date:	Completion date:
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For common plans of development projects provide the following information

Total Number of acres in project*:	Number of individual lots in development:	Number of lots to be developed:
Total acreage intended to be disturbed*:		Number of acres intended to be disturbed at any one time:
Start date:	Completion date:	List Contractors:

SECTION IV – DISCHARGE TO A WATER BODY

Name of Receiving Water*:	Anticipated number of discharge points:
Location of anticipated discharge points: Latitude (decimal degrees)* Longitude (decimal degrees)*:	
Receiving Water Body Stream Use Designation	<input type="checkbox"/> Cold Water Aquatic Habitat <input type="checkbox"/> Domestic Water Supply <input type="checkbox"/> Outstanding State Resource Water <input type="checkbox"/> Secondary Contact Recreation <input type="checkbox"/> Primary Contact Recreation <input type="checkbox"/> Warm Water Aquatic Habitat
Antidegradation Categorization	<input type="checkbox"/> Outstanding National Resource Water <input type="checkbox"/> Exceptional Water <input type="checkbox"/> High Quality Water <input type="checkbox"/> Impaired Water
Name of Receiving Water*:	Anticipated number of discharge points:
Location of anticipated discharge points: Latitude (decimal degrees)* Longitude (decimal degrees)*:	
Receiving Water Body Stream Use Designation	<input type="checkbox"/> Cold Water Aquatic Habitat <input type="checkbox"/> Domestic Water Supply <input type="checkbox"/> Outstanding State Resource Water <input type="checkbox"/> Secondary Contact Recreation <input type="checkbox"/> Primary Contact Recreation <input type="checkbox"/> Warm Water Aquatic Habitat
Antidegradation Categorization	<input type="checkbox"/> Outstanding National Resource Water <input type="checkbox"/> Exceptional Water <input type="checkbox"/> High Quality Water <input type="checkbox"/> Impaired Water

FORM NOI-SWCA

SECTION V – DISCHARGE TO AN MS4			
Name of MS4:		Date of application /notification to the MS4 for construction site coverage:	
Number of discharge points:	Location of each discharge point: Latitude (decimal degrees):*		Longitude (decimal degrees):*
SECTION VI – CONSTRUCTION ACTIVITIES IN OR ALONG A WATER BODY			
Will the project require construction activities in a water body or the riparian zone: <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, describe scope of activity:			
Is a Clean Water Act 404 permit required: <input type="checkbox"/> Yes <input type="checkbox"/> No		Is a Clean Water Act 401 Water Quality Certification required: <input type="checkbox"/> Yes <input type="checkbox"/> No	
SECTION VII – NOI PREPARER INFORMATION			
First Name:*	Last Name:*	Phone :*	eMail Address:*
Mailing Address:*	City:*	State:*	Zip Code:*
SECTION VIII – ATTACHMENTS			
Attach a full size color USGS 7½-minute quadrangle map with the facility site clearly marked. USGS maps may be obtained from the University of Kentucky, Mines and Minerals Bldg. Room 106, Lexington, Kentucky 40506. Phone number (859) 257-3896.			
SECTION IX – CERTIFICATION			
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.			
Signature:*		First Name:*	Last Name:*
Phone:*	eMail Address:	Date:*	

This completed application form and attachments should be sent to: SWP Branch, Division of Water, 200 Fair Oaks, Frankfort, Kentucky 40601. Questions should be directed to: SWP Branch, Operational Permits Section at (502) 564-3410.

KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM FORM NOI-SWCA – INSTRUCTIONS

WHO MUST FILE A NOTICE OF INTENT (NOI) FORM

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity to a water body of the Commonwealth of Kentucky without a Kentucky Pollutant Discharge Elimination System (KPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under the KPDES Storm Water General Permit. If you have questions about whether you need a permit under the KPDES Storm Water program, or if you need information as to whether a particular program is administered by the state agency, call the **Storm Water Contact, Operational Permits Section, Kentucky Division of Water at (502) 564-3410.**

WHERE TO FILE NOI FORM

NOIs must be sent to the following address or submitted in on-line at <https://dep.gateway.ky.gov/eForms/Default.aspx?FormID=3>:

Operational Permits Section
SWP Branch, Division of Water
200 Fair Oaks Lane
Frankfort, KY 40601

Electronic NOI-SWCAs are to be submitted a minimum of seven (7) working days prior to commencement of construction related activities. Paper NOI-SWCAs are to be submitted a minimum of thirty (30) working days prior to commencement of construction related activities.

COMPLETING THE FORM

Enter information in the appropriate areas only. (*) denotes a required field. Enter N/A (Not Applicable) for fields that are required but do not apply to your submission. If you have any questions regarding the completion of this form call the **Storm Water Contact, Operational Permits Section, at (502) 564-3410.**

SECTION I – FACILITY OPERATOR INFORMATION

Operator Name(s): Enter the name or names of all operators applying for coverage under KYR10 using this NOI.
Mailing Address, City, State, and Zip Code: Provide the mailing address of the primary operator
Phone No.: Provide the telephone numbers of the person who is responsible for the operation.
Status of Owner/Operator: Select the appropriate legal status of the operator of the facility from the dropdown list.

Federal
Public (other than federal or state)
State
Private

SECTION II – FACILITY/SITE LOCATION INFORMATION

Name of Project: Provide the name of the project.
Physical Address, City, State, Zip Code and County: Provide the physical address of the project.
Latitude/Longitude: Provide the general site latitude and longitude of the operation.
SIC Code: Enter the Standard Industrial Code for the project

SECTION III – SITE ACTIVITY INFORMATION

For single projects provide the following information:

Total number of acres in project: Indicate the total acreage of the project including both disturbed and undisturbed areas.
Total number of acres to be disturbed: Indicate the total number of acres of the project to be disturbed.
Anticipated start date: Indicate the approximate date of when construction activities will begin.
Anticipated completion date: Indicated the approximate date of when final stabilization will be achieved.

For common plans of development provide the following information:

Total number of acres in project: Indicate the total acreage of the project including both disturbed and undisturbed areas.
Number of individual lots in development, if applicable: Indicate the number of individual lots or unit in the common plan of development
Number of lots to be developed: Indicate the number of lots that you intend to develop.
Total acreage of lots intended to develop: Indicate the total acreage of the lots you intend to develop
Total acreage intended to disturb: Indicate the total acreage of the lots you intend to disturb
Number of acres intended to disturb at any one time: Indicate the maximum number of acres to be disturbed at any one time.
Anticipated start date: Indicate the approximate date of when construction activities will begin.
Anticipated completion date: Indicated the approximate date of when final stabilization will be achieved.
List of contractors: Provide the names of all known contractors that will be working on site.

**KENTUCKY POLLUTANT DISCHARGE ELIMINATION SYSTEM
FORM NOI-SWCA – INSTRUCTIONS**

SECTION IV – IF THE PERMITTED SITE DISCHARGES TO A WATER BODY THE FOLLOWING INFORMATION IS REQUIRED

Name of Receiving Water: Provide the names of the each water body receiving discharges from the site. Provide only official USGS names do not provide local names

Anticipated number of discharge points: Indicate the number of discharge points to each receiving water body.

Location of anticipated discharge points: Provide the latitude and longitude of each discharge point. Add points as necessary.

Receiving Water Body Stream Use Designation: Check all appropriate boxes

Antidegradation Categorization: Select from the drop down box one of the following:

Outstanding National Resource Water
Exceptional Water
High Quality Water
Impaired Water

SECTION V – IF THE PERMITTED SITE DISCHARGES TO A MS4 THE FOLLOWING INFORMATION IS REQUIRED

Name of MS4: Provide the name of the MS4 to which the activity will discharge

Number of discharge points to the MS4: Indicate the number of discharge points

Location of each discharge point: Provide the latitude and longitude of each discharge point. Add points as necessary

Date of application/notification to the MS4 for construction site permit coverage: Indicate the date the MS4 has or will be notified.

SECTION VI – CONSTRUCTION ACTIVITIES IN OR ALONG A WATER BODY

Will the project require construction activities in a water body or the riparian zone: Select Yes or No from the drop down box.

If Yes, describe scope of activity: Provide a brief description of the activity (ies) that will take place in the water body or the riparian zone.

Is a Clean Water Act 404 permit required: Select Yes or No from the drop down box.

Is a Clean Water Act 401 Water Quality Certification required: Select Yes or No from the drop down box.

SECTION VII – NOI PREPARER INFORMATION

Provide the name, mailing address, telephone number and eMail address of the person preparing the NOI.

SECTION VIII – Attachments

Attach a USGS topographic map indicating the location of the activity and the proposed discharge points.

SECTION IX – CERTIFICATION

Provide the name, mailing address, telephone number and eMail address of the person who is responsible for the activity

Signature: Provide full name of the responsibility party. This will constitute a signature.

The NOI must be signed as follows:

Corporation: by a principal executive officer of at least the level of vice president

Partnership or sole proprietorship: by a general partner or the proprietor respectively

TECHNICAL SPECIFICATIONS
CUMBERLAND COUNTY WATER DISTRICT
CUMBERLAND COUNTY, KENTUCKY

2014 WATER SYSTEM IMPROVEMENTS

CONTRACT NO. 1

PROJECT NO. 1423

FEBRUARY 2015

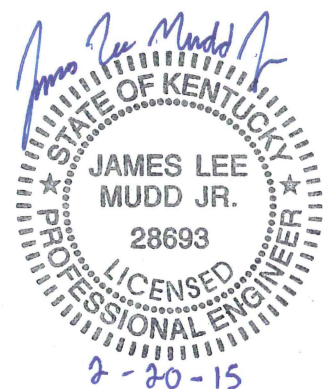
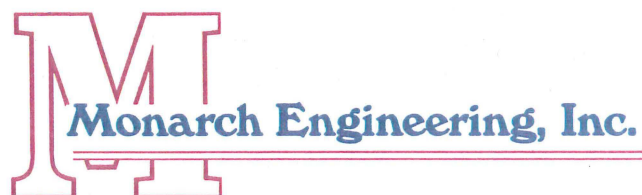


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SECTION 1 - WATER MAINS

1.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to furnish and install the water mains as shown on the drawings and as directed

1.1 Water Pipe Materials. All pipe materials shall conform to the manufacturer's standard lengths and diameters. Testing when required by the Owner shall be done in accordance with the appropriate ASTM specifications for the material selected. The water main type shall be PVC water pipe or ductile iron.

1.1.1 Polyvinyl Chloride Pipe PVC SDR 17 or SDR 21. PVC pipe shall comply with ASTM D-1784 for material and shall be Class 250 (SDR 17) or Class 200 (SDR 21) as shown on the drawings or indicated on the bid form. All PVC pipe shall conform to the latest revisions of the following specifications:

ASTM D2241 (PVC Plastic Pipe SDR-PR and Class T)
National Sanitation Foundations Testing Laboratories (NSF)

The name of the manufacturer of the plastic pipe to be used must be found on the current listing of Plastic Materials for Potable Water Application, published by the NSF (National Sanitation Foundation), and must meet the requirements of the Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, D1784, 12454-B (PVC 1120) published by ASTM. Rubber gaskets shall conform to ASTM D3139.

Wall thickness shall be in accordance with ASTM D-2241. Pipe ends shall be beveled to accept the coupling with gasket. The bell section shall be designed to be as strong as the pipe wall.

Samples of pipe physical and chemical data sheets shall be submitted to the Engineer for approval prior to the pipe being purchased.

The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions, or other defects. The pipe shall be as uniform as commercially practical in color and shall have a ring painted around the spigot ends in such a manner as to allow field checking of setting depth of the pipe in the socket. Pipe must be delivered to the job site by means that will adequately support it and not subject it to undue stresses. In particular, the load shall be so supported such that the bottom rows of pipe are not damaged by crushing. The pipe shall be unloaded carefully and stored as close to the final point of placement as is practical.

Pipe markings shall include the following marked continuously down the length:

- Manufacturer's Name
- Nominal Size
- Class Pressure Rating
- PVC 1120
- NSF Logo
- Identification Code

The lubricant shall be that as recommended and supplied by the pipe manufacturer.

1.1.2 Polyvinyl Chloride Pipe (PVC) Cast Iron Pipe Size. This pipe shall meet the requirements of AWWA C900-75, latest revision, "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for Water" and shall be furnished in cast iron pipe equivalent outside diameters with separate couplings including gaskets.

The pipe shall be made from Class 12454-A or Class 12454-B virgin compounds as defined in ASTM D-1784. The standard code designation shall be PVC 1120. The PVC compounds shall be tested and certified as suitable for potable water products by the NSF approval marking.

Solvent cement couplings or joints shall not be used. PVC joints using elastomeric gaskets shall be tested as assembled joints and shall meet the laboratory performance requirements specified in ASTM D-3139.

Pipe shall be pressure Class 200, DR 14 or Class 150, DR 18 as shown on the drawings or the bid form.

Pipe and Couplings shall be marked as follows:

- Nominal Size and OD Base
- Material Code Designation (PVC 1120)
- Dimension Ratio Number
- AWWA Pressure Class
- AWWA Designation Number (AWWA C900)
- Manufacturers Name or Trade Mark and Production Record Code
- Seal of the NSF Laboratory

Each standard and random length of pipe shall be proof tested at four times its rated class pressure for a minimum of 5 seconds. Bells or couplings shall be tested with the pipe.

The pipe shall not split, crack, or break when tested by the parallel plato method, and it shall not flake or disintegrate when tested by the acetone immersion method as specified by ASTM D-2241.

1.1.3 Ductile Iron Pipe. Ductile Iron Pipe shall be designed in accordance with AWWA (ASA A21.50) and for the conditions as stated in these specifications and the pressure rating for the pipe shall be 350 PSI. Ductile iron pipe shall conform to AWWA C-151 (ASA A21.51). Pipe shall be cement lined in accordance with AWWA C104 (ASA A21.4) and all exposed pipe and fittings shall have a shop prime coat applied that is compatible with subsequent field enamel paint coats.

The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA A21.50 and will be shown on the drawings or the bid form.

The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

Pipe joints shall be mechanical joint, rubber ring slip joint, flanged, or locked mechanical joint equal to AWWA C-111.

1.1.4 Fittings. Ductile Iron mechanical joint fittings with appropriate adapters shall be used with PVC pipe and ductile iron pipe. Fittings shall comply with AWWA C-110 or C-111 and shall be manufactured for the size and pressure class of the line on which they are used. Compact fittings are acceptable and they shall conform to the latest AWWA specifications.

Mechanical joint fittings shall be used with ductile iron pipe for below ground burial and flange fittings shall be used for all interior piping where ductile iron pipe is used.

1.1.5 Mechanical Joint Restraints. Restraint devices for mechanical joint fittings shall be utilized with all fittings on both Ductile Iron and PVC pipe. Restraints shall conform to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A2153 and shall be manufactured for size and pressure class of the line on which they are used. Restraint devices for nominal pipe sizes 3-inch through 36-inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10. All Mechanical joint restraints shall be the MEGALUG® Restraint Series 2000 as manufactured by EBAA Iron, Inc., or approved equal.

1.2 Pipe Handling. Pipe delivered to the site shall be stored, handled, distributed, placed, joined together, etc. in accordance with the manufacturer's recommendation unless directed otherwise by the Engineer.

1.3 Water Main Location. The water main shall be installed in the locations as shown on the drawings and as directed by the Engineer. The Contractor and Engineer shall agree as to the exact location of the water line and there shall be no disputes unless it is clear that the proposed location significantly deviates from the drawings. At those locations where the drawings indicate that a fitting must be installed either by declaration on the drawings or by a defined bend as shown on the drawings, the Contractor shall do so and shall avoid over deflection of the pipe.

1.4 Excavation. The Contractor shall make trench excavations to only such width to provide ample room for proper construction. Sheet piling and shoring shall be provided as required for proper safety and compliance with OSHA regulations. Rock excavation shall be taken to a depth of 6 inches below the bottom of the pipe. If poor foundation conditions exist due to unstable subsurface conditions, the trench shall be under excavated to the depth required and filled with stone to obtain proper bearing capacity.

Watchmen or barricades, lanterns, and other such signs and signals as is necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions shall be provided by and properly maintained at the expense of the Contractor.

Only one half of street crossings and road crossings shall be excavated before placing temporary bridges over the excavation.

1.5 Blasting and Rock Excavation. The Contractor shall make his own investigation as he deems necessary to ascertain the sub surface conditions to be encountered in the work.

All blasting operations shall be conducted in accordance with municipal ordinances, state and federal laws and the applicable blasting codes. Soil particle velocity shall not exceed the limit set by Kentucky law. All explosives shall be stored in conformity with the applicable ordinances, laws and safety regulations. No blasting shall be done within five feet of any water mains, sewer lines, natural or manufactured gas lines, liquid petroleum lines, or other utilities.

The Contractor shall use delay caps or other approved methods to reduce earth vibrations and noise. Mud capping shall not be permitted as a method to breaking boulders. No blasting shall be permitted on Sundays or after dark.

Prior to commencing with the work, the Contractor shall, during a preconstruction conference with the Owner and Engineer, state clearly his approach to performing the excavations on the project. He shall be familiar with the laws and ordinances covering blasting and shall also give consideration to the use of hydraulically operated rock breaking devices in lieu of blasting where considered necessary. If blasting is not handled in an expert manner at all times the Engineer reserves the right to suspend blasting and require the work to proceed without it. Prior to blasting, the Contractor shall make his own detailed preblast survey of adjacent walks, curbs, retaining walls, house foundations, etc. to determine conditions prior to the work. Such a file of information, including photographs, may be certified in such a manner as the Contractor believes necessary. This information if required or performed shall be supplied to the Engineer prior to performing the work.

1.6 Storage of Excavated Material. All excavated material shall be stored in a manner that will not endanger the work and that will avoid obstructing roadways, sidewalks, and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire

and police call boxes, or other utility controls shall be left unobstructed and accessible. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural watercourses shall not be obstructed.

1.7 Shoring Sheeting and Bracing. The Contractor shall furnish place and maintain such sheeting and bracing as may be required to support the sides of the excavation or to protect other structures from possible damage. All sheeting and bracing shall be removed upon completion of the work unless permitted to be left in place by the Engineer. Any sheeting or bracing left in place shall be cut off at least two feet below the finished ground surface elevation. The cost of furnishing, placing, maintaining, and removing sheeting and bracing shall be included in the unit price bid for water lines and all work shall conform the OSHA requirements.

1.8 Bedding and Backfill. All water mains shall be bedded with select earth backfill or six inches of #9 or approved equal stone under and on both sides of the pipe where it is installed along the unpaved areas. Where the water line is installed along the paved areas the water line shall be backfilled with #9 or approved equal stone. Trenches shall be backfilled immediately after the water main has been installed. No rock larger than two inches will be permitted within six inches of the pipe. In unpaved or unsurfaced areas the remainder of the fill may be mounded over the top of the trench. Where trenches are in paved or traveled areas, or yard areas, compaction shall be performed during backfill. The Contractor at no time shall open up more than 500 feet of trench.

Any damage to underground structures, pipes wires, drains, etc., shall not be backfilled until they have been satisfactorily repaired or replaced to the original serviceability at the Contractor's expense and as approved by the Engineer. Settlement of backfill may be done with water furnished by the Contractor under the direction of the Engineer where such will not endanger traffic or damage property. When excavated rock is used for backfilling, it shall have sufficient dirt or fine material to fill all voids and shall not be used within twelve inches of the pipe.

To be accepted as final cleanup all excess rock one inch and larger shall be removed from the disturbed site.

1.9 Thrust Blocks and Anchorage. Thrust blocks shall be installed at all tees, bends, crosses, dead ends, valves, hydrants, blowoff assemblies, and as directed by the Engineer. The size of the thrust block shall depend on the soil and type of fitting, and shall conform to the pipe manufacturer's recommendations. At any location where a vertical bend is required the Contractor shall install the anchorage as directed by the Engineer in conjunction with the pipe manufacturer.

Thrust blocks shall be constructed of Class B concrete conforming to KBH Specification 601 and placed between the fitting and the trench wall. At no time will sack-crete or pre bagged concrete mixtures be allowed. All thrust block and anchorage concrete shall be delivered to the job site by means of a ready mix concrete truck and placed immediately upon arrival.

The thrust blocks shall be sized as shown on the detail drawings or as directed by the Engineer.

1.10 Temporary Surfacing. All trenches in paved areas shall, following compacted backfill, receive a top layer of compacted dense grade stone as shown on the detailed drawings. Such temporary surfacing shall be maintained and shall be paved as soon as conditions permit.

1.11 Hydrostatic Testing. The water line and appurtenances, as rapidly as valves are installed, shall be hydrostatically tested in accordance with these specifications. Defective joints of pipe shall be replaced as directed by the Engineer. Cracked or defective pipe, fittings, valves, or hydrants shall be replaced by the Contractor and the test shall be repeated until the test results are satisfied. All meter settings and service tubing as shown on the drawings shall be included in the hydrostatic test.

The test pressure shall not be less than 1.25 times the working pressure at the highest point along the test section and the hydrostatic test shall be of at least a two hour duration. The test pressure shall not vary by more than five psi. for the duration of the test.

1.11.1 Pressurization. After the pipe has been installed all or any valved section shall be subjected to the hydrostatic test. Each valved section of the pipe shall be slowly filled with water and the specified test pressure, corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer. As part of the testing equipment a meter shall be installed to measure all water added to the tested section.

1.11.2 Air Removal. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Owner.

1.11.3 Leakage Defined. Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within five psi. of the specified test pressure after the pipe has been filled with water and the air has been expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.

1.11.4 Allowable Leakage. No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{133,200}$$

Where:

L = allowable leakage in gallons per hour

S = length of pipe tested in feet

D = nominal diameter of the pipe in inches

P = average test pressure during the leakage test in pounds per square inch

This formula is based on an allowable leakage of 11.65 gpd./mi./in. of nominal diameter at a pressure of 150 psi.

All leaks shall be repaired whenever or wherever there is evidence of a leak. Water used by the Contractor shall be paid for by the Contractor at the rate of \$2.00 per 1,000 gallons.

1.12 Sterilization. Upon completion and acceptance of the hydrostatic test of a section of the water main that section shall be thoroughly disinfected before being placed in service by the use of chlorine or chlorine compounds in such amounts as to produce a concentration of not less than 50 ppm and a residual of not less than 25 ppm at the end of 24 hours and followed by thorough flushing. Putting small amounts of chlorine in each joint will not be acceptable.

Where shown on the plans or otherwise required, temporary blowoff assemblies shall be constructed by the contractor to facilitate the sterilization & flushing of new water mains. The temporary blowoff assemblies shall consist of valves, PVC piping, and ductile iron fittings and other materials as depicted in the standard drawings. The installation and subsequent removal of these temporary devices shall be considered incidental to the installation of the water lines and no additional payment or bid item will be included for them.

1.13 Other Utilities. Other utilities encountered in the work shall be preserved and protected. Where relocation or repair is required to accommodate the work it shall be made in a manner acceptable to the utility having jurisdiction over the service connection. Accommodation of service connections shall not constitute any basis for extra payment.

Prior to construction, the Contractor shall arrange to meet with representatives of all utilities, and provide them with his anticipated work schedule. The Contractor shall have the utility companies make their best determination of utility locations in the areas in which he is working. Throughout the progress of the work such field markings of utilities shall be kept current.

1.14 Payment for Water. All water used from the Owner shall be metered by meters supplied by the Contractor. The Contractor shall pay for such water at the rate of \$2.00 per 1,000 gallons. This shall include any unmetered water lost which shall be computed on the basis of a discharge velocity of seven feet per second, the diameter of the line, and the estimated duration of free uncontrolled discharge or the approved method.

1.15 Cleanup. The Contractor shall provide effective cleanup of the work as it progresses. At the time of final inspection no trenches shall show any undue evidence of the construction. All areas shall be left free of ruts due to construction and shall have a clean and neat appearance without rubble or debris. The areas shall not be mounded and shall be completely restored, and all yards and fields shall be reseeded. Straw and fertilizing shall accompany the seeding and the seed mixture shall match the existing ground cover. If necessary to hasten proper restoration of terraces, principally along ditch lines, the Contractor shall sod such areas at the Engineer's direction.

1.16 Protection of Adjacent Landscape. Reasonable care shall be taken during construction of the process lines to avoid damage to vegetation. Ornamental shrubbery and tree branches shall be temporarily tied back, where appropriate, to minimize damage. Trees which receive damage to branches shall be trimmed of those branches. Tree trunks receiving damage from equipment shall be treated with a tree dressing.

1.17 Underground Detection Wire. At all locations where water lines are installed, a detection wire shall be installed. For open cut installation, tracer wire is to be #12 AWG solid copper with 30 mil blue HDPE insulation. For trenchless installation, tracer wire is to be #12 AWG solid copper clad steel core with 45 mil blue HDPE insulation.

Tracer wire shall be installed with the pipe at the trench bottom and access boxes shall be installed at each valve, hydrant and air release valve. Tracer wire access boxes shall be spaced no further than 1000' apart. A minimum of 3 feet of tracer wire should be coiled up inside of each access box. Tracer wire access boxes shall be magnetized heavy duty type as manufactured by Copperhead Industries, LLC, Snake Pit or approved equal.

1.18 Exposing Existing Water Line. Where the new water line is to be installed parallel to an existing water line the Contractor shall be responsible for exposing the existing water lines at 100 feet intervals.

1.19 Payment. Payment shall be included in the payment for the work to which it is subsidiary in the Bid Schedule.

SECTION 2 - CASING PIPE

2.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to furnish and install casing pipes as shown on the drawings.

2.1 Materials. Bored and jacked casing pipe shall be plain end steel pipe conforming to AWWA Specification C200 with a minimum yield strength of 35,000 psi. The inside diameter of the casing pipe shall be a minimum of four inches greater than the largest outside diameter of the water pipe, joint or coupling.

The minimum wall thickness shall be in accordance with the following table:

<u>Diameter of Casing-Inches</u>	<u>Minimum Wall Thickness-Inches</u>	
	<u>Under Railroads</u>	<u>All Other Uses</u>
12-3/4 and under	0.188	0.188
14	0.250	0.250
16	0.281	0.250
18	0.312	0.250
20 and 22	0.344	0.250

Casing pipe shall have continuously welded joints. Any field welding shall be performed by a certified welder and shall be in accordance with AWWA Specifications C206

2.2 Prior Approvals. Prior to boring and jacking under roadways the Contractor shall submit drawings and other necessary information regarding the proposed construction to the Engineer for approval by the proper authorities if requested.

2.3 Bore and Jack Construction. The Contractor shall investigate the subsurface conditions which will be encountered and shall base his bid on his findings. No distinction shall be made between boring through earth and boring through rock.

The Contractor shall provide a jacking pit, bore through the earth and or rock, and jack the casing pipe into place at the proper line and grade as the bore is being made. "Free boring" will not be allowed unless directed by the Engineer. The carrier pipe shall be pushed through the casing pipe with care being taken to insure that the pipe joints are tight and properly made. Shims attached to the carrier pipe to prevent floating shall be redwood or that as specifically made for the application.

The approach trench shall be large enough to accommodate one section of casing pipe and the jacks and blocking. Two rails or sills shall be laid in the bottom of the trench to keep the casing at the established line and grade.

The installation procedure must be such that the casing pipe is placed concurrently with the removal of the soil. The outside diameter of the lead auger section must not be less than one half inch smaller in diameter than the casing inside diameter.

The ends of the casing pipe shall be plugged and made watertight prior to backfilling. A neoprene gasket that will slip over the cover pipe and allow the carrier pipe to pass through will be considered water tight.

2.4 Traffic Control Devices and Maintenance of Traffic. The proper placement and maintenance of traffic control devices and the maintenance of traffic flows shall comply with the standards set forth under the General Specifications.

The Contractor shall notify the proper City, County, or State officials prior to the commencement of boring and jacking or tunnel operations.

2.5 Open Cut Construction. Where steel casing pipe is to be installed by open cutting rather than by boring or jacking the same casing pipe as described above will be utilized.

2.6 Measurement and Payment. The unit price bid per linear foot for boring and jacking, as measured from end to end of the casing pipe, shall constitute full compensation for the work as specified. Open cut steel casing pipe as measured from end to end of the casing pipe shall constitute full compensation for the work as specified. Carrier pipes shall be furnished under the item as described in other portions of these technical specifications.

SECTION 3 - CREEK CROSSING

3.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install creek crossings as shown on the drawings and as directed.

3.1 Materials. The creek crossing shall be installed as per the detailed drawings or as described herein and the casing pipe shall be PVC pipe. In the event where a casing pipe is not required the creek crossing shall be installed with ductile iron. All carrier pipe and casing pipe shall be that as described in other sections of these technical specifications or as shown on the plan sheets

3.2 Installation. The creek crossings shall be installed with plastic carrier pipe placed within a plastic casing pipe, or ductile iron carrier pipe without a casing pipe unless specified otherwise. Where a plastic casing pipe is used it shall be of the minimum size to accommodate the carrier pipe. The casing pipe or water line pipe without casing pipe shall be placed a minimum of 30 inches below the bed of the stream, creek, or river and a twelve inch minimum layer of crushed stone shall be placed above the pipe where a casing pipe is not required. Class B concrete shall be placed between the crushed stone and the base of the stream, creek, or river, or between the casing pipe and the base of the waterway. Where concrete is placed, all water from the stream shall be diverted away from the area of concrete placement by means of diversion pipes or temporary embankments.

3.3 Payment. The unit bid shall constitute full compensation for furnishing and installing the creek crossings.

SECTION 4 – VALVE AND VALVE BOX

4.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install gate valve and valve boxes at the locations as shown on the drawings and as directed.

4.1 Materials. All gate valves shall be resilient wedge seat gate valves which fully comply with the latest revision of AWWA C509, and shall also be UL listed and FM approved. The valves shall be tested and certified to ANSI/NSF 61. The valves shall have a 250 psig working pressure. The valve type shall be NRS (non-rising stem) and the valve shall have an arrow cast on the 2” square operating nut which shows the opening direction. The direction of opening shall be shall to the left. The bolt that attaches the operating nut to the stem shall be recessed into the operating nut so as not to interfere with valve wrench operation.

The valves shall have bolts and nuts for the stuffing box and bonnet with one of the following compositions:

- a. Steel, ASTM A-307, Grade B zinc plated.
- b. Type 304 stainless steel.
- c. Type 316 stainless steel.

Valve stems shall be made of bronze ASTM B-132 alloy C67600 bar stock material. The stem shall have at least one “anti-friction” thrust washer above and below the stem collar to reduce operating torque. The design of the valve stem shall be such that if excessive input torque is applied, stem failure shall occur above the stuffing box at such a point as to enable the operation of the valve with a pipe wrench or other readily available tool. The stem material shall provide a minimum 70,000 psi tensile strength with 15% elongation and yield strength of 30,000 psi. Valves with cast stems or two piece stem collars are not acceptable.

The valves shall have a stuffing box that is o-ring sealed. Two o-rings shall be placed above and one o-ring below the stem thrust collar. The thrust collar shall be factory lubricated. The thrust collar and its lubrication shall be isolated by the o-rings from the waterway and from outside contamination providing permanent lubrication for long term ease of operation. Valves without a stuffing box are unacceptable. Valves without at least three stem o-rings are also unacceptable. The valve body, bonnet, stuffing box, and disc shall be composed of ASTM A-126 Class B grey iron or ASTM A395 or A536 ductile iron. The body and bonnet shall also adhere to the minimum wall thickness as set forth in Table 2, section 4.3.1 of AWWA C509.

The valve disc and guide lugs must be fully (100%) encapsulated in SBR ASTM D2000 rubber material. The peel strength shall not be less than 75 pounds per inch. Guide caps of an acetal bearing material shall be placed over solid guide lugs to prevent abrasion and to reduce the operating torque.

The valves shall have all internal and external ferrous surfaces coated with a fusion bonded thermosetting powder epoxy coating of 10 mils nominal thickness. The coating shall conform to AWWA C550.

Tapping valves shall have an inlet flange conforming to ANSI B16.1 Class 125 for attachment to a tapping sleeve or cross. In addition, the valve inlet flange shall have a machined projection or raised face complying with MSS SP-60 for accurate alignment to the mating recess in the tapping sleeve flange. The seat opening of the tapping valves shall be at least .30" larger than the nominal pipe size to permit full diameter cuts.

The valves shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten (10) years from the date of manufacture. The manufacturing facility for the valves must have current ISO certification.

Each valve shall have the manufacturer's initials, pressure rating, and the year in which manufactured, cast onto the body. The manufacturer shall be Mueller Co. or approved equal

Valve boxes shall be of cast iron extension type with screw or slide adjustments and flared base. The minimum thickness of metal shall be 3/16". The cover shall have the word "WATER" cast in the metal. Valve boxes shall be installed over each outside gate valve unless otherwise shown on the drawings. The boxes shall be of such length as to provide a depth of cover of not less than 30 inches over the pipe.

4.2 Installation. Valve boxes shall be set plumb and straight and with the operating nut directly in the center in thoroughly compacted earth with the top of the box level and projecting one fourth inch above paved streets and one inch above other areas. The valve boxes in unpaved areas shall have a four inch thick concrete slab three feet in diameter around and sloping away from the valve box.

4.3 Payment. The unit price bid shall constitute full compensation for furnishing and installing gate valves, valve boxes, and other related appurtenances.

SECTION 5 – FLUSH HYDRANT

5.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install the hydrants as shown on the drawings and as directed by the Engineer.

5.1 Materials. Hydrants shall meet or exceed all applicable requirements and tests of ANSI and the latest revisions of AWWA Standard C502. They shall also meet all test requirements and be listed by Underwriters Laboratories Inc. They shall also meet all test requirements and have full approval of Factory Mutual. Hydrants shall be of the compression type, opening against the pressure and closing with the pressure and shall be rated for a minimum working pressure of 250 psi. They shall have a minimum 4-1/2" main valve opening and a minimum inside lower/upper barrel diameter (I.D.) of 6" to assure maximum flow performance. All hydrants shall be three-way in design, having one 4-1/2" pumper nozzle and two 2-1/2" hose nozzle(s). Nozzles shall thread counterclockwise into hydrant barrel utilizing "o" ring seals. A suitable nozzle lock shall be in place to prevent inadvertent nozzle removal.

The hydrant bonnet shall be attached to the upper barrel by not less than eight bolts and nuts and sealed by an "o" ring. The bonnet assembly shall provide an oil reservoir and lubrication system that automatically circulates lubricant to all stem threads and bearing surfaces each time the hydrant is operated. This lubrication system shall be sealed from the waterway and any external contaminants by use of "o" ring seals. An anti-friction washer shall be in place above the thrust collar to further minimize operating torque. The oil reservoir shall be factory filled with a low viscosity, FDA approved non-toxic oil lubricant which will remain fluid through a temperature range of -60⁰ F. to +150⁰ F.

The operating nut shall be a one piece design, pentagon/square in shape manufactured of ASTM B-584 bronze. The operating nut shall be affixed to the bonnet by means of an ASTM B-584 bronze hold down nut. The hold down nut shall be threaded into the bonnet in such a manner as to prevent accidental disengagement during the opening cycle of the hydrant. The use of Allen head set screws as a means of retention is unacceptable. A resilient weather seal shall be incorporated into the hold down nut, for the purpose of protecting the operating mechanism from the elements. The direction of the opening shall be as specified by the counterclockwise. An arrow shall be cast on the bonnet flange to indicate the opening direction.

Hydrants shall be a "traffic-model" having upper and lower barrels joined at the ground line by a separate and breakable "swivel" flange providing 360° rotation of upper barrel for proper nozzle facing. This flange shall employ not less than eight bolts. The safety flange segments shall be located under the upper barrel flange to prevent the segments from falling into the lower barrel when the hydrant is struck. The pressure seal between the barrels shall be an "o" ring. The proper ground line shall be cast clearly on the lower barrel and shall provide not less than 18" of clearance from the centerline of the lowest nozzle to the ground.

The operating stem shall consist of two pieces, not less than 1 1/4" diameter (excluding threaded or machined areas) and shall be connected by a stainless steel safety coupling. The safety coupling shall have an integral internal stop to prevent the coupling from sliding down into the lower barrel when the hydrant is struck. Screws, pins, bolts, or fasteners used in conjunction with the stem couplings shall also be stainless steel. The top of the lower stem shall be recessed 2" below the face of the safety flange to prevent water hammer in the event of a "drive over" where a vehicle tire might accidentally depress the main valve. The lower barrel shall be an integrally cast unit. The use of threaded on or mechanically attached flanges is deemed unacceptable. The hydrant bury depth shall be clearly marked on the hydrant lower barrel.

Composition of the main valve shall be a molded rubber having a durometer hardness of 95 +/- 5 and shall be reversible in design to provide a spare in place. Plastic (polyurethane) main valves are unacceptable. The main valve shall have a cross section not less than 1".

Hydrants shall be equipped with (2) two drain valves which drain the barrel when the hydrant is closed and seal shut when the hydrant is opened. These drain valves shall be an integral part of the one piece bronze upper valve plate. They shall operate without the use of springs, toggles, tubes, levers or other intricate synchronizing mechanisms. The upper valve plate, seat ring and drain ring (shoe bushing) must be ASTM B-584 bronze and work in conjunction to form an all bronze drain way. A minimum of two (2) internal and two (2) external drain openings are required. Drains ported through an iron shoe must be bronze lined. The bronze seat ring shall thread into a bronze drain ring (or shoe bushing) providing a bronze to bronze connection. Seat rings shall be "o" ring pressure sealed

The interior of the shoe including the lower valve plate and stem cap nut shall have a protective coating that meets the requirements of AWWA C-550. If a stem cap nut is utilized, it must be locked in place by a stainless steel lock washer or similar non-corrosive device that will prevent the cap nut from backing-off during normal use.

The hydrant shall be coated with a prime coat and two finish coats of paint as suggested by the manufacturer and approved by the Engineer. The shop drawings shall indicate the coating and color proposal.

Hydrants shall be warranted by the manufacturer against defects in materials or workmanship for a period of ten years (10) from the date of manufacture. Hydrants shall be Mueller Super Centurion 250 or approved equal.

Hydrant adapters shall be the swivel by solid adapter with swivel gland type as manufactured by Tyler Pipe/Union Foundry Company, or approved equal.

Foster adapters shall be constructed of ductile iron and comply with applicable AWWA Standards and shall be lined and coated in accordance with AWWA C104 and C110.

They shall be as manufactured by Infact Corporation, or approved equal and shall be designed for a working pressure of 250 psi.

Mechanical Joint restraints shall be the Grip Ring® Pipe Restrainer as manufactured by Romac Industries, Inc., or approved equal.

The hydrant assembly shall be shown as on the details/drawings and as outlined in the Bid Schedule.

5.2 Installation. The hydrants shall be set in accordance with the detailed drawings complete with gate valve and connecting pipe. The hydrant shall be installed perpendicular to the surrounding ground surface and the hydrant riser shall be completely buried. The depth of bury shall be the same as the adjoining water line. The shoe of the hydrant shall be encased in Class B concrete and the concrete shall extend to undisturbed earth. Gravel shall be placed around the hydrant on top of the concrete thrust restraint and at the weep hole a minimum depth of twelve inches in depth. Select earth backfill shall be compacted to fill the remaining excavated void and the surface shall match the surrounding surface. The hydrant shall be secured to the companion gate valve by means of a hydrant adapter and pipe restrainer or by other approved means. The hydrant adapter shall be the swivel by solid adapter with swivel gland type. The direct connection of mechanical joint (MJ) fittings between the valves and tee shall be made using Foster adapters where flush hydrants are indicated on the Construction Drawings.

5.3 Payment. The unit price bid shall constitute full compensation for furnishing and installing the hydrant, gate valve, up to ten feet of water line, and any associated pipe fittings required to install the hydrant to the main water line.

SECTION 6 – BLOWOFF ASSEMBLY

6.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install the Blowoff Assemblies as shown on the drawings and as directed.

6.1 Materials. Blowoff Assemblies shall consist of the valve, pipe, and fittings in accordance with these specifications and the corresponding drawings. The gate valve and piping shall be the same size and pressure class as the line it is connected to unless otherwise noted.

6.2 Installation. The Blowoff Assembly shall be installed at the locations as shown on the drawings and as outlined on the detail drawings.

6.3 Payment. The unit price bid shall constitute full compensation for the furnishing and installation of each Blowoff Assembly to include one gate valve, piping, blocking, valve box, fittings and gravel.

SECTION 7 - CONNECTION

7.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to connect and disconnect water mains as shown on the drawings and as directed.

7.1 Materials. The connections and disconnects shall be performed by the use of ductile iron mechanical joint fittings, approved tapping valves and sleeves, and water main pipe as shown on the drawings described elsewhere in these technical specifications. Concrete for thrust restraint shall be Class B concrete and sack-crete shall not be allowed.

7.2 Installation. Unless otherwise noted on the plans, connections shall be made with a tapping sleeve and valve and done so in accordance with the Owners schedule of operation. Once the main line has been tapped the new section of water main shall be valved off from the rest of the system by closing the tapping valve. The tapping valve shall remain closed until the Engineer has been satisfied that the new water main has been installed correctly, met the requirements of the hydrostatic test, been sanitized in accordance with the regulatory requirements, and any water main to be abandoned has been disconnected from the water system. The disconnection of a water main that is to be abandoned shall be accomplished by installing a blind flange at the point of abandonment and secured by means of a concrete thrust block. In the event where the thrust block shall be installed in the area of the abandoned water main a minimum three foot section of the abandoned water main shall be removed and the void replaced with concrete.

7.3 Payment. The unit price bid shall constitute full compensation for furnishing and installing the connections including any abandonment or disconnections of existing water mains. This shall include all fittings but water mains and gate valves shall be paid as per the bid schedule for those respective items.

SECTION 8 -DIRECTIONAL DRILLING / BORING

8.0 Scope of Work. It is intent of this specification to define the acceptable methods and materials for installing water lines by the horizontal directional drilling method and the requirements for high density polyethylene (HDPE) pipe installed by horizontal directional drilling, directional boring, guided boring or in open cut trenches.

8.1 Requirements. Contractor shall provide HDPE pipe conforming to all standards and procedures, and meeting all testing and material properties as described in this specification for installation by horizontal directional drilling.

The estimated length of each directional bore is indicated on the plan sheets. This stated length shall be the footage used for the contractors payment calculation regardless of the actual length required for installation.

Contractor shall be responsible for all installation processes and procedures associated with the installation by horizontal directional drilling in accordance with this specification.

8.2 Installation Plan. At least 7 days prior to mobilizing equipment, Contractor shall submit his detailed installation plan to the Engineer.

The plan shall also include a listing of major equipment and supervisory personnel and a description of the methods to be used.

8.3 Variations in Plan or Profile. The Contractor may request changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points. Proposed changes shall be submitted in writing to the Engineer and receive approval of the Engineer prior to construction.

8.4 Alignment. The proposed plan and profile installation locations are based on alignments to accommodate acquired right-of-way, to avoid obstructions, and to properly maintain operation flow velocities.

8.5 Qualifications. Directional drilling and pipe installation shall be done only by an experienced Contractor specializing in directional drilling and whose key personnel have at least five (5) years experience in this work. Furthermore, the Contractor shall have installed directional drilled pipe at least as large as 18 inches in diameter, have performed crossings at least 650 feet in length, and successfully installed at least 2000 feet in length.

8.6 Products. High Density Polyethylene (HDPE) pipe accordance to these specifications shall be used in HDD installations. All piping system components shall be the products of one manufacturer and shall conform to the latest edition of ASTM D2447, ASTM D3350, and ASTM F714 for HDPE.

Pipe shall conform to the dimensionality and general characteristics of the mainline carrier piping to which it will be connected to. The inside diameter of the pipe to be used in HDD applications shall be equal to or greater than that of the mainline carrier piping.

8.7 Piping. Piping shall be extruded from a polyethylene compound and shall conform to the following requirements:

The polyethylene resin shall meet or exceed the requirements of ASTM D3350 for PE 3408 material with a cell classification of 335434C, or better. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black, well dispersed by precompounding in a concentration of not less than 2 percent.

The maximum allowable hoop stress shall be 800 psi at 73.4 degrees F.

The pipe manufacturer shall be listed with the Plastic Pipe Institute as meeting the recipe and mixing requirements of the resin manufacturer for the resin used to manufacture the pipe in this project.

Joining shall be performed by thermal butt-fusion in accordance with the manufacturer's recommendations.

8.8 Concrete Restraint Wall. The contractor shall install a concrete restraint wall on each end of the HDPD piping. The wall should be constructed as shown in the miscellaneous detail drawings. Details on concrete construction are included elsewhere in these specifications.

8.9 Execution. All HDD pipes shall be cut, fabricated, and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying, and pulling of HDD pipe shall be accomplished by personnel experienced in working with HDD pipe being used. The pipe supplier shall certify in writing that the Contractor is qualified to join, lay, and pull the pipe or representative of the pipe manufacturer shall be on site to oversee the pipe joining. Expense for the representative shall be paid for by the Contractor.

8.10 Transportation and Unloading. All pipe shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Care shall be taken during transportation of the pipe to ensure that it is not cut, kinked, or otherwise damaged. Any pipe damaged in shipment shall be replaced as directed by the owner or engineer.

Each pipe shipment should be inspected prior to unloading to see if the load has shifted or otherwise been damaged. Notify owner or engineer immediately if more than immaterial damage is found. Each pipe shipment should be checked for quantity and proper pipe size, color, and type.

Pipe should be loaded, off-loaded, and otherwise handled in accordance with AWWA M23, and all of the pipe supplier's guidelines shall be followed. Off-loading devices such as chains, wire rope, chokers, or other pipe handling implements that may scratch, nick, cut, or gouge the pipe are strictly prohibited.

During removal and handling, be sure that the pipe does not strike anything. Significant impact could cause damage, particularly during cold weather.

If appropriate unloading equipment is not available, pipe may be unloaded by removing individual pieces. Care should be taken to insure that pipe is not dropped or damaged. Pipe should be carefully lowered, not dropped, from trucks.

8.11 Handling and Storage. Any length of pipe showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work. Damaged areas, or possible areas of damage may be removed by cutting out and removing the suspected incident fracture area. Limits of the acceptable length of pipe shall be determined by the owner or engineer. Any scratch or gouge greater than 10% of the wall thickness will be considered significant and can be rejected unless determined acceptable by the owner or engineer.

Pipe shall be stored and stacked per the pipe supplier's guidelines. Pipe lengths should be stored and placed on level ground. Pipe should be stored at the job site in the unit packaging provided by the manufacturer. Caution should be exercised to avoid compression, damage, or deformation to the ends of the pipe. . If pipe is to be stored for periods of 1 year or longer, the pipe should be shaded or otherwise shielded from direct sunlight. Covering of the pipe which allows for temperature build-up is strictly prohibited. Pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excess heat accumulation.

The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged at night to prevent animals or foreign material from entering the pipe line or pipe section. Waterproof nightcaps of approved design may be used but they shall also be so constructed that they will prevent the entrance of any type of natural precipitation into the pipe and will e fastened to the pipe in such a manner that the wind cannot blow them loose. The practice of stuffing cloth or paper in the open ends of the pipe will be considered unacceptable.

Pipe shall be handled and supported with the use of woven fiber pipe slings or approved equal. Care shall be exercised when handling the pipe to not cut, gouge, scratch or otherwise abrade the piping in any way. Where possible, the pipe shall be raised and supported at a suitable distance back from the open end such that the open end will be below the level of the pipe at the point of support.

8.12 Installation.

The Contractor shall install the pipelines by means of horizontal directional drilling. The Contractor shall assemble, support, and pretest the pipeline prior to installation in the directional drill tunnel.

Horizontal directional drilling shall consist of the drilling of a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directionally drilled installation will be determined by the Contractor, subject to the requirements of these Specifications.

The Contractor shall prepare and submit a plan to the Engineer for approval for insertion of the HDD pipe into the opened bore hole. This plan shall include pullback procedures, ballasting, use of rollers, side booms and side rollers, coating protection, internal cleaning, internal gauging, hydrostatic tests, dewatering, and purging.

The required piping shall be assembled in a manner that does not obstruct adjacent roadways or public activities. The Contractor shall erect temporary fencing around the entry and exit pipe staging areas.

8.13 Joining Pipe Sections. The joining of pipe sections shall be completed by a Fusion Technician who is fully qualified by the pipe supplier to install the HDD pipe of the type(s) and size(s) being used. Qualification shall be current as of the actual date of fusion performance on the project.

HDD pipe will be handled in a safe and non-destructive manner before, during, and after the fusion process and in accordance with this specification and pipe supplier's guidelines. The fusion process shall be performed by qualified fusion technicians, as documented by the pipe supplier. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine.

Only appropriately sized and outfitted fusion machines that have been approved by the pipe supplier shall be used for the fusion process. Fusion machines must incorporate the following elements:

HEAT PLATE - Heat plates shall be in good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

CARRIAGE – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

GENERAL MACHINE - Overview of machine body shall yield no obvious defects, missing parts, or potential safety issues during fusion.

DATA LOGGING DEVICE – An approved datalogging device with the current version of the pipe supplier’s recommended and compatible software shall be used. Datalogging device operations and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110V power source shall be available to extend battery life.

Other equipment specifically required for the fusion process shall be used as necessary. Pipe rollers shall be used for support of pipe to either side of the machine. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and /or windy weather, per the pipe supplier’s recommendations. An infrared (IR) pyrometer for checking pipe and heat plate temperatures. Fusion machine operations and maintenance manual shall be kept with the fusion machine at all times. Facing blades specifically designed for cutting HDPE pipe shall be used.

Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of HDPE. The software shall register and/or record the parameters required by the pipe supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician’s joint report.

8.14 Testing. The pipe shall be hydrostatically tested after joining into continuous lengths prior to installation and again after installation. Pressure and temperature shall be monitored with certified instruments during the test. After this test, the water will be removed with pigs. Erosion prevention procedures will be used during removal and discharge of the water. Hydrostatic testing shall be performed in accordance with Section 1 of the Specifications. All costs associated with acquiring water for testing shall be included in the established contract unit bid prices.

8.15 Tolerances. Pipe installed by the directional drilled method must be located in plan as shown on the Drawings, and must be no shallower than shown on the Drawings unless otherwise approved. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 30 feet. This “as built” plan and profile shall be updated as the pilot bore is advanced. The Contractor shall at all times provide and maintain instrumentation that will accurately locate the pilot hole and measure drilling fluid flow and pressure. The Contractor shall grant the Engineer access to all data and readout pertaining to the position of the bore head and the fluid pressures and flows.

When requested, the Contractor shall provide explanations of this position monitoring and steering equipment. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment. No information pertaining to the position or inclination of the pilot bores shall be withheld from the Engineer.

Sags in the pipeline shall not exceed 5 percent of the nominal pipe diameter. Sags will only be allowed where the entering and exiting grades are adequate to provide velocities through the sag area sufficient for moving solids. No more than (1) sag area shall occur between two (2) manholes. The alignment of each pilot bore must be approved by the Engineer before pipe can be pulled. If the pilot bore fails to conform to the above tolerances, the Engineer may, at his option, require new pilot boring to be made.

After the pipe is in place, cleaning pigs shall be use to remove residual water and debris. After the cleaning operation, the Contractor shall provide and run a sizing pig to check for anomalies in the form of buckles, dents, excessive out-of-roundness, and any other deformations. The sizing pig run shall be considered acceptable if the survey results indicate that there are no shaper anomalies (e.g. dens, buckles, gouges, and internal obstruction) greater than 2 percent of the nominal pipe diameter, or excessive ovality greater than 5 percent of the nominal pipe diameter. For gauging purposes, dent locations are those defined above which occur within a span of five feet or less. Pipe ovality shall be measured as the percent difference between the maximum and minimum pipe diameters. For gauging purposes, ovality locations are those defined above which exceed a span of five feet.

8.16 Ream and Pullback.

Reaming: Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the Contractor.

Pulling Loads: The maximum allowable pull exerted on the HDD pipelines shall be measured continuously and limited to the maximum allowed by the pipe manufacturer so that the pipe or joints are not over stressed.

Torsion and Stresses: A swivel shall be used to connect the pipeline to the drill pipe to prevent torsional stresses from occurring in the pipe. The lead end of the pipe shall be closed during the pullback operation.

Pipeline Support: The pipelines shall be adequately supported by rollers and side booms and monitored during installation so as to prevent over stressing or buckling during the pullback operation. Such support/rollers shall be spaced at a maximum of 60 feet on centers, and the rollers to be comprised of a nonabrasive material arranged in a manner to provide support to the bottom and bottom quarter points of the pipeline allowing for free movement of the pipeline during pullback. Surface damage shall be repaired by the Contractor before pulling operations resume.

The contractor shall at all times handle the HDD pipe in a manner that does not over stress the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 50% of yield stress for flexural bending of the pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the

Contractor at his expense. The Contractor shall take appropriate steps during pullback to ensure that the pipe will be installed without damage.

8.17 Handling Drilling Fluids and Cuttings.

During the drilling, reaming, or pullback operations, the Contractor shall make adequate provisions for handling the drilling fluids, or cuttings at the entry and exit pits. These fluids must not be discharged into the waterway. When the Contractor's provisions for storage of the fluids or cuttings on site are exceeded, these materials shall be hauled away to a suitable legal disposal site. The Contractor shall conduct his directional drilling operation in such a manner that drilling fluids are not forced through the sub-bottom into the waterway. After completion of the directional drilling work, the entry and exit pit locations shall be restored to original conditions. The Contractor shall comply with all permit provisions.

Pits constructed at the entry or exit point area shall be so constructed to completely contain the drill fluid and prevent its escape to the waterway. The Contractor shall utilize drilling tools and procedures which will minimize the discharge of any drill fluids. The Contractor shall comply with all mitigation measures listed in the required permits and elsewhere in these Specifications.

To the extent practical, the Contractor shall maintain a closed loop drilling fluid system.

The Contractor shall minimize drilling fluid disposal quantities by utilizing a drilling fluid cleaning system which allows the returned fluids to be used.

As part of the installation plan specified herein before, the Contractor shall submit a drilling fluid plan which details types of drilling fluids, cleaning and recycling equipment, estimated flow rates, and procedures for minimizing drilling fluid escape.

8.18 Drilling Operations.

The Contractor shall prepare a plan to be submitted for Engineer approval which describes the noise reduction program, solids control plant, pilot hole drilling procedure, the reaming operation, and the pullback procedure. All drilling operations shall be performed by supervisors and personnel experienced in horizontal directional drilling. All required support, including drilling tool suppliers, survey systems, mud cleaning, mud disposal, and other required support systems used during this operation shall be provided by the Contractor.

Drill pipe shall be API steel drill pipe, Range 2, Premium Class or higher, Grade S-135 in a diameter sufficient for the torque and longitudinal loads and fluid capacities required for the work. Only drill pipe inspected under API's Recommended Practice Specification API RP 7G within 30 days prior to start and certified as double white band or better shall be used.

A smoothly drilled pilot hole shall follow the design centerline of the pipe profile and alignment described on the construction drawings.

Between the entry or exit point the Contractor shall provide and use a separate steering system employing a ground survey grid system, such as "TRU-TRACKER" or equal wherever possible. The exit point shall fall within a rectangle 5 feet wide and 10 feet long centered on the planned exit point.

During the entire operation, waste and leftover drilling fluids from the pits and cuttings shall be dewatered and disposed of in accordance with all permits and regulatory agencies requirements. Remaining water shall be cleaned by Contractor to meet permit requirements.

Technical criteria for bentonite shall be as given in API Spec. 13A, Specification of Oil Well Drilling Fluids Material for fresh water drilling fluids. Any modification to the basic drilling fluid involving additives must describe the type of material to be used and be included in Contractor's drilling plan presented to the Engineer. The Owner retains the right to sample and monitor the waste drilling mud, cuttings and water.

8.19 Environmental Provisions.

The Horizontal Directional Drilling operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to the adjacent creek or land areas involved during the construction process. The Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the immigration of drilling fluids and/or groundwater.

The Contractor shall visit the site and must be aware of all structures and site limitations at the directional drill crossing and provide the Engineer with a drilling plan outlining procedures to prevent drilling fluid from adversely affecting the surrounding area.

The general work areas on the entry and exit sides of the crossing shall be enclosed by a berm to contain unplanned spills or discharge.

Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desalter/desander, centrifuges, material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with the drilling program. The cutting and excess drilling fluids shall be dewatered and dried by the Contractor to the extent necessary for disposal in offsite landfills. Water from the dewatering process shall be treated by the Contractor to meet permit requirements and disposed of locally. The cuttings and water for disposal of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by the Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills.

Waste drilling mud and cuttings shall be dewatered, dried, and stock piled such that it can be loaded by a front end loader, transferred to a truck and hauled offsite to a suitable legal disposal site. The maximum allowed water content of these solids is 50% of weight. Due to a limited storage space at the worksite, dewatering and disposal work shall be concurrent with drilling operations. Treatment of water shall satisfy regulatory agencies before it is discharged.

8.20 Payment. Payment shall be included in the payment for the work as shown on the plan sheets and to which it is subsidiary in the Bid Schedule. The estimated length of each directional bore is indicated on the plan sheets. This stated length shall be the footage used for the contractors payment calculation regardless of the actual length required for installation. Where applicable, the unit price for directional boring shall include labor and materials for installation of both the casing and carrier pipe.

SECTION 9 - METER SETTING & METER RECONNECTION

9.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install the meter settings, meter reconnects, and service tubing as shown on the drawings and as directed.

9.1 Materials. The meter settings shall consist of a saddle, corporation stop, service tubing, coppersetter, meter, meter box, and appurtenances. The corporation stops/ball valves shall be B11-333 as manufactured by Ford with a pack joint for polyethylene pipe. Pack joint inlet couplings shall be C14-33-Q as manufactured by Ford for polyethylene pipe. Saddles shall be equal to the Ford S70 Series with a hinged pin for PVC and 202 Series for ductile iron. The coppersetter shall be equal to the Ford 70 Series Coppersetter VHH72-7W-11-33 with a seven inch rise for a 5/8 inch by 3/4 inch meter and complete with an inlet key valve and outlet dual check valve. A tandem coppersetter to accommodate a pressure reducer and meter shall be used where specified. The pressure reducing valve shall be Mueller, Model No. H-9300 No. 3, or approved equal with a bronze strainer. Each regulator is to have an adjustable pressure range of 60-125 psi and to be set at 70 psi.

All meters shall be a displacement type magnetic drive cold water meter complying with ANSI/AWWA Standard C700, latest revision. All Meters shall meet or exceed the American Water Works Association Standard C707-R92 for Encoder-Type Remote-Registration systems for Cold Water Meters when equipped with an open architecture radio MIU. They shall be Hersey 400 PD as manufactured by Mueller Systems.

The size of the meter shall be 5/8 inch by 3/4 inch or as shown otherwise on the Plans. The meter shall have a straight reading dial in U. S. gallons and must have a working pressure of 150 psi. Serial numbers shall be stamped on both the lid and meter body. The register shall be a true absolute encoder register that provides direct electronic transfer of meter reading information to any number of AMR device options. Minimally, a Touch Pad and Radio MIU device shall read the encoder register. The unit shall also include a high performance, transmitter designed for mobile AMR. It shall be compatible with the Owners current radio read metering system and shall transmit an encoded serial number, water consumption, leak detection information and status data via radio frequency.

The meter boxes shall be black plastic (HDPE) rectangular boxes and shall be 20-inches wide x 32-inches long x 24-inches deep as manufactured by Highline Products, Inc., or approved equal. Meter box settings shall be prefabricated with the copper-setters and fittings as specified ready for connection at the inlet and outlet ends. Meter boxes shall include a single piece flat HDPE lid.

Service tubing shall be 3/4 inch polyethylene or type K copper tubing with a minimum pressure rating of 200 PSI. One-inch and two-inch service lines shall be PVC, PE, or K copper with a minimum pressure rating of 200 PSI. Insert stiffeners shall be used when

using polyethylene service tubing and shall be Series 50 or 70 as manufactured by Ford Meter Box Company, Inc., or approved equal.

9.2 Installation. Meters shall be set as shown on the detail drawings with backfill neatly compacted in place. The top of the meter box shall be set 1/2 inch above grade. The meter shall be at least 18 inches below the ground surface.

Service line reconnects shall consist of reestablishing service on the customer side of a new meter. New service line shall be installed to connect the new water main to the existing service line at the closest location possible. The new and existing service line shall be connected using an approved brass compression coupling.

Where applicable, the contractor is also responsible under this bid item for the abandonment of the existing meter settings. This includes disconnection at the direction of the engineer, removing all remnants of the meter box/vault and all other related appurtenances to a point two feet below existing ground level. Any void created by removal of items shall be backfilled with the adjacent area being restored to match the surrounding ground conditions including any incidental pavement replacement which may be required. All existing interior piping, meters, valves, and other appurtenances shall be removed and delivered to the owner prior to demolition and removal of the existing meter box/vault.

Meter reconnects shall consist of reestablishing service to an existing meter after the new water main has been installed. New service line shall be installed to connect the new water main to the existing service line at the closest location possible. The new and existing service line shall be connected using an approved brass compression coupling.

9.3 Payment. The unit price bid shall constitute full compensation for furnishing and installing the meter setting, or meter reconnect, with the above described appurtenances. Service tubing shall be paid by the linear foot. Installation of the service tubing through or beneath paved surfaces shall be considered as an incidental cost for the installation of the service tubing and there shall be no compensation for pavement replacement.

SECTION 10 - STONE AGGREGATE

10.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install the stone aggregate as shown on the drawings and as directed.

10.1 Materials. The stone aggregate shall be dense grade stone #9 or as directed by the Engineer or as otherwise shown. The stone shall be free of dirt, sand, trash, debris, and free water.

10.2 Installation. The Contractor shall install the aggregate at the locations as shown on the drawings which includes any trenches where the water main or service line disturbs any roadway. This also includes any areas where casing pipe is installed in open trenches or the locations where a bore or receiving pit was excavated. Stone shall be backfilled to top of grade where any trenches disturb paved areas. The Engineer may limit the amount of stone to be placed upon determination that the application is excessive.

10.3 Payment. Stone aggregate shall be incidental to the installation of the water mains, and other appurtenances. There shall be no separate pay item for stone aggregate.

SECTION 11- PAVEMENT REPLACEMENT

11.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to install concrete and bituminous pavement replacement where pavement is disturbed during construction.

11.1 Materials. Pavement replacement for bituminous surfaces shall consist of a prime coat of emulsified asphalt, Class 1 Bituminous Binder, and Class 1 Bituminous Asphalt as specified by the Kentucky Bureau of Highways latest specifications.

Pavement replacement for concrete surfaces shall consist of Class A concrete including reinforcement consisting of No. 4 reinforcing bars placed on twelve inch centers in both directions or otherwise as directed by the engineer.

Support backfill shall be No. 9 stone, dense grade aggregate or flowable fill as per the detailed drawings and specifications herein.

11.2 Installation. Immediately upon placement of the water lines and appurtenances the disturbed traveled way shall be backfilled with No. 9 stone or dense grade aggregate extending from the top of the pipe up to the traveled way surface. The area of disturbance will be repaved once settlement has subsided granted that water line installation, testing and all other cleanup has been completed as dictated by the Engineer.

In preparation for the installation of pavement replacement, the top twelve inches of stone backfill shall be compacted with a mechanical tamping machine. The use of rubber tire or track driven equipment such as backhoes or dozers shall not satisfy the requirement for final compaction.

11.2.1 State Highway Pavement Replacement. Where bituminous pavement replacement is required due to a disturbance of a Kentucky State Highway, the trench shall be backfilled with #9 stone up to 9-inches below the top of the existing pavement. The stone shall be properly compacted and capped with a 6-inch layer of KYDOT approved flowable fill. A 3-inch layer of temporary asphalt pavement shall then be installed flush with the level of the existing pavement. Upon completion of the water line installation, testing and all other cleanup, the Contractor shall mill the temporary asphalt and the existing asphalt in preparation for final pavement replacement. The total width of final pavement replacement shall be a minimum of three feet from the each edge of temporary pavement. Following milling of existing and temporary pavement, the Contractor shall replace void with an approved prime coat of emulsified asphalt applied at a rate of 0.35 gallons per square yard and a 3-inch finish coat asphalt pavement. The pavement shall be rolled to a smooth finish and provide a gentle transition to the existing pavement. A detail illustration regarding the methods described has been included in the standard drawings.

11.2.2 Full Width Pavement Replacement. Where full width bituminous pavement replacement is required, the pipe trench shall be backfilled as described herein. Upon completion of the water line installation, testing and all other cleanup, the Contractor shall install full width pavement replacement in all areas indicated on the plans. In areas where existing curbing is in place, the contractor shall mill the existing paved surface before new asphalt pavement overlay is installed. In areas where curbing is not in place, the contractor shall install asphalt overlay directly atop existing pavement. An approved prime coat of emulsified asphalt applied at a rate of 0.35 gallons per square yard shall be applied in preparation of for installation of the asphalt overlay. The finish coat of asphalt pavement shall be a minimum of 2-inches across the entire roadway cross-section. The pavement shall be rolled to a smooth finish and provide a gentle transition to all existing pavement.

11.2.3 Incidental Pavement Replacement. Unless specifically noted otherwise, pavement replacement shall be incidental to the cost of installing the water line. This includes all driveways, parking lots, city street crossings, and all other locations where state highway or full-width pavement replacement isn't specifically noted on the plans. Where incidental pavement replacement, including partial pavement replacement, is required, the pipe trench shall be backfilled as described herein. Upon completion of the water line installation, testing and cleanup, the Contractor shall install pavement replacement in all areas where the existing pavement has been disturbed. The total width of pavement replacement shall extend a minimum of three feet outward from each edge of the pipeline trench. Partial pavement replacement will be required when pavement is disturbed along the edge of a paved area. In partial pavement replacement situations the replacement pavement shall extend into the paved area a minimum three feet and toward the pipeline trench to a point equal to that of the existing pavement. In both cases, the transition from the replacement pavement and the existing pavement shall be saw cut with a neat and clean appearance. All existing pavement material within the total width of the pavement replacement area shall be removed prior to installation of new pavement.

Where concrete pavement replacement is required, reinforcing steel shall be placed within three inches of the surface of the existing concrete and it shall be supported with CMU support pieces. The area to be repaved shall be formed to coincide with the adjoining concrete surfaces and the edges of the repaved area shall be smooth and uniform. The concrete shall be placed on top of the compacted gravel at a minimum depth of six inches. The surface finish shall match that of the adjoining concrete. The transition to all adjoining pavement shall be smooth and uniform such that ponding will not occur.

Where bituminous pavement replacement is required the base shall be prepared with a prime coat of emulsified asphalt applied at a rate of 0.35 gallons per square yard. A 2-inch thick layer of bituminous binder shall then be placed above the prime coat. The final coat of bituminous concrete shall then be placed at a depth of 1 1/2 inches. The final coat of pavement shall be rolled to a smooth finish and provide gentle transitions to all existing pavement.

A detail illustration regarding the methods described has been included in the standard drawings.

11.3 Final Acceptance. All pavement replacement shall be inspected prior to the final warranty period expiration. Any pavement replacement found to be deteriorated or not uniform due to settlement of the disturbed subsurface shall be repaired before the work is recommended for final acceptance. It is anticipated that this inspection shall take place on or about the eleventh month of the one year warranty period. The warranty period for all pavement replacement shall not commence until the final warranty period for the project in its entirety is initiated.

11.4 Payment. The unit price bid shall constitute full compensation for furnishing and installing pavement replacement as it is outlined in the bid schedule and specifications herein. Unit measurement of all pavement replacement not considered incidental shall be in linear feet, with the measurement being taken parallel to the corresponding pipeline trench

All disturbed pavement which is not specifically indicated on the plans as receiving state highway or full-width pavement replacement shall be considered incidental to the cost of installing the water lines and shall receive no additional payment.

SECTION 12 - EXPLORATION

12.0 Work Included. Under this item the Contractor shall provide all labor, tools, equipment, and materials to explore for existing water lines and appurtenances that are not as shown on the Drawings.

12.1 Description of Work. In those locations where the existing water lines and appurtenances are not in the locations as shown on the Drawings the Contractor shall explore for the utility at the direction of the Engineer. The Contractor shall utilize all equipment necessary to search for the water line or appurtenance and any disturbance of other utilities shall be the responsibility of the Contractor. Any other work or disturbance created by the Contractor as a result of the exploration shall be incidental to this item.

In locations where new water lines are to be installed parallel to existing lines, the contractor shall locate existing water lines in 100 foot intervals. This particular requirement shall be considered **incidental** to the installation of the water lines and it **shall not be included** in the calculation of this pay item.

12.2 Payment. The unit price bid shall constitute full compensation for the exploration of the water lines and appurtenances. The Resident Engineer shall approve the Contractor to initiate and terminate the exploration and the Resident Engineer shall monitor the amount of time in 15 minute increments.

SECTION 13 – BOOSTER PUMP STATION REHABILITATIONS

13.0 Work Included. Under this item, the Contractor shall provide all labor, tools, equipment, and materials to complete the booster pump station rehabilitations as shown on the Drawings and as specified herein.

13.1 Demolition & Removal. The contractor shall be responsible for the demolition and removal of the existing equipment and appurtenances scheduled to be replaced. This work shall include all components contained within and external to the existing facility as shown on the plans.

There will be active equipment within the project area as indicated on the drawings. It is essential that these facilities remain intact and in service during the proposed demolition. Consequently, the contractor shall exercise due concern for the operation of these facilities and shall diligently direct all his activities toward maintaining continuous operation of the existing facilities and minimizing operational inconvenience.

13.1.1 Examination of Site. The Contractor shall examine the drawings, visit the site and determine for himself the extent of the work, the extent of work affected therein and all conditions under which he is required to perform the various operations. It is highly recommended that prior to presentation of Bid Proposal, the bidder or qualified representative of the bidder visit the project site and review the conditions in the field.

13.1.2 Execution. The Contractor shall not proceed with the demolition and removal of any equipment without approval from both the Owner and Engineer. Furthermore, the Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires or pipes running to or through the project site. Copies of said notices shall be submitted to the Engineer. Contractor shall notify utility companies or local authorities furnishing water, electrical, or telecom services to remove any equipment owned by them in structure to be demolished and to remove, disconnect, cap or plug their services to facilitate demolition.

The Contractor shall maintain existing utilities scheduled to remain in service and protect against their damage during demolition operations. Existing utilities serving occupied or operational facilities shall not be interrupted except when authorized by Engineer. The Contractor shall provide temporary services as required during interruptions to existing utilities. The Contractor shall be solely responsible for making all necessary arrangements in conjunction with the discontinuance or interruption of any public or private utilities or services under the jurisdiction of outside utility companies.

13.1.3 Ownership of Materials. The Owner will retain all salvageable or useable material or equipment. Any and all materials not retained by the Owner shall become the Contractor's property and shall be removed off site. The sale of removed items on-site is prohibited by the Owner; however the off-site sales of salvageable material by the Contractor are encouraged.

13.1.4 Disposal of Materials. All materials and debris resulting from the demolition operations shall be disposed of by the Contractor at locations outside the project site in a manner that will comply with all local, State and Federal regulations and as per OSHA (29CFR192663 and 354) and EPA Regulations.

A suitable disposal site shall be arranged for and secured by the Contractor, and he shall assume full responsibility for acceptable disposal of the material. Final acceptance of the work will not be made until the disposal areas are in acceptable condition with respect to the Contractor's obligations as expressed above. The Contractor shall pay for any required permits or dumping fees.

The Contractor shall provide the Owner with information and evidence concerning disposal details and arrangements. Salvaged materials may be stored on the site temporarily, but not beyond seven days from the time of removal from their original position.

13.2 Piping.

13.2.1 Piping & Fittings. Unless otherwise shown on the plans, all piping 3-inches & greater in diameter shall be flanged ductile iron designed in accordance with AWWA C150 (ASA A21.50) and for the conditions as stated in these specifications and the pressure rating for the pipe shall be 350 psi. In addition, all ductile iron pipe shall conform to AWWA C-151 (ASA A21.51). Pipe shall be cement lined in accordance with AWWA C104 (ASA A21.4) and all exposed pipe and fittings shall have a shop prime coat applied that is compatible with subsequent field enamel paint coats.

Ductile iron flanged fittings with appropriate adapters shall be used. Fittings shall comply with AWWA C-110 and shall be manufactured for the size and pressure class of the line on which they are used. Compact fittings are acceptable and they shall conform to the latest AWWA specifications.

The specified thickness will be determined for the given internal and external loading requirements in accordance with ASA A21.50 and will be shown on the drawings or the bid form. The net weight, class or nominal thickness and sampling period shall be marked on each pipe.

All piping and equipment shall be equipped with ANSI Standard B16.1, Class 125 flanges. Flanged connections shall include "specially designed gaskets" rated for high pressure service up to 350 psi. Flange gaskets shall be furnished of high-quality black, molded SBR rubber with required properties per ANSI/AWWA C111/A21.11 and be ANSI/NSF Standard 61 certified for contact with potable water.

Unless otherwise shown on the plans, all station piping less than 3-inches in diameter shall be threaded ductile iron meeting ASTM A-536, grade 65-45-12, with minimum wall thickness equal to 0.25" and diameters equal to IPS size pipe. Threads shall be NPT per ANSI B1.20.1 standards. Where applicable, piping shall use make use of threaded flanges to facilitate an appropriate connection to flanged equipment.

13.2.2 Static and Sensing Lines. All gauge, switch and transmitter sensing lines shall be minimum 3/4" OD Type K rigid copper tube and fittings with 95-5 Tin-Antimony soldered joints. Sensing lines shall run from the sensing point and a ball valve to the point of device mounting. The alignment and organization of the sensing lines shall be straight runs with 90 degree fittings and be continuously rising.

Near connection to sensing point and gauge plate assembly, sensing lines shall be constructed using Red Brass fittings and nipples as indicated on the detailed drawings. Red Brass piping shall meet ASTM B43 and ASTM B687 standards and threads shall be NPT per ANSI B1.20.1 standards. A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

As shown on the plans, a three channel low profile cable protectors with standard ramps shall be used to protect sensing lines fastened to the floor. The protectors shall be of a low profile design (1.25 " or less) and utilize "Dog-Bone" type modular interlocking connectors and feature standard ramps to prevent a tripping hazard. Access shall be via a hinged lid for easy cable placement. They should be of polyurethane construction with a five bar tread plate surface for maximum traction. Cable protectors shall be manufactured by Checker Industrial Safety Products, Guard Dog Model GD3x75-ST-B/B or approved equal.

13.2.3 Flange Coupling Adapter. Restrained type Uni-Flange or a flanged coupling adapter (FCA) shall be used as shown on the plans. Adapters shall incorporate a ductile iron mechanical joint by flange oversized sleeve and wedge-action restraining gland manufactured in accordance with ASTM A536, Grade 65-45-12. The flanged end must conform to Class 125/150 and ANSI/AWWA C115/A21.15 drill pattern. The mechanical joint end must be in accordance with ANSI/AWWA C111/A21.11, C110/A21.10 and C153/A21.53. Adapter must be installed using a wedge-action restraining gland suitable for the adjoining pipe material. The adapter shall offer a maximum water working pressure rating of 350 psi and provide a minimum 2:1 factor of safety. Model SFA or approved equal.

Flange Coupling Adaptors shall be as manufactured by Sigma Corp., Model SFA, or approved equal.

13.2.4 Tapping Sleeves. Tapping sleeves shall meet applicable AWWA C223 standards and be certified to NSF/ANSI 61-G. Valve body shall be constructed of carbon steel per ASTM A283 C. The neck shall be carbon steel per ASTM A53 and the flange shall be carbon steel A36. The flange drilling shall be per AWWA C207 class D (ANSI 150# bolt pattern). The gasket shall be NSF-61 approved, Nitrile (Buna N) compounded to resist oil, alkalis, most (aliphatic) hydrocarbon fluids, water and many chemicals. The gasket temperature rating shall be -20°F to +180°F. The nuts and bolts shall be high strength low alloy steel per ASTM A307 (ANSI 21.11) standards. The nuts shall be semi-finished hex head. The bolts shall be replaceable. The tapping sleeve shall be factory coated with a fusion bonded Flexi-Coat epoxy per AWWA C213, coated to an average of 12-mil thickness. A 3/4" test outlet and plug shall be provided. The plug shall be 3/4" carbon steel with square head and fusion bonded epoxy coating.

Tapping Sleeves shall be as manufactured by Smith-Blair, Inc., Series 622, or approved equal.

13.2.5 Saddles. Service saddle shall have a ductile iron body per ASTM A536. The saddle shall have an outlet for the service connection that will allow an NPT or AWWA thread to be tapped into it. The saddle shall have two carbon steel bales per ASTM A108 (C1018) and be electro-galvanized with dichromate seal per ASTM B633. The nuts shall be heavy hex steel A563 with an electro-galvanized finish and a di-chromate seal per ASTM B633. The washers shall be carbon steel per ASTM A108 and electro-galvanized with dichromate seal per ASTM B633. The gasket shall have a hydro-mechanical lip that seals better on the pipe surface as the line content pressure increases. The gasket shall be made of Nitrile (BunaN) and NSF 61 listed. The gasket shall be compounded to resist: water, oil acids, alkalis, most (aliphatic) hydrocarbon fluids and many other chemicals. The gasket shall have a temperature range of -20°F to +180°F. The gasket shall be fully cemented into a cavity to hold it in place around the outlet during installation.

Saddles shall be as manufactured by Smith-Blair, Inc., Series 313 or approved equal.

13.3 Valves & Appurtenances.

13.3.1 Butterfly Valves. Butterfly valves shall be of the tight closing, rubber seated type and fully comply with the latest revision of AWWA Standard C504, Class as required, and ANSI/NSF 61. Valves shall be bubble-tight at rated pressure class in either direction, and shall be satisfactory for applications, involving throttling service and for applications requiring valve actuation after long periods of inactivity. Valve discs shall rotate 90° from the full open position to the tight shut position. Regardless of valve size, angular disposition of disc can be up to 1" off center without leakage.

The butterfly valve shall be a high performance butterfly valve. Valve body shall be wafer style, for ANSI Class 150 flange bolting and have a metal reinforced, dovetail seat for drip-tight, bi-directional shutoff. The valve stem shall be one piece connected to the disk by stainless steel torque plugs with upper and lower RTFE inboard stem bearings and heavy duty upper stem bushing. The valve body shall be cast iron with stainless steel disk and stem, EPDM seat, polyester upper stem bushing and NBR stem seal.

Valve bodies shall be full-lug wafer type constructed of carbon steel conforming to ASTM A216. Valve discs shall be constructed of Type 316 stainless steel conforming to ASTM A351. The valve stem shall be one piece connected to the disk by stainless steel torque plugs with upper and lower RTFE inboard stem bearings and heavy duty upper stem bushing. Valve shafts shall be constructed of 18-8 Type 304 or Type 316 stainless steel. Valve seats shall have a metal reinforced, dovetail seat constructed of EPDM or other approved synthetic compound. Valves shall have seats that are simultaneously molded in, vulcanized and bonded to the body. Seat bond must withstand 75 lbs. pull under test procedure ASTM D-429, Method B.

Valves shall be installed with the valve shaft oriented in horizontal position unless otherwise shown on the drawings. Operators shall be self-locking with open and close stops provided to limit valve disc travel. This shall ensure that the disc will not creep or flutter under service conditions and that the seat will close at an angle of 90° from full open. Valve sized six (6) inches and smaller shall be equipped with lever operator and 10 degree increment throttling stops. Valve sized eight (8) inches and larger shall be equipped with a weather-proof, heavy-duty, handwheel gear operator complete with a position indicator.

Operators shall be totally enclosed, permanently lubricated and sealed gear reducers. A vent shall be provided between the valve trunnion and actuator base to prevent infiltration of fluid into the actuator. The operator case shall be completely watertight, sealed by means of approved gaskets, gasket compounds, O-rings or threaded plugs. Operators shall be filled with a suitable oil lubricant or thoroughly coated with an approved grease at the factory. If the operator lubricant is oil, provide suitable fill and drain plugs. Operators shall be self-locking with a permanent factory set stop at each end of travel.

Butterfly Valves shall be manufactured by Keystone, K-Lok, Series F360 or approved equal.

13.3.2 Check Valves. Check valves shall be of the full flow body type, with a domed access cover and vent port Valves shall be fully comply with the latest revision of AWWA Standard C508, Class as required, and ANSI/NSF 61, Annex G.

The valves shall be provided with flanges in accordance with ANSI B16.42, Class 150 for ductile iron flanges. Valves shall be factory equipped with a lever and air cushion assembly mounted between the weight assembly. The air cushion assembly shall consist of a clevis mounted tie-rod type closed cylinder with the exhaust port piped to a brass flow control valve and the inlet port piped to a breather/filter. The valve must be capable of gravity closure should the weight mechanism fail. Both the weight assembly and air cushion shall be field adjustable.

The valve body shall be full flow equal to nominal pipe diameter at all points through the valve and shall be equipped with a threaded adjustable open stop. The body seat shall be o-ring sealed and field replaceable without removing the valve from the line. The end flanges shall contain integrally cast mounting pads on sizes 3 inches and larger. The top access port shall be full size, allowing removal of the disc without removing the valve from the line. The access cover shall be domed in shape to provide flushing action over the disc for operating in lines containing high solids content.

The disc shall be of one-piece construction and connected to the shaft with a disc arm and two pivot pins to provide pivot action to allow self-adjusting seating at all pressures. The disc seat shall be resilient with integral o-ring type sealing surface for drop tight shut-off at high and low pressures and for easy replacement in the field without removing the valve from the line.

The shaft seals shall consist of V-type packing in a fixed gland with an adjustable follower designed to prevent over compression of the packing and to meet design parameters of the packing manufacturer. Removable, slotted shims shall be provided under the follower flanges to provide for adjustment and prevent over loading of the packing.

The valve body, cover and disc shall be constructed of ASTM A536 Grade 65-45-12 ductile iron. The exterior and interior of the valve shall be coated with an NSF/ANSI 61 approved fusion bonded epoxy coating. The removable body seat shall be constructed of ASTM A276, Type 304 stainless steel. The resilient seat shall be precision molded EPDM.

Check valves shall be manufactured by Val-Matic Valve & Mfg., Series 7000AC or approved equal.

13.3.3 Ball Valves. For applications less than 3” in diameter, ball valves shall be used. The ball valves shall meet or exceed to ASME B16.44. The ball valves will be 2-piece forged brass body, full port, blow out proof stem, PTFE seats, PTFE packing with adjustable stem packing gland. The valves will be equipped with NPT threaded pattern connections on both end and shall come complete with lever operators. Maximum working pressure shall be rate at a minimum of 400 psi.

Ball valves shall be manufactured by Nibco, Model T-FP-600A or approved equal.

13.3.4 Pressure Relief Valves. Pressure relief valves shall consist of three major components: the body with seat installed, the cover with bearing installed, and the diaphragm assembly. Valves shall be equipped with NPT threaded pattern end connections and be rated for a maximum working pressure of 400 psi.

The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the main valve or pilot controls. Valve body and cover shall be epoxy coated. The stainless steel seat with integral bearing shall be of the solid, one piece design.

The diaphragm assembly shall contain a non-magnetic stainless steel stem of sufficient diameter to withstand high hydraulic pressures. The stem shall be fully guided through its complete stroke by a removable bearing in the valve cover and an integral bearing in the valve seat. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary.

The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully open or fully closed position.

The pilot control system shall include CK2 isolation valves and X46 flow clean strainer. The pilot system shall include an opening and closing speed control on all valves. Pilot controlled sensing shall be upstream of the pilot system strainer so accurate control may be maintained if the strainer is partially blocked. The pressure relief pilot shall be a direct-acting, adjustable, spring-loaded, diaphragm valve designed to permit flow when controlling pressure exceeds in the adjustable spring setting. The pilot control is normally held closed by the force of the compression on the spring above the diaphragm and it opens when the pressure acting on the underside of the diaphragm exceeds the spring setting.

The pressure relief control valves shall be manufactured by Cla-Val Model 50G-01BKC or approved equal.

13.3.5 Magnetic Flow Meter. The magnetic flow meters shall be microprocessor-based, and flanged. It shall indicate, totalize, and transmit flow in full pipes. The magnetic flowmeter shall utilize DC bi-polar pulsed coil excitation, automatically re-zeroing after every cycle. The accuracy shall be at least 0.5% of flow rate over a 33:1 turndown at all flow rates above 1 fps. Accuracy shall be verified by calibration in a flow laboratory traceable to the NIST.

The flow sensor liner shall be Tefzel as approved by both the EPA and the FDA. The housing shall be steel. The integrally-mounted flow sensor and transmitter shall be FM approved and CSA approved. The electronics shall be remote mounted in a Nema 4X enclosure as shown on the plans. The flow meter shall be UL listed and approved.

The meter shall incorporate HI-Z circuitry. The preamplifier input impedance shall not be less than 10^{12} ohms. External ultrasonic electrode cleaners shall not be acceptable. Isolated outputs shall be 4-20 mA dc. Low flow cutoff shall be adjustable from 0-9% FS and there shall be two flow alarms settable from 0-99% of span.

The 2-line, 16-character alphanumeric display shall indicate user-defined flow units and total flow. All menu advice and commands shall be viewed on this display. The flow meter shall incorporate the MAG-COMMAND feature allowing menu selection and changes to be made from outside the housing via Hall-effect sensors. It shall not be necessary to remove covers, panels or fasteners to accomplish calibration or program changes. The meter software shall incorporate a password feature preventing inadvertent program changes. All printed circuit boards shall be contained in a plug-in module and be interchangeable for any size without requiring test equipment. Totalized flow and programmed configuration shall be maintained in memory for the meters lifetime.

The meter used in the station is designed to hold the stated accuracy limits with no more than three (3) upstream and zero (0) downstream pipe diameters of straight pipe length approaching and leaving the meter wherein the three upstream diameters does allow a full ported gate valve as shown. The station manufacturer shall be required to have the approval of the meter manufacturer for each of the meter installations attesting to the fact that stated accuracy limits will be met. Substituting another manufacture's meter with different and more upstream-downstream straight pipe run diameters being required will change flow meter accuracy to below the stated accuracy limits.

The flow meter shall be manufactured by Sparling Instruments, Inc., model FM656 TIGERMAGEP or approved equal.

13.3.6 Combination Pressure Gauges. Combination pressure gauges shall have a built-in pressure snubber and have 4-1/2" minimum diameter faces and turret style case, black fiberglass-reinforced thermoplastic with a clear acrylic window with Buna-N gasket. The movement shall be rotary; the bourdon tube shall be copper alloy C-type. The gauge shall have a 1/4" MNPT lower mount process connection and contain a 0.6mm copper alloy restrictor. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:

Suction Pressure - 0 to 160 psi, 20 psi figure intervals, with graduating marks every 2 psi.

Discharge Pressure - 0 to 400 psi, 50 psi figure intervals, with graduating marks every 5 psi.

All gauges will be panel mounted off the pipeline and be connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point will not be accepted. Gauge ranges, markings and gauge location shall be identified in the submittal documents.

Gauges shall be manufactured by WIKA Model 212.34 or approved equal.

13.3.7 Suction Diffusers. Suction diffusers shall be provided as shown on the Plans to ensure optimum flow conditions on the inlet side of each pump. Suction Diffusers shall be of compact design, functioning as an elbow, strainer, and suction flow diffuser all in one unit. Each unit shall feature straightening vanes on the outlet side reduces turbulence into the pump. These shall be designed to minimize stress and erosion within the pump, and eliminate the need for a length of straight pipe to diminish turbulence. The body of each unit shall be manufactured using ASTM A126-B Cast Iron and be of standard center to flanged face dimensions. Class 125 flanged end connection shall be provided on both the inlet and outlet.

Each unit shall be provided with a removable strainer manufactured of Type 304 Stainless steel with .250-inch perforations and a separate removable fine mesh screen liner which acts as a start-up strainer. Following the start-up period, the Contractor shall remove and discard the liner, leaving only the primary screen for operation. Access to the strainer shall be via a removable cover equipped with quick opening knobs manufactured of ASTM A536 Ductile Iron and an EPDM O-ring seal. The seal shall be such that it eliminates the need to clean the sealing area and install a new flat gasket when removing the cover.

For convenience, pipe support bosses shall be provided on either side. A plug shall also be provided to allow for easy draining of the unit for cleaning and maintenance. Threaded and plugged upstream and downstream pressure/ temperature taps shall be included on both sides of the body. Suction Diffusers shall be as manufactured by Mueller Steam Specialty, Model 1011, or approved equal.

13.4 Booster Pumps. The Contractor shall furnish and install two (2) booster pumps for each pump station as shown on the Drawings. The pumps shall be vertical multi-stage centrifugal water pumps equipped with an appropriate driver as described herein.

13.4.1 Standard Specifications & References. Design, manufacturing and assembly of elements of the equipment herein specified shall be in accordance with, but not limited to, published standards of the following, as applicable. Where reference is made to one of the below standards, the revision in effect at the time of bid opening shall apply.

- Hydraulic Institute (HI)
- American National Standards Institute (ANSI)
- American Society for Testing and Materials (ASTM)
- American Bearing Manufacturers Association (ABMA)
- National Electrical Manufacturers Association (NEMA)
- Institute of Electrical and Electronics Engineers (IEEE)
- National Electrical Code (NEC)

13.4.2 General. The pumping units shall all be supplied by one manufacturer and shall be complete including pumps, motors, and other accessories as specified herein.

The pumps, motors, drives, and other accessories shall be designed and built for 24-hour continuous service at any and all points within the specified range of operation, without overheating, without damaging cavitation, and without excessive vibration or noise.

Each major piece of equipment shall be furnished with a stainless steel nameplate (with embossed data) securely mounted to the body of the equipment. As a minimum, the nameplate for the pumps shall include the manufacturer's name and model number, serial number, rated flow capacity, head and speed. As a minimum, nameplates for motors shall include the manufacturer's name and model number, serial number, horsepower, speed, input voltage, amps, number of cycles, power and service factors.

13.4.3 Quality Assurance. To assure unity of responsibility, the motors and other accessories shall be furnished by the pump manufacturer. All pumping units specified herein shall be furnished by a single manufacturer.

The equipment specified herein is intended to be of proven ability as manufactured by concerns having extensive experience in the production of such equipment. The equipment furnished shall be designed, constructed and installed to operate satisfactorily when installed as shown on the Drawings. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards, except where otherwise specified herein.

The pump manufacturer shall be fully responsible for the design, arrangement and operation of all connected rotating components as assembled and mounted on a fabricated steel base to ensure that neither harmful nor damaging vibrations occur at any speed within the specified operating range.

Vibration, when measured in the direction of maximum amplitude on the pump and motor bearing housings, shall not exceed limits given in the latest ANSI/HI nomograph for the applicable pump type.

Manufacturer shall have installations of like or similar application with a minimum of 5 years service for this pump size. Pump(s) are to be engineered and manufactured under a written Quality Assurance program. The Quality Assurance program is to be in effect for at least ten years, to include a written record of periodic internal and external audits to confirm compliance with such program. Pump(s) are to be engineered and manufactured under the certification of ISO-9001.

13.4.4 Delivery, Storage & Handling. All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the unit and equipment are ready for operation.

All equipment and parts must be properly protected against any damage during shipment. The Contractor shall store equipment in accordance with the manufacturer's instruction.

13.4.5 Pump Operating Conditions. The pump shall be rated for the following flow conditions and shall produce the noted total pump head including velocity head losses at the pump discharge. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region being outlined below. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.

HIGHWAY 1880 BOOSTER PUMP STATION

- Design Point: 100 GPM @ 525 feet TDH
- Pump Efficiency at Design Point: 73.1%
- NPSHr at Design Point: 7.4 feet
- Min. Stable Flow: 14 GPM
- Max. Point: 145 GPM @ 330 feet TDH
- Minimum Suction Pressure: 0 PSI;
- Maximum Discharge Pressure: 365 PSI;
- Motor: Non-overloading for 25 rated HP;
- Motor Speed: 3521 rpm nominal;
- Motor Service Factor: 1.15;
- Electrical Power: 230/460 volt, 3 phase, 60cycle

The pump shall be that as manufactured by Grundfos Model CR 20-10 or approved equal.

HIGHWAY 449 BOOSTER PUMP STATION

- Design Point: 150 GPM @ 550 feet TDH
- Pump Efficiency at Design Point: 75.5%
- NPSHr at Design Point: 9.3 feet
- Min. Stable Flow: 20 GPM
- Max. Point: 205 GPM @ 370 feet TDH
- Minimum Suction Pressure: 0 PSI;
- Maximum Discharge Pressure: 435 PSI;
- Motor: Non-overloading for 40 rated HP;
- Motor Speed: 3541 rpm nominal;
- Motor Service Factor: 1.15;
- Electrical Power: 230/460 volt, 3 phase, 60cycle

The pump shall be that as manufactured by Grundfos Model CR 32-8 or approved equal.

13.4.6 Pump Construction. Pump will be counterclockwise rotation when viewed from the driver end looking at the pump. Each pump shall be designed for in-line installation requiring no more than 1.5 square feet of floor space (including motor). The pump impellers shall be secured directly to the pump shaft by means of a splined shaft arrangement.

The pump base shall be of fabricated cast iron of the proper configuration for the application. The suction/discharge base shall have 2" (or 2.5") ANSI Class 250 flange connections as indicated in the drawings or pump schedule. Pumps shall be provided with a pressure gauge connection. The top of the discharge head shall have a registered fit for mounting driving motor.

The pump shaft shall be 316 or 431 Stainless Steel and shall be turned and ground. Impellers, impeller wear rings, diffuser chambers, outer sleeves shall be of 304 Stainless Steel. All impellers shall be statically and dynamically balanced. Shaft journals and chamber bearings shall be of Silicon Carbide and all O-rings shall be EPDM. Shaft couplings for motor flange sizes 184TC and smaller shall be made of cast iron or sintered steel. Shaft couplings for motor flange sizes larger than 184TC shall be made of ductile iron (ASTM 60-40-18).

The shaft seal shall be a balanced o-ring cartridge type. Seal collars, drivers, springs, sleeves, gland plates shall be of 316 Stainless Steel. Both Stationary & Rotating Rings shall be of Silicon Carbide which is imbedded with graphite. Seal O-rings shall be of EPDM. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, shaft coupling and motor. Pumps shall have adequate space within the motor stool so that shaft seal replacement is possible without motor removal

13.4.7 Pump Motor. Motors will be controlled by VFD's and shall be inverter duty rated, NEMA MG-1. In addition, motors shall be designed for continuous duty operation, NEMA design B with a 1.15 Service Factor. Motors shall be Totally Enclosed Fan Cooled type furnished with class "F" insulation. A NEMA C-Flange for vertical mounting shall be standard and lifting provisions shall be incorporated. Drive end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump.

Motor nameplate shall be mounted on enclosure with stainless steel fastening pins. Nameplate shall have, as a minimum, all information as described in NEMA Standard MG 1-20.40.1.

Motor shall be sized for maximum horsepower from shut-off to run-out. The thrust bearing in the motor is utilized to carry both mechanical and hydraulic thrust of the pump. Torque capabilities must exceed those required by the pump at all operating conditions. This is shown on the pump

speed-torque curve, which is available from the factory upon request. To ensure proper alignment and successful operation, a drive shaft with needle-bearing universal joints is often used between the engine and the drive shaft of the gear.

In addition to that listed above, the following criteria shall be representative of the supplied motor: a.) Rated for Ambient 40 C; b.) Premium efficiency; c.) Inverter ready, meeting MG-1 part 31.4.4.2; d.) Direct on line start; f.) Continuous duty; g.) Shaft grounding ring; h.) Thermostats normally closed.

13.4.7 Anti-Vibration Mounting Pads. Each pump shall be installed with anti-vibration pads under each mounting leg or anchor point. The pads shall be 6 inches square by 1 inch thick, manufactured of neoprene rubber with a 16 gauge steel top plate. A 3/4" diameter center hole should be provided for bolting through and the pad should come complete with a 3/4" neoprene isolation washer cemented to a steel washer.

Anti-Vibration Pad shall be manufactured by Mason Industries, Type MBSW, or approved equal.

13.4.8 Shop Testing. A complete test report for each supplied pump, including certified characteristic curves of the pump, consisting of at least all information required above, except for NPSHR, and certified copies of the hydrostatic test report, shall be submitted to and approved by the Engineer before the pumps are shipped. Each pump specified herein shall be factory tested in accordance with the latest edition of the Hydraulic Institute Standards. Tests may be conducted with shop column, discharge head and motor to facilitate the manufacturing process. If the application is variable speed a minimum speed curve shall be plotted on the performance curve basis the affinity laws and the test data.

13.4.9 Warranty. The pump unit shall be covered by the manufacturer's standard warranty, non-prorated extended to 24 months from startup, not to exceed 30 months from shipment. The manufacturer's warranty shall not relieve the Contractor from furnishing a complete system warranty as specified in the General Conditions.

13.4.10 Start-Up. The manufacturer or supplier of the pumping unit shall provide the services of a factory-trained representative for a maximum period of one day, to assist the contractor and owner with the initial start-up of the pump system. It shall be the responsibility of the contractor to inform all parties of this initial start-up, and to insure their attendance. The manufacturer's representative shall instruct all personnel attending the start-up in the correct and required operation, maintenance and service procedures for the pumping system.

13.5 Testing & Disinfection. After all piping, valves, pumps, and appurtenances have been installed, the complete assembly shall be subjected to a hydrostatic test. The section of the pipe being tested shall be slowly filled with water and brought to the specified test pressure by means of a pump connected to the pipe in a manner satisfactory to the Engineer. The test pressure shall not be less than 1.25 times the working pressure at the location of the test as determined by the Engineer. The duration of the hydrostatic test shall be at least four hours, and the pressure shall not vary by more than five psi.

Upon completion and acceptance of the hydrostatic test, piping shall be thoroughly disinfected before being placed in service. Disinfection shall be achieved through the use of chlorine or chlorine compounds in such amounts as to produce a concentration of not less than 50 ppm with a residual of not less than 25 ppm at the end of 24 hours. Once disinfection is complete, the piping shall be thoroughly flushed as required.

13.6 Building Improvements & Modifications. The Contractor shall make modifications & improvements to the existing pump station building as shown on the Drawings and described herein.

13.6.1 Cutting and Patching. The Contractor shall employ skilled workers to perform cutting and patching of buildings as required. Any cutting and patching work shall be performed at the earliest feasible time, and complete without delay.

Cut in-place construction shall be accomplished to provide for installation of other components or performance of other construction, and subsequently patched as required to restore surfaces to their original condition. Temporary support components shall be supplied and installed as required. Protect in-place construction which is to remain during all cutting and patching to prevent undo damage. This shall include protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations. Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems as directed by the engineer before cutting to prevent interruption to occupied areas.

Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. The Contractor shall review proposed procedures with Engineer prior to starting work and shall comply with the Engineer's recommendations. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

On any finished surface, cut or drill from the exposed or finished side into concealed surfaces. Concrete and masonry shall be cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Regarding process, mechanical and electrical systems and components, cut off pipe or conduit in walls or partitions to be removed. Any remaining portion of pipe or conduit shall be capped, plugged or sealed to prevent entrance of moisture or other foreign matter after cutting.

The Contractor shall not proceed with patching work until after construction operations requiring cutting are complete. Patch construction shall consist of filling, repairing, refinishing, closing up, and similar operations. When patching areas adjacent to the building exterior, components shall be installed in a manner that restores enclosure to a weather tight condition. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other sections of these Specifications, where applicable.

Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing. Clean piping, conduit, and similar features before applying paint or other finishing materials.

Where walls or partitions that are removed, extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces. Patch, repair, or rehang in-place ceilings as necessary to provide an even plane surface of uniform appearance.

All areas and spaces where cutting and patching are performed shall be thoroughly cleaned following completion. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

13.6.2 Concrete Construction. The Contractor shall provide all labor, tools, equipment and materials to place concrete at the locations as shown on the Drawings. This shall include formwork, concrete specifications, reinforcement, finishes and any work related to the placement of concrete.

13.6.2.1 References. The Contractor shall obtain and have available in the field office at all times the latest revisions of the following references:

1. Specifications for Structural Concrete for Buildings ACI 301
2. Specifications for Structural Concrete for Buildings ACI Sp-15
3. Manual of Standard Practice - CRSI
4. Placing Reinforcing Bars - CRSI
5. Building Code Requirements for Reinforced Concrete ACI 318
6. Environmental Engineering Concrete Structures ACI-350R
7. Recommended Practice for Concrete Formwork ACI-347
8. Construction and Industrial Plywood PS-1
9. Field Reference Manual, ACI Publication SP-15

The following standards shall also apply to this work:

1. ASTM C-143 Test Method for Slump of Hydraulic Cement Concrete
2. ASTM C-150 Specification for Portland Cement
3. ASTM C-33 Specification for Concrete Aggregates
4. ASTM C-260 Specification for Air Entraining Admixtures for Concrete
5. ASTM C-494 Specification for Chemical Admixtures for Concrete
6. ASTM A-615 Specification for Deformed and Plain Billet
7. ASTM C-94 Specification for Ready-Mixed Concrete
8. ASTM C-31 Practice for Making and Curing Concrete Test Specimens in the Field
9. ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
10. ASTM C42 Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
11. ASTM A-616 Rail Steel Deformed and Plain Bars for Concrete Reinforcement
12. ASTM A-617 Axle Steel Deformed and Plain Bars for Concrete Reinforcement

- | | | |
|-----|------------|---|
| 13. | ACI 315 | Details and Detailing of Concrete Reinforcement |
| 14. | ACI 315R | Manual of Engineering and Placing Drawings for Reinforced Concrete Structures |
| 15. | ASTM A-185 | Welded Steel Wire Fabric for Concrete Reinforcement |
| 16. | ACI 301 | Specifications for Structural Concrete for Buildings. |

13.6.2.2 Submittals. The Contractor shall submit the following data established per ACI 301 for evaluation and approval by the Engineer.

1. Concrete mix designs, test results and curves plotted to establish water cement ratio if paragraph 3.9.3.3. of ACI 301 is used.
2. Proposed mix designs and all necessary substantiating data used to establish proposed mix designs if paragraph 3.9.1.1. or 3.9.1.2. of ACI 301 is used.
3. Mix designs for all mixes proposed or required to be used, including all mixes containing admixtures.
4. A certified copy of the control records of the proposed production facility establishing the standard deviation as defined in paragraph 3.9.1.1. of ACI 301.
5. Certification attesting that admixtures equal or exceeds the physical requirements of ASTM C-494 for Type A (water reducing) Type D (water reducing and retarding) and Type E (water reducing and accelerating) admixtures.
6. Drawings showing locations of all proposed construction joints.
7. Certification that the concrete aggregates comply with the provisions of ASTM C33.
8. Certification that the air-entraining admixture complies with ASTM C-260.

13.6.2.3 Quality Assurance.

13.6.2.3.1 Consistency. Concrete shall be of such consistency that it can be worked readily into all parts of the forms and around embedded work, without permitting the materials to segregate, or free water to collect on the surface.

13.6.2.3.2 Compression Tests. During the progress of work, at least one set of three compression test cylinders shall be made for each 50 cubic yards of structural concrete or major fraction thereof, and not less than one such set for each type of concrete for each days pouring. Cylinders made in the field shall be made and cured in accordance with the ASTM Standard Method of Making and Curing Concrete Test Specimens in the Field, designation C31, except that wherever possible molds shall be left on cylinders until they reach the laboratory.

One cylinder of each set shall be broken in accordance with ASTM C-39 at seven days and the other two at 28 days. Two copies of these test results shall be submitted to the Engineer on the same day of the tests.

Additional tests of the in-place concrete shall be made when test results indicate specified concrete strengths and other characteristics have not been attained in the structure. Cored cylinders used to test concrete adequacy shall comply with ASTM C42. All test procedures and results shall be

subject to the review and approval of the Engineer. The Contractor shall pay for such tests when unacceptable concrete is verified. On evidence of these tests, any concrete that fails to meet the specified strength requirements shall be strengthened or replaced as directed by the Engineer at the Contractor's expense.

13.6.2.3.3 Inserts in Concrete. All castings, inserts, conduits, and other metalwork shall be accurately built into or encased in the concrete by the Contractor as directed and all necessary precautions shall be taken to prevent the metalwork from being displaced or deformed. The installation shall be inspected before concrete is placed. All anchor bolts shall be set by means of substantial templates.

13.6.2.4 Testing. Concrete testing shall be performed by a testing agency hired by the Contractor, at his expense.

The testing agency shall perform the following tests on the sampled concrete:

- | | |
|----------------|----------------------------------|
| a. Slump | c. Concrete Temperature |
| b. Air Content | d. Compression Test of Cylinders |

Upon completion of the tests, written reports shall be submitted to the Engineer clearly identifying the tests performed the results, and the batch of concrete in which the tests were performed.

If, in the opinion of the Engineer, there is reasonable doubt that the concrete aggregates comply with ASTM C33, the testing agency shall test the fine aggregate and course aggregate for compliance with these specifications.

13.6.2.5 Standard Concrete Mix. Structural concrete of the various classes required shall be proportioned by Section 3.9 of ACI 301 to produce the following 28-day compressive strengths:

Selection of Proportions for Class A Concrete:

1. 4,000 psi compressive for strength at 28 days.
2. Type II cement plus water reducing dispersing agent and air. Type I cement may be used if the C3A content of the cementitious material is less than 8 percent.
3. Maximum (water)/(cement and water reducing dispersing agent) ratio = 0.45.
4. Minimum cement content = 564 lbs. (6.0 bags)/cu. yd. concrete.
5. Nominal maximum size coarse aggregate = No. 67 (3/4" max).
6. Air content = 6% plus or minus 1% by volume.
7. Slump = 2" - 3" in accordance with ASTM C-143.

13.6.2.6 Optional Concrete Mix Using Fly Ash. Structural concrete of the various classes required shall be proportioned by Section 3.9 of ACI 301 to produce the following 28-day compressive strengths:

Selection of Proportions for Class A Concrete:

1. 4,000 psi compressive for strength at 28 days.
2. Type II cement plus water reducing dispersing agent and air. Type I cement may be used if the C3A content of the cementitious material is less than 8 percent.
3. Maximum (water)/(cement plus water reducing dispersing agent) ratio - 0.45.
4. Minimum cement content - 517 lbs. (5.5 bags)/cu. yd. concrete.
5. Maximum Fly Ash Content - 71 lbs./cu. yd.
6. Nominal maximum size coarse aggregate - No. 67 (3/4" max) or No. 57 (1" max).
7. Air content - 6% plus or minus 2% by volume.
8. Slump = 2" - 3" in accordance with ASTM C-143.

13.6.2.7 Grout. Provide the following grout mixture at locations noted on the plans:

Less than 2" in depth

<u>Material</u>	<u>Volume</u>
Cement	1 part
Sand	2 part
Water = 5 gals./100 lbs. cement	

From 2" to 12" in depth

<u>Material</u>	<u>Volume</u>
Cement	1 part
Pea Gravel	2.5 parts
Sand	2 parts
Water = 5 gals./100 lbs. cement	

Greater than 12" in depth

Material

Class A Concrete

The grout mixtures shown above are not to be used in areas that are to receive non-shrink grout. Grout fill which is formed in place by using rotating equipment as a screed shall be mixed in proportions and consistencies as required by the manufacturer or supplier of the equipment.

13.6.2.8 Admixtures. An air entraining admixture shall be used on all concrete and shall be the Master Builders MB-VR, or MicroAir, Euclid Chemical Company AIR-MIX, W. R. Graces Darex, or equal. The admixture shall meet the requirements of ASTM C-260. Certification attesting to the percent of effective solids and compliance of the material with ASTM C-260 shall be furnished.

A water-reducing, admixture for concrete shall conform to ASTM C-494 for type A (water-reducing and normal setting admixtures) and shall be Master Builders Pozzolith 344N, Nox-Crete Plastiflow, Plastocrete 161 by Sika, or an approved equal. The water-reducing, set retarding mixture for concrete shall conform to ASTM C-494 for Type D (water-reducing and retarding admixtures) and shall be Master Builders, Pozzolith 100-XR, Daratard-17 by W. R. Grace, or an approved equal. Certification shall be furnished attesting that the admixture exceeds the physical requirements of ASTM C-494, Type A, water-reducing and normal setting admixture, and when required, for ASTM C-494, Type D, water reducing and retarding admixture when used with local materials with which the subject concrete is composed.

The admixture manufacturer shall provide a qualified concrete technician employed by the manufacturer to assist in proportioning concrete for optimum use. He also will be available to advise on proper addition of the admixture to the concrete and on adjustment of the concrete mix proportions to meet changing job conditions.

Where the Contractor finds it impractical to employ fully the recommended procedures for hot weather concreting, the Engineer may at his discretion require the use of a set retardant admixture for mass concrete 2.5 feet or more thick and for all concrete whenever the temperature at the time concrete is cast exceeds 80 degrees F. The admixture shall be selected by the Contractor subject to the review of the Engineer. The admixture and concrete containing the admixture shall meet all the requirements of these specifications. Preliminary tests of this concrete shall be required at the Contractor's expense.

When more than one admixture is used, all admixtures shall be compatible. They should preferably be by the same manufacturer.

Calcium chloride will not be permitted as an admixture in any concrete.

Water-reducing, non chloride, accelerators shall conform to ASTM C-494 Type E and shall be Accelguard 80 by the Euclid Chemical Company or Pozzolith High Early by Master Builders or an approved equal.

13.6.2.9 Water. The water for concrete shall be clean, fresh, and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

13.6.2.10 Aggregates. Fine aggregates shall be natural and having clean, hard, uncoated grains, and shall be free from injurious amounts of clay, dust, organic matter or other deleterious substances, and shall conform to ASTM C-33. Sand shall be graded as follows:

	<u>Percent</u>
Passing 3/8 Inch Sieve	100
Passing No. 4 Sieve	90-100
Passing No. 16 Sieve	45-80
Passing No. 50 Sieve	5-25
Passing No. 100 Sieve	0-8

Coarse aggregates shall be crushed stone having clean, hard, uncoated particles, and shall be free from injurious amounts of soft, friable, thin, elongated or laminated pieces. Coarse aggregates shall conform to ASTM C-33 and shall be graded in accordance with the following:

	<u>Percent by Weight</u>	
	<u>No. 57</u>	<u>No. 67</u>
Passing 1-1/2 Inch Square Sieve.....	100	---
Passing 1-Inch Square Sieve.....	95-100	---
Passing 3/4-Inch Square Sieve.....	---	90-100

Passing 1/2-Inch Square Sieve.....	25-60	---
Passing 3/8-Inch Square Sieve.....	---	20-55
Passing No. 4 Square Sieve	0-10	0-10
Passing No. 8 Square Sieve	0-5	0-5

Refer to the Specification of ACI 301 for maximum size of coarse aggregate.

13.6.2.11 Aggregates and Determining Proportions. No concrete shall be used in the work until the materials and mix designs have been tested by the testing laboratory and accepted by the Engineer. The Engineer shall have the right to order changes as may be necessary to meet the specified requirements. If concrete of the required characteristics is not being produced as the work progresses, the Engineer may order such changes in proportions or materials, or both, as may be necessary to secure concrete of the specified quality. The Contractor shall make such changes at his own expense and no extra compensation will be allowed because of such changes.

13.6.2.12 Mixing. All central plant and rolling stock equipment and methods shall conform to the Truck Mixer and Agitator Standards of the Truck Mixer Manufacturers' Bureau of the National Ready Mixed Concrete Assn., as well as the ACI Standards for Measuring, Mixing, Transporting, and Placing Concrete ACI 304R-89, and with the ASTM specification for Ready Mixed Concrete, Designation C94-89b.

13.6.2.13 Placing and Compacting Concrete. At least 20 hours before the Contractor plans to make any placement of concrete, he shall notify the Engineer of his intention and procedure. Unless otherwise planned, the work shall be so executed that a section begun on any day shall be completed during daylight of the same day.

Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks. The quantity of concrete to be mixed or delivered in any one batch shall not exceed the rated capacity of the mixer or agitator for the respective conditions as stated on the nameplates.

Information necessary to calculate the total mixing water shall be recorded on the delivery slip for the Engineer's information. Total mixing water includes free water on the aggregates, water and ice batched at the plant, and water added by the truck operator. The Contractor may request permission to add water at the job site, and when the addition of water is permitted by the Engineer, the quantity added shall be the responsibility of the Contractor and in no case shall the total water per bag of cement exceed that determined by the designed mix. Mixing and discharge time shall be as recommended in ACI-304.

Concrete which has become compacted or segregated during transportation to or on the site of the work shall be satisfactorily remixed just prior to being placed in the forms.

Partially hardened concrete shall not be deposited in the forms. The re-tempering of concrete which has partially hardened (that is, the remixing of concrete with or without additional cement, aggregate, or water) will not be permitted.

The concrete shall be mixed only in the quantity required for immediate use. Concrete that has developed an initial set shall not be used. The Contractor shall have sufficient plant capacity and transporting apparatus to insure continuous delivery at the rate required.

The temperature of the concrete mixture immediately before placement shall be between 50 degrees F and 90 degrees F.

Concrete that is truck mixed or transported in truck mixers or truck agitators shall be delivered to the site of the work and discharge completed in the forms within 1 1/2 hours or before the drum has revolved 300 revolutions whichever comes first after the introduction of the mixing water to the cement and aggregates, or the introduction exceeds 85 degrees F, the time shall be reduced to 45 minutes. Concrete shall be placed in the forms within 15 minutes after discharge from the mixer at the job site.

If concrete is placed by pumping, no aluminum shall be used in any parts of the pumping system which contact or might contaminate the concrete. Aluminum chutes and conveyors shall not be used.

No concrete shall be placed on frozen sub-grade or in water, or until the sub-grade, forms, and preliminary work have been accepted. No concrete shall be placed until all materials to be built into the concrete have been set and have been accepted by the various trades and by the Engineer. All such materials shall be thoroughly clean and free from rust, scale, oil, or any other foreign matter.

Forms and excavations shall be free from water and all dirt, debris, and foreign matter when concrete is placed. Except as otherwise directed, wood forms and embedded wood called for or allowed shall be thoroughly wetted just prior to placement of concrete.

Chutes for conveying concrete shall be metal or metal lined and of such size, design and slope as to ensure a continuous flow of concrete without segregation. The slope of chutes shall have approximately the same slope. The discharge end of the chute shall be provided with a baffle, or if required, a spout and the end of the chute or spout shall be kept as close as practicable to, but in no event more than 5 feet above the surface of the fresh concrete. When the operation is intermittent, the chute shall discharge into a hopper.

In thin sections of considerable height (such as walls and columns), concrete shall be placed in such manner as will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the mass of concrete being placed. To achieve this end, suitable hopper spouts with restricted outlets, etc. shall be used as required or permitted unless the forms are provided with suitable openings.

No wooden spreaders shall be left in the concrete.

For any one placement, concrete shall be deposited continuously in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section, and so as to maintain until the completion of the unit, an approximately horizontal plastic surface.

During and immediately after being deposited, concrete shall be thoroughly compacted by means of suitable tools and methods, such as internal type mechanical vibrators operating at not less than 5,000 rpm or other tool spading to produce the required density and quality of finish. Vibration shall be done only by experienced operators under close supervision and shall be carried in such manner and only long to produce homogeneity and optimum consolidation without permitting segregation of the solid constituents, "pumping" of air, or other objectionable results. All

vibrators shall be supplemented by proper spade puddling approximately 2 to 3 inches away from forms to remove included bubbles and honeycomb. Excessive spading against the forms, causing the deposition of weak mortar at the surface shall be avoided.

The concrete shall be thoroughly rodded and tamped about embedded materials so as to secure perfect adhesion and prevent leakage. Care shall be taken to prevent the displacement of such materials during concreting.

The distance between construction joints shall not exceed 25 feet for all concrete construction and not less than 48 hours shall elapse between casting of adjoining units unless these requirements are waived by the Engineer. Provision shall be made for jointing successive units as indicated or required. Where joints are not shown on the Drawings, they are required to be made at a spacing of approximately 25 feet. Additional construction joints required to satisfy the 25 foot spacing shall be located by the Contractor subject to the review of the Engineer. The Contractor shall submit for review Drawings separate from the steel reinforcing Drawings, showing the location of all proposed construction joints. All construction joints shall be prepared for bonding as specified in ACI 301 for Bonding Concrete at Construction Joints. Joints in walls and columns shall be maintained level.

The sub-grades for slab on grade for the plant works building only shall be covered with a vapor barrier consisting of a 6 mil minimum thickness polyethylene sheet with joints lapped a minimum of 12 inches unless otherwise required or permitted.

13.6.2.14 Bonding Concrete at Construction Joints. In order to secure full bond at construction joints, the surface of the concrete previously placed (including vertical, inclined, and substantially horizontal areas) shall be thoroughly cleaned of foreign materials and laitance, if any. The previously placed concrete at the joint shall be damp but free of standing water. The surface shall be prepared as per ACI 301. The referenced cement grout shall be between one and two inches thick on all wall pours. Waterstops shall be used on all construction joints.

13.6.2.15 Sealing Concrete at Construction Joints. All Construction joint surfaces shall receive Sikaflex-2C NS Polyurethane Elastomeric sealant or approved equal. Surface preparation and manufacturer's specified primer shall be applied in accordance to the manufacturer's recommendations. Minimum joint size shall be 1/4" deep by 1/2" wide unless shown otherwise on the Drawings.

13.6.2.16 Epoxy Bonding Agent. The epoxy bond agent shall be provided as indicated on the Drawings and shall be applied per manufacturer's instructions. Epoxy bonding agent shall be Sikadur Hi-Mod LPL by Sika Corporation or Eucopoxy LPL by Euclid Company or approved equal.

13.6.2.17 Curing and Protection. All concrete, particularly slabs and including finished surfaces, shall be treated immediately after concreting or cement finishing is completed, to provide continuous moist curing for at least seven days, regardless of the adjacent air temperature. Walls and vertical surfaces may be covered with continuously saturated burlap, or kept moist by other acceptable means. Horizontal surfaces, slabs, etc. shall be ponded to a depth of 1/2" wherever

practicable, or kept continuously wet by the use of lawn sprinklers, a complete covering of continuously saturated burlap, or by other acceptable means.

For at least seven days after having been placed, all concrete shall be so protected that the temperature at the surface will not fall below 45 degrees F. No manure, salt, or other chemicals shall be used for protection. The above mentioned seven day periods may be reduced if compression tests, in accordance with ASTM C-39, on field cured cylinders indicate that expected seven day strength gain has been achieved, and approval is granted by the Engineer. Wherever practicable, finished slabs shall be protected from the direct rays of the sun to prevent checking and crazing.

13.6.2.18 Trimming and Repair of Surface Defects. The Contractor shall use suitable forms, mixture of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching. Concrete which, in the opinion of the Engineer has excessive honeycomb, aggregate pockets, or depressions will be rejected and the Contractor shall, at his own expense, remove the entire section containing such defects and replace it with acceptable concrete. As soon as the forms have been stripped and concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled and surface defects which do not impair structural strength shall be repaired.

Defective concrete shall be cut perpendicular to the surface until sound concrete is reached, but not less than 1" deep. The remaining concrete shall be thoroughly roughed and cleaned. Concrete in an area at least 6" wide surrounding the area to be patched shall be dampened. A bonding grout shall be prepared using a mix of approximately one part cement to one part fine passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface. The patching mixture shall be made of the same materials and approximately the same proportions as used for the concrete except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one part cement to 2 1/2 parts sand by damp loose volume. White Portland cement shall be substituted for a portion of the gray Portland cement on exposed concrete in order to produce a color matching the color of the surrounding concrete. The quantity of mixing water shall be no more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, it shall be left undisturbed for at least one hour before being finally finished. The patched area shall be kept damp for seven days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed.

After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching mortar. The use of mortar patching as above specified shall be confined to the repair of small defects in relatively green concrete. If substantial repairs are required, the defective portions shall be cut out to sound concrete and the defective concrete replaced by means of gunite, or the structure shall be taken down and rebuilt, all as the Engineer may decide or direct.

13.6.2.19 Concrete Finishes. All concrete exposed to view in the completed structures shall be produced using materials and workmanship to such quality that only nominal finishing will be required. The provisions of paragraphs 13.3, 13.4 and 13.6 of ACI 301 shall apply to all exterior exposed to view concrete surfaces, including the outside surfaces of tanks.

All formed, exterior, exposed to view, concrete shall be prepared, then rubbed. Exterior vertical surfaces shall be rubbed to one foot below grade. Interior vertical surfaces of dry pits shall not be rubbed. Interior vertical surfaces of open topped liquid containers shall be rubbed to one foot below the minimum liquid level that will occur during normal operations. Walls inside a building shall not be rubbed. Overhead slabs (exterior or interior) shall not be rubbed.

All vertical surfaces below minimum liquid level in liquid containing structures and all other surfaces that are not to be rubbed shall have a smooth form finish.

All smooth form concrete vertical surfaces shall be true plane within 1/4" in 10 feet as determined by a 10 foot straight edge place anywhere on the surface in any direction. Abrupt irregularities shall not exceed 1/8". Basin, flume, conduit and tank floors shall have a "troweled" finish unless shown otherwise on Drawings. Weirs and overflow surfaces shall be given a troweled finish.

Exterior platforms, steps and landings shall be given a broom finish. Broom finish shall be applied to surfaces which have been steel troweled to an even smooth finish. The troweled surface shall then be broomed with a fiber bristle brush in the direction transverse to that of the main traffic. Walking surfaces of slabs shall have a troweled finish unless shown otherwise on Drawings.

Nox-Crete Harbeton, Chem Hard by L & M Construction Chemicals, Lapidolith by Sonneborn hardener treatment, or an approved equal shall be applied to all exposed concrete floors in occupied spaces. The floors shall be thoroughly cured, cleaned, and perfectly dry with all work above them completed. The hardener shall be applied evenly and freely and in conformance with manufacturer's instructions, using not less than three coats, allowing 24 hours between coats. One gallon of hardener shall cover not more than 100 square feet. After the final coat is completed and dry, surplus hardener shall be removed from the surface of the concrete by scrubbing and mopping with water.

13.6.2.20 Watertightness. The structures which are intended to contain liquids and/or will be subjected to exterior hydrostatic pressures shall be so constructed that when completed and tested, there shall be no loss of water and no wet spots shall show. Liquid retaining structures shall be tested for leakage in accordance with ACI-350R. As soon as practicable after the completion of the structures, the Contractor shall fill them with water and if leakages develop or wet spots develop, the Contractor shall empty such structures and correct the leakage in an approved manner. Any cracks which appear in the concrete shall be dug out and suitably repaired. Temporary bulkheads over pipe openings in walls shall be provided as required for the testing. After repairs, if any are required, the structures shall be tested again and further repaired if necessary until satisfactory results are obtained. All work in connection with these tests and repairs shall be at the expense of the Contractor.

Pipes shall not be poured or solidly grouted in concrete walls or floors unless fixations are indicated on the Project Drawings, for example as anchorage to resist pipe thrusts, unless otherwise required or permitted. At wall and slab penetrations, openings shall be formed

approximately one inch greater than the OD of the pipe. For openings 10 inches and less in diameter, openings may be cored if permitted by the Engineer before pouring wall or slab so that extra reinforcing steel can be accurately located and referenced to avoid the subsequent core hole, unless otherwise required or permitted. After pipe placement and alignment adjustment, the annular space between opening and outside of pipe shall be packed with dry braided hemp (or unbraided where pipe does not center in openings) to within two inches of the wall or slab surface. The two-inch deep annular space shall be packed with non-shrink grout or caulked in strict accordance with the material manufacturer's instructions.

Sleeves shall be cast in floors and walls for penetrations of small pipe, cut and fitted on the job, such as steel, wrought iron, copper, plastic and rubber pipe and hoses. Unless otherwise required or permitted, sleeves shall be steel, cast iron or plastic or about one inch greater ID than the OD of the pipe and shall be flush with wall and slab surfaces. The annular space between sleeve and outside of pipe shall be packed and grouted or caulked as previously described, except the joint depth shall be one inch. Penetrations may be made by coring according to previously described requirements if permitted by the Engineer. Where openings larger than 10 inches in diameter are required for pipe penetrations in existing walls and slabs, the opening shall be made approximately two inches to four inches larger in diameter than the pipe OD. The pipe shall be wrapped with 1/2-inch braided hemp and positioned in the opening. The space between the hemp and the opening shall be solidly packed with non-shrink grout previously described, after application of a bonding adhesive to the opening surfaces. The grout shall be finished flush with wall and floor surfaces. After the grout has hardened sufficiently, hemp shall be removed to two-inch depths on each side of walls and slabs and the resulting annular spaces shall be packed with non-shrink grout or caulked as required or permitted, as previously described. All joints around pipe shall be watertight unless otherwise required or permitted.

The top surface of all concrete decks (except slabs on grade) shall be coated with Sikagard-70 water-repellent penetrating sealer as manufactured by the Sika Corporation, Nox-Crete Stifel, or another approved equal. The manufacturer's recommendations shall be followed in all areas of application.

13.6.2.21 Equipment Pads. Unless otherwise shown or directed, all pumps, other equipment, and items such as lockers, motor control centers and the like, shall be installed on concrete bases. The bases shall be constructed to the dimensions shown on the plans or as required to meet plan elevations. Where no specific plan elevations are required, the bases shall be six inches thick and shall extend three inches outside the metal equipment base. In general, the concrete bases shall be placed up to one inch below the metal base. The equipment shall then be properly shimmed to grade and the one inch void filled with non-shrink grout. Prior to the final set of the grout, it shall be cut back and the edge plastered with 1:2 cement mortar.

13.6.2.22 Concrete Form Materials. Plywood shall be Douglas Fir species, medium density overlaid one side grade; sound, undamaged sheets with straight edges. Forms shall be sufficiently rigid to prevent displacement or sagging between supports, and so constructed that the concrete will not be damaged by their removal. The Contractor shall be entirely responsible for their adequacy. For surfaces to be given rubbed finish, the form in contact with the concrete shall be made of plywood, metal, metal framed plywood faced, or other acceptable panel-type materials, to provide continuous straight, smooth, exposed surfaces. Forms shall not be pieced out by use of

material different from those in the adjacent form or in such manner as will detract from the uniformity of the finished surface. For surfaces other than those to be given rubbed finish, forms shall be made of wood, metal or other acceptable material. Wooden forms shall be constructed of sound lumber or plywood of suitable dimensions, free from knotholes and loose knots. Plywood shall be in reasonably good condition. Metal forms shall be of an acceptable type for the work involved.

Form ties to be encased in concrete shall not be made of through bolts or common wire, but shall be of a well established type, so made and installed as to embody the following features:

1. After removal of the protruding part of the tie, there shall be no metal nearer than 1-1/2" to the face of the concrete.
2. That part of the tie which is to be removed shall be at least 1/2" in diameter, or if smaller, it shall be provided with a wood, metal, or plastic cone 1" long placed against the inside of the forms. Cones shall be carefully removed from the concrete after the forms have been stripped.
3. Ties which pass through walls of liquid retaining basins and all dry rooms below grade shall be provided with acceptable water stop, securely fastened to the ties.

The Form Release Agent shall be a colorless material which will not stain concrete, absorb moisture or impair natural bonding or color characteristics of coating intended for use on concrete. Acceptable products include Nox-Crete Form Coating Release Agent, Debond Form Coating by L & M Construction Chemical, Inc., or approved equal.

Fillets for chamfered corners shall be wood strip type to the size and shape as shown on the Drawings.

Nails, spikes, lag bolts, through bolts and anchorages shall be sized as required of strength and character to maintain formwork in place while placing concrete.

Earth or rock forms shall not be permitted. The vertical surface of all footings shall be formed.

Forms for walls, columns, or piers shall have removable panels at the bottom for cleaning, and inspection. Forms for thin sections (such as walls or columns) of considerable height shall be arranged with suitable openings so that the concrete can be placed in a manner that will prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the fresh concrete, unless special spouts are used to place concrete and so that construction joints can be properly keyed and treated. Forms for exposed surfaces shall be built with 3/4" chamfer strips attached to produce smooth, straight chamfers at all sharp edges of concrete.

Before form material is reused, all surfaces that are in contact with the concrete shall be thoroughly cleaned, all damaged places repaired, and all projecting nails withdrawn.

13.6.2.23 Wetting and Oiling Forms. The inside surface of wood board forms shall be soaked with clean water and kept continuously wet for 12 hours before any concrete is placed. In case forms have been erected for some time and have become dry so that joints have opened, then the forms shall be thoroughly soaked at least twice each day for at least three days prior to placing concrete. If the forms cannot be tightened to the satisfaction of the Engineer, they shall be torn

down and rebuilt. Plywood forms may be treated with a non-staining form oil, mineral oil or lacquer. If oil is used, all excess oil shall be wiped off with rags to leave the surface of the forms just oily to the touch. In freezing weather oil shall be used.

Coatings of dust shall be removed from contact surfaces of forms before placing concrete. Concrete shall not be placed in any form until inspected by the Engineer and permission is given to start placing.

13.6.2.24 Form Removal. Forms shall not be removed without approval of the Engineer. All form removal shall be accomplished in such a manner as to prevent injury to the concrete.

Forms shall not be removed sooner than the following minimum times after the concrete is placed. These periods represent cumulative number of days and fractions of days, not necessarily consecutive, during which the temperature of the air adjacent to the concrete is above 50°F.:

<u>Element</u>	<u>Time</u>
Beams, arches - supporting forms and shoring.....	14 days
Conduits, deck slabs - supporting (inside) forms and shoring.....	7 days

<u>Element</u>	<u>Time</u>
Conduits (outside forms), sides of beams, small structures.....	24 hours
Columns, walls, spillway risers - with side or vertical load	7 days
Columns, walls, spillway risers - with no side or vertical load	4 days
Concrete supporting more than 30 feet of wall in place above it ...	7 days
Concrete supporting 20 to 30 feet of wall in place above it*	4 days
Concrete supporting not more than 20 feet in place above it*	24 hours

*Age of stripped concrete shall be at least seven days before any load other than the weight of the column or wall itself is applied.

When conditions on the job are such as to justify the requirements, forms will be required to remain in place for longer periods. Forms for beams, girders, and flood slabs shall remain in place for at least seven days and shall only be removed when test cylinders used under the same conditions as the members break with a compressive strength as required in these specifications.

13.6.2.25 Construction Tolerance. The forms shall be constructed and rigidly braced in place within the following tolerances:

1. Variation from true alignment as shown on the drawings in the lines and surfaces of walls:

In 10 feet	1/4 inch
In 20 feet maximum	3/8 inch
In 40 feet or more.....	3/4 inch

2. Variation from the level or from the grades indicated on the drawings in floors or slabs:

In 10 feet	1/4 inch
In 20 feet maximum	3/8 inch
In 40 feet or more.....	3/4 inch

3. Variation in sizes and/or locations of floor and/or wall openings:

1/4 inch total

4. Variation in thickness of slabs and walls and in cross-sectional dimensions of columns and beams:

Minus	1/4 inch
Plus.....	1/2 inch

5. Variation in plan dimension of footings:

Minus	1/2 inch
Plus.....	2 inches

13.6.2.26 Expansion and Contraction/ Construction Joints. Unless otherwise shown, waterstops for construction and control joints shall be 4 inches wide, 3/16” minimum thickness, flat-ribbed, or dumbbell polyvinyl chloride (PVC), in accordance with Corps of Engineers Specifications CRD-C-572, latest revision, as manufactured by Vinylex Corp., W.R. Grace Company, Greenstreak, or equal. Split-ribbed waterstops may be used where appropriate.

Unless otherwise shown, waterstops for expansion joints shall be nine inches wide, 1/4” minimum thickness, ribbed with center bulb polyvinyl chloride (PVC) in accordance with Corps of Engineers Specifications CRD-C-572, latest revision as manufactured by Vinylex Corp., W.R. Grace Company, Greenstreak, or equal.

Only where indicated on the drawings, the Contractor shall install a self-expanding waterstop impregnated with sodium bentonite similar to Volclay Waterstop-RX. The manufacturer’s recommended installation procedures shall be followed. Self expanding waterstops shall not be used at expansion joints and water containment structures.

Joint filler shall conform to ANSI/ASTM D994 and they shall be bituminous impregnated fiberboard, closed cell polyethylene or self-expanding cork; of the sizes detailed and in the locations indicated on the Drawings. Bituminous impregnated fiberboard shall not be used to fill joints in liquid retaining structures. Where the application requires cementing the joint filler into place, a pressure sensitive adhesive recommended by the filler manufacturer shall be used.

13.6.2.27 Waterstops. Waterstops shall be provided at all joints where indicated on the Drawings. Waterstops shall also be provided in all joints, vertical and horizontal up to 1’-0” minimum above finished grades and in water containment and subterranean structures. Install waterstops continuous without displacing reinforcement. All joints between adjacent continuing and intersecting sections of waterstop including butt joints, tee joints, and other angled joints shall be heat fused to form a watertight seal. Waterstops shall not be lapped. Waterstops shall be securely wired in place to maintain proper position during placement of concrete.

13.6.2.28 Reinforcing Steel. The Contractor shall place reinforcing steel at the location as shown on the Drawings.

13.6.2.28.1 Materials. The minimum yield strength of the reinforcement shall be 60,000 pounds per square inch. Bar reinforcement shall conform to the requirements of ASTM A-615, A-616, or A-617. All bar reinforcement shall be deformed. Smooth dowels shall be plain steel bars conforming to ASTM A-615, Grade 40. Welded wire fabric when specified shall conform to ASTM 185, welded steel wire fabric for concrete reinforcement. Reinforcement supports and other accessories in contact with the forms for members which will be exposed to view in the finished work shall have approved high density polyethylene tips so that the metal portion shall be at least one quarter of an inch from the form or surface. Supports for reinforcement, when in contact with the ground or stone fill, shall be precast stone concrete blocks.

13.6.2.28.2 Fabrication. Reinforcement shall be bent cold. It shall be accurately to the dimensions and shapes shown on the plans and to within tolerance specified in the ACI code and the CRSI Manual of Standard Practice. Reinforcement shall be shipped with bars of the same size and shape, fastened securely with wire and with metal identification tags using size and mark.

13.6.2.28.3 Placing and Fastening. Before being placed in position, reinforcement shall be cleaned of loose mill and rust scale, dirt and other coatings that will interfere with development of proper bond. Reinforcement shall be accurately placed in positions shown on the drawings and firmly held in place during placement and hardening of concrete by using annealed wire ties. Bars shall be tied as required to prevent displacement under foot traffic and during casting operations, and shall be placed within tolerances allowed in Section 5.6.2 of ACI 301. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers or other approved supports. If fabric reinforcement is shipped in rolls, it shall be straightened into flat sheets before being placed.

Before any concrete is placed, the Engineer shall have inspected the placing of the steel reinforcement and given permission to deposit the concrete. Concrete placed in violation of this provision will be rejected and thereupon shall be removed.

Unless otherwise specified, reinforcement shall be furnished in the full lengths indicated on the plans. Splicing of bars, except where shown on the plans, will not be permitted without the approval of the Engineer. Where splices are made, they shall be staggered insofar as possible.

Wire mesh reinforcement shall be continuous between expansion joints. Laps shall be at least one full mesh plus two inches, staggered to avoid continuous lap in either direction and securely wired or clipped with standard clips.

Dowels shall be installed at right angles to construction joints and expansion joints. Dowels shall be accurately aligned parallel to the finished surface, and shall be rigidly held in place and supported during placing of the concrete. One end of dowels shall be oiled or greased or dowels shall be coated with high density polyethylene with a minimum thickness of 14 mils.

13.6.2.28.4 Shop Drawings. The Contractor shall submit a complete set of shop drawings including schedules and bending drawings for all reinforcement used in the work in accordance with ACI 315, and ACI 315R. Review of drawings by the Contractor and the Engineer is required before shipment can be made.

13.6.3 Unit Masonry. The Contractor shall furnish all labor, materials, and equipment required to construct and install unit masonry for structures as shown on the Drawings and specified herein.

13.6.3.1 Submittals. The Contractor shall submit to the Engineer manufacturer's product data for each type of masonry unit, caulking compound, accessory, and other manufactured products, including certifications that each type complies with specified requirements.

The Contractor shall submit to the Engineer for verification purposes, samples of each exposed masonry unit. Include in each set of samples the full range of exposed textures to be expected in the completed work. For initial selection of exposed masonry units submit samples showing full range of textures available.

13.6.3.2 Unit Masonry Construction. Unit masonry walls shall be laid up with blocks & bricks and with thickness as shown on the Drawings. Masonry units shall be laid in a running bond pattern. Grouted construction, reinforced construction, control joints, expansion joints, roof anchors, and other special construction shall be as shown on the Drawings.

Masonry Units shall be delivered hand stacked or in original packages. In unloading, they must be carefully handled in the same manner, hand stacked or "ricked" on boards. Throwing or dumping of masonry units or any handling as to cause chipping or otherwise marring of corners or edges will not be permitted. Handle and store materials off the ground in such manner as to prevent damage or intrusion of foreign matter. All masonry units shall be covered. Store concrete units under a cover that permits circulation of air without excessive moisture absorption. Store cement, lime, gypsum and air setting mortars in tight sheds with elevated floors.

All masonry units shall be laid plumb, level and true to line in full bed of mortar. Lay out all face coursing in advance vertically and horizontally for placing doors, windows, and structural steel to minimize cutting closures or jumping bond. All head joints and bed joints shall be completely full of mortar. Mortar for the bed joints shall be spread thick, and the furrow in the mortar shall be shallow, not deep. Mortar spread on the wall shall be limited to that which can be covered before the surface of the mortar has begun to dry. Ample mortar for the head joint shall be placed on the end of each unit to insure a full joint when the unit is shoved into place. Enough mortar shall be used to cause mortar to ooze out on both sides of the head joint and bed joint. Slushing is not permitted. Units shall be adjusted to the line immediately when first set into the wall, and they shall not be moved thereafter unless relaid in fresh mortar.

All joints shall be of uniform thickness, approximately 3/8 inch. All exterior joints shall be cut flush. As the mortar takes its initial set (when the mortar requires pressure to make a print with the thumb), they shall be tooled to provide a concave surface. A tool approximately twice the diameter of the joint shall be used. All masons must use jointing tools of the same size. Head joints shall be tooled first. Sufficient pressure shall be applied during the tooling of the joints to compact the mortar firmly against the units and provide a neat smooth weather tight joint. Exposed interior masonry work shall have neatly tooled concave joints made with same size tool used on exterior joints.

Where cutting concrete block is necessary, use motor-driven carborundum or diamond saw or other method to produce clean cut edges. Do all necessary cutting to accommodate installation of electric outlets, conduits, plumbing fixtures, pipes, brackets, and bathroom accessories. Block with chipped or irregular cut surfaces will not be accepted.

Protect concrete block facing against staining. When work is not in progress, all unfinished masonry shall be covered with a weighted down, non-staining, waterproofed material or canvas to overhang the wall at least two feet. When work is resumed, top surface of work shall be cleaned of all loose mortar and, in drying weather, thoroughly wetted. Concrete units shall be cleaned but not wetted.

No masonry shall be laid when the temperature is below 32 degrees Fahrenheit on a rising thermometer or below 40 degrees Fahrenheit on a falling thermometer, unless adequate precaution against freezing is provided. No masonry shall be constructed on or with frozen materials. All masonry units stored in the open or stacked near the mortar boards shall be covered with canvas or waterproofed material to prevent excessive wetting when freezing is expected. In cold weather, masonry shall be protected against freezing for at least 48 hours after being laid with the temperature on both sides of the wall maintained above 40 degrees Fahrenheit.

Point and fill all holes and cracks in exposed joints with additional fresh mortar. If the mortar has hardened, defects shall be chiseled out, wetted and refilled solidly with fresh mortar and tooled as specified.

Concrete block masonry walls shall be cleaned in strict accordance with the recommendations of the National Concrete Masonry Association. Clean exposed masonry surfaces thoroughly from top down, to remove stains and mortar deposited during construction. Cleaning with soap powder or other mild solutions shall not be attempted in less than 48 hours after the construction of the wall.

13.6.3.3 Concrete Masonry Units. Blocks shall be manufactured of Portland Cement, Ohio River Sand or clean crushed limestone fine aggregate and crushed limestone. Blocks shall meet the requirements of the Standard Specifications for Hollow-Load-Bearing Concrete Masonry Units, ASTM Designation C 90, Grade N, Type 1, normal-weight. Except as specified under Article 9, "Rejection", of ASTM Designation C 90, the expense of inspection and testing shall be borne by the Owner. Blocks shall be of nominal dimensions and shapes as shown on the Drawings. They shall have actual dimensions 3/8-inch less than nominal dimensions to allow for width of joints. Interior blocks shall be regular units, with smooth faces on both sides. Special blocks shall be used at bond beams, corners and junctions, and about windows and doors.

13.6.3.4 C.M.U. Mortar. Mortar shall be in accordance with the Property Specifications, ASTM Designation C 270. Unless otherwise indicated on the Drawings, mortar shall be Type M, which shall be proportioned by volume, 1 part Portland Cement, 1 part masonry cement and not less than 4 1/2 parts nor more than 6 parts sand measured in a damp loose condition (80 pounds per cubic foot, dry basis), or 1 part Portland Cement, 1/4 part hydrated lime, and not less than 2 3/4 parts nor more than 3 3/4 parts sand measured in a damp loose condition. Sand shall be adjusted to obtain specified strength.

Portland Cement: Any standard brand conforming to ASTM Specification C 150, same as specified for concrete.

Masonry Cement: Any standard brand conforming to ASTM C 91.

Lime: Hydrated lime must be at least 92 percent hydrated, conforming to ASTM Standard C 207.

Sand: First quality clean natural Kentucky or Ohio River Sand. When dry 100 percent shall pass a No. 8 sieve and not more than 35 percent shall pass a No. 50 sieve, and conforming to ASTM Standard Specification C 144.

The Contractor shall have on the job and use adequate and accurate equipment for obtaining required proportions by volume and cement, sand, and lime in the mortar.

The mortar shall be thoroughly mixed, and only in such quantity as is needed for immediate use. Mortar shall be mixed with a maximum amount of water consistent with satisfactory workability for the mason. Over wetting of mixes shall not be permitted. Only machine mixing shall be used, except for small jobs when hand mixing is specifically authorized by the Engineer.

For machine mixing, while the mixer is in operation, the mortar materials shall be batched in the following order. Add approximately 3/4 of the required water, 1/2 the sand, all of the cement, then the remainder of the sand. Allow the batch to mix briefly and then add water in small quantities until satisfactory workability for the mason is attained. Caution is urged to avoid over-wetting of the mix. The mortar shall then be mixed a minimum time of 5 minutes after all materials have been added. The mixer drum shall be completely empty before recharging next batch.

For hand mixing, the cement and sand shall be thoroughly mixed in the following manner, before water is added: Spread the sand in the box, spread the cement on top of the sand and mix well with hoe from both ends of the box. Add about 3/4 of the required water and mix until all materials are uniformly damp. Add water in small amounts and continue mixing until satisfactory workability for the mason is attained. Allow the batch to stand approximately 5 minutes and remix thoroughly with the hoe, without additional water.

The mortar shall contain as much water as it can possibly carry and still provide satisfactory workability for the mason at the time the masonry unit is laid in the wall. It shall be re-tempered on the board as necessary to maintain this consistency. Re-tempering of the mortar in the mortar box shall not be permitted. Over wetting mixes to reduce tempering time, or excessive re-tempering with continual additions of water, tend to weaken paste. The size of batches should be limited to avoid this requirement.

All mortar shall be used within two hours after mixing and under no circumstances be used after initial set. In cold weather, sand and water shall be heated sufficiently to maintain the temperature of mortar when used to above 50 degrees Fahrenheit. Antifreeze compounds to lower the freezing point of mortar shall not be used. Accelerators or other admixtures shall not be permitted without acceptance of the Engineer.

13.6.3.5 C.M.U. Reinforcement. The Contractor shall use reinforcement at control joints as shown on the Drawings. Anchor block to adjacent columns and beams with dovetail anchors 24 inches O.C. horizontally and 16 inches O.C. vertically unless otherwise required or shown.

Masonry wall steel wire reinforcement shall consist of Cavity-Lok, Block-Lok, Rectangular Ties and “Z” Bars as manufactured by AA Wire Products Company, Dur-O-Wal, Inc. or equal.

Block-Lok shall have 2 galvanized (ASTM A641, Class 3) side rods and galvanized (ASTM A153, Class B-2), flush welded, cross ties spaced not greater than 16 inches on centers as follows:

	Heavy Duty	Standard	Spec. Standard	Extra Heavy Duty
Knurled Side Rods	3/16” Dia.	8 Ga. Galv.	3/16” Dia.	
Cross Ties	9 Ga.	9 Ga.	9 Ga. Galv.	3/16” Dia.

Rectangular Ties shall be not dipped galvanized (ASTM A153, Class B-2) after fabrication, 3/16” diameter by 4 inches wide, without moisture drip. Dovetail Anchor Slots shall be 24-gauge galvanized (ASTM A153, Class B-2) steel with 1-inch wide by 1-inch deep by 5/8-inch throat equal to AA Wire Products Company AA100. Dovetail Anchors shall be 1-inch wide, 12-gauge galvanized (ASTM A153, Class B-2) steel and corrugated. Length shall be sufficient to extend from face of concrete, through joint, to within 5/8 inch of masonry face except for partition walls where length shall be 5 1/2 inches from face of concrete to end of anchor.

13.6.3.6 Brick. Provide brick shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

Facing brick shall comply with ASTM C 216. Subject to compliance with those requirements, available products that may be incorporated into the Work include shall be as specified herein. All facing brick style and color shall be as selected by the Owner, being grade SW, FBS type. Face brick shall provide a minimum average net-area compressive strength of 8000 psi. Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced." The Initial Rate of Absorption shall be less than 30 g/30 sq. in. per minute when tested per ASTM C67. The units shall be modular type, with actual dimensions of 3-5/8 inches wide by 2-1/4 inches high by 7-5/8 inches long. Where shown to "match existing," provide face brick matching color range, texture, and size of existing adjacent brickwork.

Building (Common) Brick shall comply with ASTM C 62; Grade SW. Face brick shall provide a minimum average net-area compressive strength of 8000 psi. The units shall be modular type, with actual dimensions matching that of the corresponding facing brick. Use where brick is indicated for concealed locations. Face brick complying with requirements for grade, compressive strength, and size indicated for building brick may be substituted for building brick.

13.6.3.7 Brick Mortar. For work below grade, use mortar composed of one part Portland cement, ¼ part hydrated lime and three parts sand, by volume. Optional use, one part Portland cement, one part masonry cement, and six parts sand by volume. For work above grade, use mortar composed of one part Portland cement, one part hydrated lime and six parts sand, by volume. Optional use, one part masonry cement, and three parts sand by volume. Sand shall be measured in a damp loose condition and shall be adjusted to obtain specified strength

Portland Cement: Any standard brand conforming to ASTM Specification C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

Masonry Cement: Any standard brand conforming to ASTM C 91.

Lime: Hydrated lime must be at least 92 percent hydrated, conforming to ASTM Standard C 207.

Sand: First quality clean natural Kentucky or Ohio River Sand. When dry 100 percent shall pass a No. 8 sieve and not more than 35 percent shall pass a No. 50 sieve, and conforming to ASTM Standard Specification C 144.

Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use on pigments with a record of satisfactory performance in masonry mortar. Formulate blend as required to produce color to match existing mortar and color selected for chocolate accent brick, as selected from manufacturer's standard colors. Pigments shall not exceed 10 percent of Portland cement by weight.

The Contractor shall have on the job and use adequate and accurate equipment for obtaining required proportions by volume and cement, sand, and lime in the mortar.

The mortar shall be thoroughly mixed, and only in such quantity as is needed for immediate use. Mortar shall be mixed with a maximum amount of water consistent with satisfactory workability for the mason. Over wetting of mixes shall not be permitted. Only machine mixing shall be used, except for small jobs when hand mixing is specifically authorized by the Engineer.

For machine mixing, while the mixer is in operation, the mortar materials shall be batched in the following order. Add approximately ¾ of the required water, ½ the sand, all of the cement, then the remainder of the sand. Allow the batch to mix briefly and then add water in small quantities until satisfactory workability for the mason is attained. Caution is urged to avoid over-wetting of the mix. The mortar shall then be mixed a minimum time of 5 minutes after all materials have been added. The mixer drum shall be completely empty before recharging next batch.

For hand mixing, the cement and sand shall be thoroughly mixed in the following manner, before water is added: Spread the sand in the box, spread the cement on top of the sand and mix well with hoe from both ends of the box. Add about ¾ of the required water and mix until all materials are uniformly damp. Add water in small amounts and continue mixing until satisfactory workability for the mason is attained. Allow the batch to stand approximately 5 minutes and remix thoroughly with the hoe, without additional water.

The mortar shall contain as much water as it can possibly carry and still provide satisfactory workability for the mason at the time the masonry unit is laid in the wall. It shall be re-tempered on the board as necessary to maintain this consistency. Re-tempering of the mortar in the mortar

box shall not be permitted. Over wetting mixes to reduce tempering time, or excessive re-tempering with continual additions of water, tend to weaken paste. The size of batches should be limited to avoid this requirement.

All mortar shall be used within two hours after mixing and under no circumstances be used after initial set. In cold weather, sand and water shall be heated sufficiently to maintain the temperature of mortar when used to above 50 degrees Fahrenheit. Antifreeze compounds to lower the freezing point of mortar shall not be used. Accelerators or other admixtures shall not be permitted without acceptance of the Engineer.

13.6.3.8 Brick Reinforcement. For non-veneer brickwork applications, the Contractor shall use reinforcement identical to that specified for C.M.U. construction. For veneer applications adjustable masonry-veneer anchors shall be used as shown on the drawings. At a minimum, placement shall be at sixteen (16) inches vertically and twenty-four (24) inches horizontally. Anchors shall allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs and to concrete or C.M.U. walls. Anchors shall be capable of withstanding a 100-lbf load in both tension and compression without deforming or developing play in excess of 0.05 inch.

13.6.3.9 Built-In Work. Consult other trades in advance and make provisions for installation of their work in order to avoid cutting and patching. Built-in work specified under other sections of these Specifications is to be installed as the work progresses.

Set sills and copings and steel lintels in beds of mortar unless otherwise shown on Drawings. Fill jambs and heads of metal door frames solid with mortar. Caulk around all sides of metal window, curtain wall, and door frames.

13.6.3.10 Caulking Compound and Accessories. Caulking compound shall be Sonolastic NP1 or NP2 as manufactured by Sonneborn-Contech Inc. or equivalent by W. R. Grace Co. Color shall be light gray throughout unless noted on Drawings. For water immersion, prime with Sonneborn-Contech Primer No. 733 for concrete and masonry, and Primer No. 758 for glass and metals. Where additional sealant backing is needed to control the depth of sealant in relation to joint width. Use Sonneborn Sonofoam Backer-Rod (closed cell polyethylene foam) equivalent W.R. Grace Co. products, or equal.

Caulking compound shall completely seal all joints around frames and sills of doors, windows and other openings in masonry and concrete walls, and all other joints or spaces noted on the Drawings to be caulked. Set door thresholds in full bed of caulking compound. All caulking compound, primer and joint filler shall be installed in strict accordance with the manufacturer's printed instructions, which shall be available at the job site.

All joint surfaces must be dry, thoroughly clean and primed as recommended by the caulking manufacturer. Apply primer with a brush or clean cloth in sufficient amount to obtain 100 percent coverage. Best results are obtained when primer is applied in a thin coat for most surfaces; however, porous surfaces require a somewhat heavier but not excessive coat. Allow primer to dry for the recommended period before applying sealant.

The depth of sealant shall be 1/2 the width of the joint, with a maximum depth of 1/2 inches and a minimum of 1/4 inches. Joint depths exceeding this design criterion should be filled to the proper depth using a joint filler or backup material such as a backer-rod, which should be about 1/8 inch larger in diameter than the width of the joint to allow for compression. Where the joint is too small to permit a backer-rod, a polyethylene film strip must be used to prevent the sealant bonding to joint filler.

Caulking can be applied with a bulk or air powered caulking gun. The manufacturer's recommendations for minimum temperature at which caulking can be applied shall be adhered to. The application to masonry, metal, glass and wood shall be as specified in the manufacturer's instructions. In all cases removal contractor shall remove excess caulking and leave surface neat, smooth and clean. All caulked joints shall be watertight.

13.6.3.11 Window Sills and Copings. Type of windows, sills and copings shall be shown on Drawings. Sills and copings shall be cut and/or cast accurately to shape and dimensions with joints and bonding as shown on the Drawings. Exposed faces shall be straight and true with sharp lines and arises. Beds and joints shall be straight and at right angles to face. Make joints 1/4 inch wide unless otherwise shown on Drawings. All sills and copings shall have drip grooves.

Cut stone window sills and copings shall be standard quality Indiana Limestone of fine to medium texture, free from defects marring appearance. Color shall be gray selected to eliminate a spotty appearance and to obtain even distribution of texture and color. Exposed surfaces shall have a Standard Machine Smooth Finish.

Precast concrete window sills and copings shall be top quality units of fine to medium texture, free from defects marring appearance. Color shall be gray. Exposed surfaces shall have a smooth stonelike finish.

Exterior sills, copings and similar units with exposed top surfaces shall be cut or cast with a wash. Provide raised fillets at back of window sills. Provide holes and sinkages for all anchors and dowels as required. Provide Lewis holes for all units requiring metal anchorage. Locate holes at least two inches from any soffit or exposed face. Anchors and bolts shall be steel or wrought iron, hot zinc-coated after fabrication.

Units shall be set by experienced masons to produce a first class job. Thoroughly clean units, then sponge with clean water just before setting; when setting in cold weather, clean by brushing instead of sponging.

Set each stone plumb, level and true to line in a full bed of mortar and tap to even bearing. Sawing through mortar joints to correct bearing or adjust joint will not be permitted. Soft wood wedges soaked in water, may be used where necessary to prevent crushing of mortar; wedges must be removed when dry and before pointing. Keep face of units free from mortar. Brush joints clean, carefully remove any wedges so that pointing will be continuous; after thorough wetting, point all joints (except those specified to be left open or caulked) flush with pointing mortar. Leave building expansion joints open except where shown on the Drawings to be filled. No pointing shall be done when temperature is below 35 degrees Fahrenheit.

After completion of setting, all units shall be thoroughly cleaned by scrubbing with brushes and soap power or other suitable cleaning compound or by the application of steam. Cleaning compounds shall not contain acid or other ingredients that will injure units. Cleaning shall begin at top and continue down face of building. Upon completion, leave units clean and free from mortar, stain and traces of cleaning compound and with all joints pointed.

Protect offsets and sills with covering until completion of masonry work. Use galvanized nails to prevent rust stains. Protect other work as necessary to prevent damage. Replace damaged or defective units.

Prepare and submit fabrication and setting drawings to the Engineer; do not fabricate units until Drawings have been accepted. Drawings shall show jointing, bonding, connection with other work, typical and special anchoring dimensions and setting number of each unit. Each piece, when delivered, shall have corresponding setting number marked on back or unexposed edge.

13.6.4 Roofing. The Contractor shall furnish and install a single ply Ethylene Propylene Diene Monomer (EPDM) Membrane Roofing System as described herein. The installed roofing membrane systems shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure. Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

The EPDM roofing system shall be a manufactured by Firestone Building Products, RubberGard™ Platinum™ Series.

13.6.4.1 Submittals. The Contractor shall submit to the Engineer manufacturer's product data for each component of the roofing system, including accessories, and other manufactured products, including certifications that each type complies with specified requirements.

The Contractor shall submit to the Engineer for verification purposes, samples of each roofing system component. Maintenance and warranty data should also be provided.

13.6.4.2 Quality Assurance. To assure unity of responsibility, the Contractor shall obtain all components from the single source roofing system manufacturer guaranteeing the roofing system. All products used in the system must be labeled by the single source roofing system manufacturer issuing the guarantee.

The installer of the roofing system shall be a qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and is eligible to receive the specified manufacturer's guarantee.

13.6.4.3 Delivery, Storage, and Handling. Deliver roofing materials in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation

manufacturer's written instructions for handling, storing, and protecting during installation. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

13.6.4.4 Project Site Conditions. The Contractor shall proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

When the outside temperature is below 40 °F (4.4 °C), certain combinations of temperature and humidity may cause condensation on the surface of solvent-based adhesives and primers. If this condition occurs, discontinue the application. When the ambient air conditions no longer cause condensation on adhesive surfaces and the membrane is clean and dry then re-apply additional adhesive or primer and proceed.

The consistency of sealants, adhesives and primers will begin to thicken as the temperature drops. Start work with sealants, adhesives and primers that have been stored between 60°F and 80°F Insulated and heated boxes are recommended. Complete test areas to determine if conditions will cause problems such as condensation with the application of the materials. Stop the operation or change to another warm container when material becomes too thick to properly apply.

When the outside temperature is below 40 F installation of the EPDM roof system requires additional application procedures. Ensure that the roof surface is dry. Moisture, even trace amounts, may cause poor adhesion, and may lead to moisture entrapment within the roofing system. Use of temporary roofs should be considered when roof applications must occur in cold or potentially wet weather to permit continued interior construction or roof-top work to proceed. If using Water-Based Bonding Adhesive (WBBA), temperatures and substrate must be at least 40°F and rising for the material to be applied and perform as designed. Longer drying times should be expected for lower temperatures and higher humidity.

13.6.4.5 Roof Substrate Preparation. The Contractor shall ensure that the substrate is acceptable for the roof system as recommended by the Manufacturer. The complete removal of all existing roof system components is required; re-cover applications will not be permitted. Following removal, any defects in the substrate shall be corrected before installation is allowed to commence. All surface voids of the immediate substrate greater than 1/4" wide must be filled with insulation.

Acceptable substrates to which the roof system is installed must be properly prepared prior to membrane installation. The surface must be relatively even, clean, dry, smooth, free of sharp edges, fins, loose or foreign materials, oil, grease and other materials that may damage the membrane. Rough surfaces that could cause damage to the membrane must be overlaid with insulation. Any ponded water, snow, frost and/or ice which are present in more than trace amounts must be removed from the work surface(s) prior to installation.

13.6.4.6 Wood Nailers. The use of treated wood nailers is no longer permitted due to new EPA requirements that have caused treated lumber to have more corrosive properties than the previous generation of wood treatments. Nailers shall be kiln-dried (Southern Pine, Douglas Fir) structural grade #2 or better, unless otherwise noted. While being stored on the roof, properly elevate and cover non-treated wood to protect from the weather and keep dry. Nailers shall be properly anchored to provide secure attachment through the warranty term.

Nailers shall be as indicated on the drawings and under no circumstances less than a minimum thickness of 2" x 4" nominal and exceed the width of any metal flange attached to it by a minimum of 1/2". The total wood nailer height must match the total thickness of insulation being used and should be installed with a 1/8" (3.2 mm) gap between each length and each change of direction. When more than one nailer thickness is used end joints should be staggered a minimum of 12" from the prior layer in straight runs.

Wood nailers must be firmly fastened to the deck or building. Mechanically fasten wood nailers to resist a minimum force of 200 lb/f in any direction. Nailers must be tapered (if applicable) so that it will always be flush at the point of contact with the insulation. A waterproof separator membrane shall be placed between the non-treated lumber and the slab roof.

13.6.4.6 Insulation. Preformed roof insulation boards shall comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated. Roofing insulation shall be Rigid Board Cellular Polyisocyanurate Thermal Insulation which complies with ASTM C 1289, Type II, with R Value greater than 19 and a minimum thickness of 1-1/2". The insulation boards shall be factory-tapered fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated. The insulation boards should be no larger than 4' X 4' for adhesive attachment.

The Contractor shall install only as much insulation as can be covered with roofing membrane and completed before the end of the day's work or before the onset of inclement weather. Neatly fit insulation to all penetrations, projections, and nailers. Insulation should be loosely fitted, with gaps greater than 1/4" filled with acceptable foam insulation. The edges of insulation boards running parallel with the deck should be supported by the top flange. Under no circumstances should the membrane be left unsupported over a space greater than 1/4". When installing multiple layers of insulation, all joints between layers must be staggered.

Insulation shall be attached using an acceptable Urethane adhesive approved by the manufacture for use on the roof deck material. The adhesive shall be applied in strict accordance with the instructions provided with the product by the manufacturer. It may be necessary to prime the substrate prior to installing the insulation in adhesive. It will likely be necessary to walk boards in or weight them down to ensure complete adhesion to the substrate.

13.6.4.6 EPDM Membrane. The EPDM Membrane shall be a single ply 90 mil synthetic rubber membrane designed for long-term waterproofing performance when used in a fully adhered roof system application. The Contractor shall install the EPDM Membrane in strict accordance with the manufactures instructions.

Initially, the membrane sheeting should be laid out, without stretching, over the acceptable substrate and allowed to relax for a minimum of 30 minutes before splicing or attaching. The system must be installed so that the seams shed the flow of water. Once the sheet is placed in its final position, allowing for a minimum 3" lap width, the sheet should be folded back evenly onto itself without wrinkles to expose the underside mating surface of the sheet.

The mating surfaces shall then be thoroughly swept with a stiff broom to remove any dusting agent or dirt that may have accumulated. The bonding adhesive can then be applied using either a 9" wide solvent-resistant paint roller, commercial-grade adhesive sprayer or power roller. The

adhesive must be applied in a relatively uniform thickness to both surfaces at approximately the same time. If adhesive is spray-applied, it must be back-rolled with a paint roller to assure proper contact and coverage. Care must be taken not to apply bonding adhesive over an area that is to be later spliced to another sheet or flashing. All bonding adhesive must be completely removed from the seam area. Ensure that the bonding adhesive is applied at the manufactures specified coverage rate.

The Contractor should allow the bonding adhesive to appropriately flash-off prior to mating. Flash-off time will vary depending on ambient conditions. Once the adhesive is ready, roll the previously coated portion of the membrane into the coated substrate slowly and evenly to minimize wrinkles.

To assure proper contact, compress the bonded half of the membrane to the substrate with a stiff push broom.

If required, the Contractor shall install seams/splices as directed by the manufacturer. Generally this shall be accomplished by positioning the membrane at the seam area by overlapping membrane 4". The bottom membrane shall then be marked 1/2" to 3/4" from the edge of the top membrane every 4' to 6' using a marking crayon. The membrane should then be tacked back using an acceptable primer as necessary to hold back the membrane at the splicing area. Excess amounts of dusting agent should then be removed on the membrane and at factory splices using a stiff push broom. Full application of the primer can then be done, using long back and forth type strokes with pressure along the length of the splicing area until surfaces become dark gray in color. The primer should be applied to both surfaces at the same time

The primer should be allowed to dry properly before application of the splice tape. The tape should be applied to the bottom membrane, aligning the edge of the release paper with the markings. Immediately roll the splice tape with a 3" to 4" wide hand roller. After the tape has been installed for the entire seam length, position the top membrane to rest on top of the tape's release paper backing. 1/8" to 1/2" of the tape should be exposed on the finished seam. Finish the installation of the tape by releasing the paper backing by pulling against the weight of the bottom membrane at approximately a 45° angle to the tape and parallel with the roof surface. The entire length of the seam should then be broomed at a 45° angle as the release paper is being removed. Complete installation of the seam by rolling using a 1-1/2" to 2" wide silicone hand roller first across the width of the seam and then along the entire length of the seam.

All 3" field seams and all EPDM flashing seams must then be covered with an additional treatment of seam flashing, centered over the completed field seam. This shall be accomplished by first cleaning the seam edge a minimum of 3" on each side of the lap using primer. The seam flashing can then be installed by removing the paper backing and pressing it down. Care to taken avoid wrinkles and the flashing should not be stretched. If multiple rolls are required, adjoining rolls should be lapped a minimum of 4". Roll the flashing using a 1-1/2" to 2" wide silicone hand roller. A seam edge treatment is required at all joint covers, roof edges, etc. as per the manufactures instructions. This shall be accomplished by applying a splice adhesive a minimum of 1" on either side of the seam edge. If the seam edge has become contaminated, it will be necessary to clean the edge prior to applying the adhesive. A continuous bead of lap sealant at approximately 3/8" x 1/4" width centered over the seam edge using a standard caulking nozzle. Using a lap sealant tool, feather the Lap Sealant immediately, taking care to leave a mound of sealant directly over the seam edge.

13.6.4.7 Drain Bar. A drain bar shall be provided along with the EPDM roofing system. The drain bar should be specifically designed to be used with membrane as per the manufacturer. Drain bar should be manufactured of extruded 6063 -T5 Aluminum meeting the corrosion resistance criteria of FM No. 4470. It should be a minimum of 4" in height and be supply in 10' sections.

The drain bar shall be installed as specified by the manufacturer being attached to the substrate using the fasteners supplied by the manufacturer. If field modifications are required, all cut surfaces must be rounded and filed to remove burrs and sharp edges. Each length of drain bar shall be separated from adjoining bar by 1/4". At inside and outside corners, the drain bar must be cut and continued. The bar must be fastened at maximum of 1" in from each end of all sections. Care should be taken to not overdrive or underdrive fastener and any shavings, etc. that may occur from field cutting should be cleaned up immediately.

13.6.4.8 Aggregate Ballast. An appropriate aggregate ballast shall be uniformly applied over roofing membrane at the rate required by membrane roofing system manufacturer, but not less than the indicated herein, spreading with care to minimize possibility of damage to membrane roofing system. Ballast as roofing membrane is installed, leaving roofing membrane ballasted at the end of the workday. Ballast installation should be compliant with the standards of ANSI/SPRI RP-4. Ballast shall be minimum Size 2 aggregate applied a rate of 13 lb/sq. ft. More ballast may be required to fully conceal membrane, which is required.

13.6.4.9 Roof Edge Fascia. The use of treated wood fascia is no longer permitted due to new EPA requirements that have caused treated lumber to have more corrosive properties than the previous generation of wood treatments. Fascia shall be kiln-dried (Southern Pine, Douglas Fir) structural grade #2 or better, unless otherwise noted. While being stored on the roof, properly elevate and cover non-treated wood to protect from the weather and keep dry.

Fascia shall be as indicated on the drawings and under no circumstances less than a minimum thickness of 2" x 10" nominal. Fascia must be firmly fastened to the building roof edge. Mechanically fasten wood nailers to resist a minimum force of 200 lb/f in any direction. A waterproof separator membrane shall be placed between the non-treated lumber and the slab roof.

Wood fascia should be clad with aluminum sheeting conforming to ASTM B 209 alloy manufactured for finish required. The metal should be tempered to suit forming operations and performance required. The surface should be equipped with a smooth and flat finish consisting of a two-coat AAMA 620 coating system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight. Finish color shall be as selected by the Owner and approved by the Engineer.

13.6.4.10 Roof Drainage System. The Contractor shall furnish and install a roof drainage system consisting of roof gutters and downspouts as shown on the drawings. Roof gutters and downspouts may be made of aluminum sheeting conforming to ASTM B 209 alloy manufactured for finish required. The metal should be tempered to suit forming operations and performance required. The surface should be equipped with a smooth and flat finish consisting of a two-coat AAMA 620 coating system consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight. Finish color shall be as selected by the Owner and approved by the Engineer. No used materials shall be installed in this project and dissimilar metals shall not be installed in contact with each other.

Gutters shall have a minimum nominal thickness of 0.027 inches, manufactured in uniform section lengths not exceeding 12 feet. Gutters shall be factory mitered and mechanically clinched and sealed watertight. The back edge shall be elevated at least 1 inch above front edge. Flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters. Matching corner units, ends, outlet tubes, and other accessories shall be provided. Wire ball downspout strainer shall be included.

Downspouts shall have a minimum nominal thickness of 0.020 inches manufactured as plain round type complete with smooth-curve elbows. Metal hangers and supports from same material as downspouts.

Gutters shall be supported at a maximum spacing of 24 inches. Gutters shall be attached by means of hangers. Downspouts shall be securely fastened at the top and bottom with intermediate supports that are a maximum of 5 feet apart. Gutters shall be installed with the minimum fall specified on the drawings. If the minimum fall is not specified on the drawings, gutters shall be installed with sufficient slope so they drain to the downspouts. Gutters shall have the minimum cross section dimensions as shown on the drawings. The opening in the gutter into the downspout shall equal the minimum downspout size. Where applicable, the connection between the downspouts and underground outlets will prevent contaminated surface water from entering outlet.

13.6.5 Heavy Duty Steel Doors. Doors, single and double leaf and of the size shown, shall be manufactured of 18-gauge galvanized steel. Door sizes and locations are as shown on the drawings. All doors shall be full flush construction and 1-3/4 inches thick. Doors shall be reinforced, stiffened, insulated, and sound deadened with a solid polystyrene foam board permanently bonded to the inside of each face skin.

The lock and hinge edge of each door shall be welded with a center hairline seam the full height of the door. The lock edge shall be reinforced full height by a 14-gauge continuous one-piece channel extruded templating. The hinge edge shall be reinforced full height by a 14-gauge continuous one-piece channel, formed and tapped for hinges. Top and bottom of the door shall be closed with 16-gauge channels. Doors shall have beveled 1/8-inch (3) in 2-inch (51) lock edge and square hinge edge. Doors shall be thoroughly cleaned and receive an iron phosphate treatment prior to receiving one coat of prime paint. Door closures and rim panics are reinforced with 14-gauge channels.

Doors shall be fully-mounted in frames produced for pre-hanging of commercial 1-3/4" doors. Frames are formed to 16-gauge commercial quality cold rolled steel conforming to ASTM A366 or A620 and A568. Frames are produced in two welded units, to be mechanically joined during installation. The base side is prepared for all required hardware. Both the unit's base and trim, are furnished with welded mitered faces. Frame anchoring includes compression anchors and stud screws. Door hinges shall be continuous gear hinges, fabricated of extruded 6063-T6 aluminum alloy/temper with pinless assembly. The doors shall have a lockset, exterior handle, interior panic type exit device, and top mounted-door closer with hold-open device.

Doors and frames shall be finished with a two-component, aliphatic/acrylic polyurethane coating, finish color as selected by the Owner and approved by the Engineer, with a high gloss finish. The coating shall be resistant to a wide range of solvents and chemicals under splash and spill conditions. The coating system is V.O.C. compliant.

Door knobs and cylindrical locks shall be as manufactured by SARGENT Manufacturing Company, 9 Line, corrosion resistant, and heavy duty bored locks or approved equal and shall meet the Federal Specification Series 161 and ANSI-A-156.2 series 4000, Grade 1. The strike shall conform to ANSI A-115.2 and be sized to work with a 1 3/4" stainless steel door. Two (2) nickel silver keys per lock shall be provided to Owner and keyed as specified by Owner.

Door closers shall be as manufactured by SARGENT Manufacturing Company, Powerglide Line, 250 Series or approved equal. Closer covers shall be metal. The entire closer assembly and cover shall be manufactured from materials and finished suitable to provide maximum protection from a highly corrosive chlorine environment and suitable for mounting on doors and frames that shall be manufactured of Type 316 Stainless Steel. The closing speed, latching speed and back check shall be controlled by key operated valves. Delayed action shall be available in addition to, not in lieu of back check. Two (2) mounting positions of the closer shall meet all requirements. Standard mountings shall provide 120° door opening and alternate mounting of 180°. All closers shall be suitable for standard, corner bracket, top jamb, parallel arm and track type applications. Closers shall be handed to match doors as shown on the door schedule and have a 10 year limited warranty.

13.7 Paint & Coatings. The Contractor shall furnish and apply coatings and paint to those items and surfaces as described herein and shown on the Drawings. Specific surfaces to be coated for this project include items incorporated into the facility as part of this project. These items include but are not limited to the following:

- Concrete Surfaces
- Masonry Surfaces
- Exposed Piping
- Exposed Conduit
- Metals, Machinery, & Equipment

13.7.1 Submittals. Before any materials are delivered to the job site, the Contractor shall submit to the Engineer a complete list of all materials proposed to be furnished including types and descriptions of paint for each part of the project. Material list shall make reference to the specified paint systems and the painting schedule for each paint product proposed to be used, indicating type of surface to be painted, building or location and system as specified. Two copies of the full range of colors available in each of the proposed products shall be submitted with the materials list.

The Contractor shall submit the following data to the Engineer for review prior to placing the material order. For purposes of comparison, indicate specified materials for which coatings are proposed.

- Type
- Manufacturer
- Current recommended method of application published by manufacturer
- Example of past performance of paints under similar conditions (case studies)
- Percentage solids by volume
- Recommended usage

13.7.2 Quality Assurance. All painting shall be done by qualified, skilled, experienced painters. In the acceptance or rejection of completed painting, no allowance will be made for lack of skill on the part of the painters.

Labels on paint containers shall include the following:

- Manufacturer's
- Generic type of paint
- Manufacturer stock number
- Color
- Instructions for thinning (if applicable)

The Contractor shall be responsible for the compatibility of all paints used in the work. A compatible paint will be considered a paint which precludes adverse effects related to bonding, drying delamination, scaling, lifting, and bleeding. In cases where shop-applied primers and coatings on materials and equipment furnished by suppliers are products different from those described in the Specifications, the Contractor shall verify compatibility with the specified field-applied coating system.

Where thinning is necessary, only the products of the manufacturer furnishing the paint, and products for thinning purposes only, will be allowed. Minimum dry mil thicknesses per coat (MDMTPC) and/or spreading rates in square feet per gallon shall be governed by the manufacturer's current data sheets or literature containing recommendations or instructions regarding these values. These recommended dry mil thickness and/or spreading rate values will be considered requirements to be met same as if set out herein in these Specifications and Contract Documents and must be included with material list submittals before the Engineer grants approval to use any paint materials. Do not exceed manufacturer's recommended coverage rates. The number of coats to be applied are specified herein and shall govern. Where the total dry film thickness is specified, this thickness shall govern over the MDMTPC.

The Contractor shall provide assurance that a qualified representative of the paint manufacturer makes periodic visits to the project site during painting to verify proper application procedures, quality and progress of work, and if necessary, to instruct painting personnel in any special preparation and/or application procedures.

13.7.3 Product Delivery, Handling and Storage. All materials shall be delivered to the job site in the original sealed and labeled containers of the paint manufacturer and shall be subject to inspection by the Engineer. All labels shall be legible and intact at time of use. Paint manufacturer's written instructions for proper surface preparation, mixing, thinning, application and drying shall be furnished with the paint, available at all times at the job site, and strictly followed.

13.7.4 Environmental Requirements. The Contractor shall comply with all applicable manufacturers' recommendations as to environmental conditions under which coatings and coating systems can be applied. Do not apply finish in areas where dust is being generated. Paint shall not be applied if the ambient temperature or temperature of surface to be painted is below 50°F or below the temperature recommended by the paint manufacturer; the relative humidity is above 85%; or the relative humidity is such that the paint will not dry properly as determined by the Engineer.

The Contractor shall protect with drop cloths, masking or other acceptable means all surfaces which could be damaged in function or appearance by paint, including surfaces not being painted concurrently and surfaces not to be painted. Hardware, accessories, fixtures and similar items shall

be removed and replaced after completion of painting. Spray painting will not be permitted when it will cause damage to adjacent or otherwise located surfaces. All paint spatters on glass shall be wiped off immediately.

13.7.5 Products. Except as otherwise specified, materials shall be the products of the following manufacturers or approved equal:

- Tnemec Company, Inc.
- Sherwin-Williams Company

Materials selected for coating systems for each type surface shall be the product of a single manufacturer, unless otherwise acceptable to the Engineer. All field applied primers and undercoats shall be provided to ensure compatibility of total coating systems and of the same manufacturer as the finish coats for each system as specified hereafter.

All materials shall herein be assigned a designation number for ease of reference. The minimum material requirements shall be as listed in the tables below.

13.7.5.1 Coating Designation Table.

Designation	Generic Composition	No. of Coats	Dry Mill Thickness Per Coat	Manufacturer's Name
Primer P-3	Polyamide Cured Epoxy	1	3.0 - 5.0	Tnemec N69-1211
		1	3.0 - 5.0	Sherwin-Williams Copoxy or Macropoxy 646
Primer P-4	High Build Epoxy Primer	*	*	Tnemec Series 130
		*	*	Sherwin-Williams Cement-Plex 875
Primer P-5	Synthetic Resin	*	*	Tnemec 151 Sherwin-Williams Loxon Conditioner.
Primer P-6	PVA Sealer	1	1.5 - 2.5	Tnemec 51-792
		1	1.0 - 2.0	Sherwin-Williams Multi-Purpose Latex Primer
Primer P-7	Primer	1	1.0 - 2.0	Tnemec 151
		1	1.0 - 2.0	Sherwin-Williams Multi-Purpose Latex Primer
Finish F-1 (Non-Submerged)	Polyamide Epoxy	1	3.0 - 5.0	Tnemec N69 HB Epoxoline II Sherwin-Williams Macropoxy 646
Finish F-1 (Submerged)	Polyamine Epoxy	3	4.0 - 6.0	Tnemec N69 HB Epoxoline
		3	4.0 - 6.0	Sherwin-Williams Dura-Plate 235
Finish F-2	Aliphatic Polyurethane	1	3.0 - 5.0	Tnemec Series 1074 - Endura Shield II
		1	3.0 - 5.0	Sherwin-Williams Acrolon 218HS or Hi-Solids Polyurethane
Finish F-3	High Build Epoxy	1	10.0 - 12.0	Tnemec N69 HB Epoxoline II
		2	4.0 - 6.0	SW Macropoxy 646
Finish F-4	Waterborne Acylic	1	-	Tnemec Series 156
		1	-	Sherwin-Williams Loxon XP
Finish F-5	Semi-Gloss	2	1.5 - 2.5	Tnemec -1029
		2	2.5 - 4.0	Sherwin-Williams Sher-Cryl Semi-Gloss
Finish F-6 (buried items)	Coal Tar Epoxy	2	8.0 - 10.0	Tnemec 46H-413 Tneme Tar
		1	16.0 - 20.0	Sherwin-Williams Hi-Mil Sher-Tar
Finish F-7	Clear High Content Acrylic Finish	2	0.5	ACRI-SEAL 800 by Toc
		2	0.5	KURE-N-SEAL by Sonneborn
		2	0.5	CURECRETE by Tnemec

* Masonry porosity shall be completely filled to seal all surface voids

13.7.5.2 Surface Designation Table.

Type of Surface	Prime Coats	Finish Coats	Minimum Number of Coats	Minimum Total Finished Dry Mil Thickness <i>(Note 1)</i>
Exposed Pipe without Bituminous Coating	P-3 <i>(Note 2)</i>	F-1	3	9.0
Manhole Frames & Covers	P-3 <i>(Note 2)</i>	F-1	3	9.0
Non-submerged Interior Metals & Machinery	P-3 <i>(Note 2)</i>	F-1	3	9.0
Submerged Metals and Machinery <i>(Note 3)</i>	P-3 <i>(Note 2)</i>	F-1	3	12.0
Non-submerged Exterior Metals & Machinery	P-3 <i>(Note 2)</i>	F-1 (Initial Coat) F-2 (Finish Coat) <i>(Note 5)</i>	3	9.0
Concrete Walls and Ceilings	-	F-3	2	8.0
Submerged Concrete Walls <i>(Note 3)</i>	-	F-1	3	12.0
Concrete Floors	F-7	F-7	2	1.0
Interior Masonry	P-4	F-3	3	8.0
Exterior Masonry	P-5	F-4	2	8.0 - 10.0 <i>(Note 4)</i>
Interior Walls (Drywall)	P-6	F-3	3	5.5
Wood	P-7	F-5	3	4.0

Notes:

1. The total finished dry mil thickness shall be in accordance with the manufacturer's coating system's requirements.
2. Use P-3 for shop primer and field touch-up primer.
3. The term submerged applies to water and wastewater. Special consideration shall be given to applications where acids or other highly corrosive materials will be present.
4. Total dry film thickness of 8.0 - 10.0 mils excludes the primer.
5. Color of F-1 shall be the same as F-2.

13.7.6 Colors. The Contractor shall comply with OSHA requirements concerning color coding and safety markers. All other colors should match that of the existing items to be replaced, unless otherwise specified or directed by the Engineer:

All coatings, except two part epoxies, shall be delivered to the job site premixed. Job tinting will not be acceptable, except as approved by the Engineer. All mixing shall be done in mixing pails placed in suitably sized non-ferrous or oxide resistant metal pans.

13.7.7 Execution. The Contractor shall examine surfaces scheduled to receive paint and/or coating finishes for conditions that will adversely affect application, permanence or quality of work and which cannot be put into an acceptable condition through surface preparation. Do not proceed with surface preparation or coating application until conditions are suitable. If surfaces are not thoroughly dry or if they cannot be put in proper condition to receive paint by customary cleaning methods, the painting applicators shall notify the Contractor in writing requesting necessary corrections. Review the specified or approved painting and coating systems and bring questions or doubts as to the proper performance in writing to the Engineer at least 15 calendar days prior to commencing work. Otherwise, the Contractor shall assume the responsibility for providing the desired results.

The commencement of painting work in any area or space will be construed as acceptance of the surface as being satisfactory and corrected at no additional cost to the Owner.

13.7.7.1 Preparation of Surfaces. All surfaces shall be thoroughly cleaned and free of dust, dirt, rust, scaling, loose paint or oily materials. No painting shall be done until surface is inspected by the Engineer. For non-ferrous metals and concrete, surface preparation shall be as follows, but not less than that required by the paint manufacturer. References to SSPC refer to The Society for Protective Coatings specifications.

Surfaces shall be primed and/or treated, as specified, as soon after completion of surface preparation as practicable, but in any event before any visible or detrimental corrosion or contamination occurs. A prepared surface, which becomes corroded or contaminated, shall be re-prepared before treating and/or priming at no additional cost to the Owner.

Concrete to be coated shall have their surfaces prepared by a light abrasive blast cleaning or water blast in accordance with SSPC-SP 13 to remove loose coatings and provide a textured surface to enhance adherence of the new coating. No abrasive blast cleaning shall be done on the job in areas containing pumps, motors or other equipment that could be damaged by infiltration of abrasive particles. Concrete surface preparation should always be in accordance with manufacturer's instructions.

All new non-galvanized structural steel for non-submerged service shall have their surfaces prepared according to SSPC-SP 6, Commercial Blast Cleaning.

All new non-galvanized structural steel and fabricated metals for submerged service or high temperature service shall have their surfaces prepared according to SSPC-SP 10 Near-White Metal Blast Cleaning.

All unprimed metal surfaces and miscellaneous fabricated metals (exclusive of structural steel and galvanized metals) to be painted shall be thoroughly cleaned according to SSPC-SP2 Hand Tool Cleaning or SSPC-SP3-63 Power Tool Cleaning, unless specifically required elsewhere in these Specifications.

Wood surfaces shall be thoroughly cleaned of all extraneous matter and all cracks, nail holes, and other defects properly filled and smoothed. Wood trim shall be sanded to fine finish and wiped clean of dust.

13.7.7.2 Shop Priming. Shop priming shall be done with primers that are guaranteed by the manufacturer to be compatible with the finish paints to be used.

13.7.7.3 Thinning. Thinning shall be done strictly in accordance with the paint manufacturer's instructions and only upon notification to the Engineer. When thinning is acceptable, additional coats of paint shall be applied as needed to build up to the specified dry paint film thickness.

13.7.7.4 Application. On metal surfaces apply each coat of paint at the rate specified by the manufacturer to achieve the minimum dry mil thickness required. Deficiencies in film thickness shall be corrected by the application of additional coat(s).

On masonry, the application rates will vary according to surface texture; however, in no case shall the manufacturer's stated coverage rate be exceeded.

On porous surfaces, it shall be the painter's responsibility to achieve a protective and decorative finish either by decreasing the coverage rate or by applying additional coats of paint.

Evenly brush out each finish coat and permit to dry per manufacturer's recommendation before applying any subsequent coats.

Successive coats of paint shall be tinted so as to make each coat easily distinguishable from each other with the final undercoat tinted to the approximate shade of the finished coat.

Finish surfaces shall not show brush marks or other irregularities. Undercoats shall be thoroughly and uniformly sanded with No. 00 sandpaper or equal to remove defects and provide a smooth even surface.

Painting shall be continuous and shall be accomplished in an orderly manner so as to facilitate inspection. Materials subject to weathering shall be prime coated as quickly as possible. Surfaces of exposed members that will be inaccessible after erection shall be cleaned and painted before erection.

All surfaces to be painted as well as the atmosphere in which painting is to be done shall be maintained at the conditions recommended by manufacturer by heating and ventilating, if necessary, until each coat of paint has hardened. Any defective paint shall be scraped off and repainted in accordance with the Engineer's directions.

Apply one coat of metal primer, of the type specified above, and one coat of flat black metal enamel, to the surfaces of all ductwork behind grilles, for a distance of 18 inches.

Perform all required back-priming work before items are installed.

Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.

Finish exterior and interior doors on tops, bottoms and side edges the same as door faces, unless otherwise indicated.

Hardware accessories, machine surfaces, plates, lighting fixtures, and similar items in place, prior to cleaning and painting, and not intended to be painted, shall be removed during painting operations or provided with surface-applied protection. The Contractor shall not only protect his work at all times, but shall also protect all adjacent work and materials by the use of sufficient

dropcloths during the progress of his work. Upon completion of the work, he shall clean up all paint spots, oil, and stains from floors, glass, hardware, and similar finished items.

13.8 Special Conditions. The Owner and the Engineer assume no responsibility for the actual condition of the structures to be demolished, removed, modified or improved. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. However, variations within each site may occur prior to the start of work.

Certain information regarding the size, character and location of existing structures, equipment, pipes and conduits has been shown on the drawings. There is no certainty of the accuracy of this information, and the location of items shown may be inaccurate and other obstructions than those shown may be encountered. The Contractor hereby distinctly agrees that the Owner is not responsible for the correctness or sufficiency of the information given; that in no event is this information to be considered as a part of the Contract; that he shall have no claim for delay or extra compensation on account of incorrectness of information regarding obstructions either revealed or not revealed by the drawings; and that he shall have no claim for relief from any obligation or responsibility under this Contract in case the location, size, or character of any item is not as indicated on the Drawings, or in case any item is encountered that is not shown on the Drawings.

13.9 Payment. Payment shall be that which is subsidiary with the Bid Schedule. The total price bid shall constitute full compensation for providing and installing the complete booster pump renovation as depicted on the drawing and specified herein.

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SECTION 16000 - ELECTRICAL GENERAL PROVISIONS

1. RELATED DOCUMENTS

A. General Provisions of Contract, General and Supplementary Conditions, and General Requirements, apply to this Section.

B. This Section shall be governed by alternates insofar as they apply to this work.

2. DESCRIPTION OF WORK

A. Provide labor, equipment, materials, supplies and components, including lamps and fuses; and perform all operations including cutting, channeling, chasing, trenching and backfilling necessary for installation of complete electrical system.

B. Appliances, equipment, and fixtures shall be current models for which replacement parts are available. Store and protect materials and equipment delivered to site in such a manner as to effectively prevent damage from climatic conditions, condensation, dust, and physical abuse. Install and connect materials and equipment in accordance with manufacturer's instructions and recommendations. Each major component of equipment shall have manufacturer's name, address, model number, and ratings on a plate securely affixed in a conspicuous place.

C. It is not the intent of this section to make any Contractor, other than the General Contractor alone, the single responsible party to the Owner. All transactions such as submittal of shop drawings, claims for extra costs, requests for equipment or materials substitution, shall be done through the General Contractor. No attempt has been made to arbitrarily assign responsibility of work, material, equipment or services to a particular trade or Contractor. Unless stated otherwise, subdivision and assignment of work shall be General Contractor's responsibility.

D. Facilities and systems of electrical work are described (but not by way of limitation) as follows:

- (1) Electrical connecting of equipment not specified to be connected as work of another Division.
- (2) Motor starters and control/protection work as indicated.
- (3) Electric equipment and motor connections.
- (4) Control/monitoring work as indicated.

E. Each CONTRACTOR bidding on the work included in these Specifications shall view the site and carefully examine the Contract Drawings and Specifications, so that he/she may fully understand what is to be done, and to document existing conditions.

3. QUALITY ASSURANCE

A. Minimum standards for all electrical work shall be latest revision of NEC. Whenever and wherever OSHA, Federal and State laws, regulations and design require higher standards than NEC, these laws, regulations, and designs shall be followed.

B. Provide electrical inspection by a licensed and recognized Electrical Inspector. Notify Electrical

(1) Inspector in writing, immediately upon start of work with a copy of notice to Engineer. Schedule inspection for rough as well as finished work. Approval from Electrical Inspector will not be allowed as reason for deviation from Contract Documents. All costs incidental to Electrical Inspection shall be borne by Contractor. Prior to final acceptance of work and release of final payment, deliver to Engineer the certificate of final inspection.

C. Obtain all permits required for entire construction of electrical system from authorities governing such work. Bear all costs of these permits.

D. All materials shall be new and best of their respective kinds unless otherwise specified and shall be listed by UL and shall be so labeled. All equipment shall conform to latest approved standards of I.E.E.E., N.E.M.A., A.N.S.I., U.L. and O.S.H.A. See individual specification sections for other specific requirements.

4. CONTRACT DOCUMENTS

A. Contract Documents are intended to cover furnishing and installing of complete electrical systems (interior and exterior) including miscellaneous systems, all tested and ready for operation.

B. Contract Documents are complementary, each to the other, and work required by either shall be included in the contract as if called for by both. Necessary items or work omitted, not clearly included, specified or indicated and material or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, or rules shall be clarified by a written request to Engineer prior to bidding. In absence of such written notice, Contractor shall be responsible for approved satisfactory functioning of entire system without extra compensation.

C. Drawings other than electrical drawings, and other sections of this specification, may show or specify electrically operated equipment and wiring diagrams. Examine all such drawings and specifications. Determine characteristics and provide necessary wiring and connections for all such equipment.

D. Keep electrical record drawings up to date each day. Record drawings will be reviewed by Engineer each month with Contractor's pay request review. Entries and notes shall be made in a neat and legible manner and these drawings delivered to the ENGINEER after completion of the construction, for use in preparation of Record Drawings.

E. Naming of a certain brand or make or manufacturer in specifications is to establish style or quality standard for articles desired. Contractor is not restricted to use of specific brand of manufacturer named unless so indicated in specifications. However, where a substitution is requested, a substitution will be permitted only with written approval of Engineer. Proposed substitutions prior to bidding shall be submitted prior to bid date. Submit three bound copies of manufacturer's data showing all pertinent data, and samples, if requested.

5. COORDINATION

A. Coordinate work of different trades so that:

(1) Interference between mechanical, electrical, architectural, and structural work including existing services shall be avoided.

(2) Within limits indicated on Drawings, the maximum practicable space for operation, repair, removal, and testing of electrical equipment shall be provided.

B. All electrical materials and equipment shall be kept close as possible to ceiling, walls and columns, to take up a minimum amount of space.

C. Provide all offsets, fittings and similar items necessary in order to accomplish requirements of coordination without additional expense to Owner.

D. Drawings are diagrammatic and indicate general location of material and equipment. Refer to architectural and structural drawings and specifications for general construction of building, for floors and ceiling heights and for locations of walls, partitions, beams, and equipment, and be guided accordingly for setting of all equipment. Do not scale electrical drawings to determine exact locations.

E. Motor horsepowers and apparatus wattage ratings indicated on Drawings or specified herein are estimated values, and corresponding sizes of feeders and other electrical equipment indicated to serve them are minimum sizes. Motors of greater horsepower and apparatus with larger wattage ratings may be provided if necessary to meet requirements of various sections of specification in which they are specified. Where larger motors or apparatus with larger wattage ratings are provided, feeders and other electrical equipment serving them shall be increased in capacity to correspond. Increase in capacity of feeder and other apparatus shall be furnished at no additional cost to the Owner.

F. Be responsible for locating all openings required in walls, floors, ceilings or roof, for all materials and equipment provided under Electrical sections.

(1) Check with other trades on scope of their work and coordinate on all locations of various items of equipment and outlets before they are finally placed and connected. Relocation of material or equipment necessitated by failure to coordinate work shall be at no cost to Owner.

(2) Do not cut work of any other trade without first consulting Engineer's representative. Repair work damaged employing services of trade whose work is damaged. Where openings or sleeves have been omitted, they shall be drilled or sawed as directed by Architect. All cutting and patching shall be responsibility of this Section.

(3) Wherever slots, sleeves or other openings are provided in floors or walls, for the passage of conduits or other forms of raceway, including bus ducts, such openings, if unused, or spaces left in such openings after installation of conduit or raceway shall be filled. Filling materials for openings in walls and floors generally shall be fire resistive and constructed and installed so as to prevent passage of water, smoke and fumes. Where conduits passing through openings are exposed in finished rooms, finishes of filling materials shall match and be flush with adjoining floor, ceiling or wall finishes.

(4) Provide exposed conduit passing through floors, walls, or ceilings of finished rooms with chrome plated escutcheons. Plates shall be split, hinged type of sufficient outside diameter to amply cover up sleeve openings for pipe.

6. WARRANTY

A. Contractor shall be responsible for warranting all work, including equipment, materials, and workmanship provided under this section. This warranty shall be against all defects of the above and shall run a minimum period of one (1) year from date of acceptance of the work, concurrent with the one year guarantee period designated for the general construction contract under which electrical work is performed. Date of acceptance shall be considered to be the date on which all "punchlist" items are completed ("punchlist" is defined to be the written listing of work that is incomplete or deficient that must be finished or replaced/repared before the CONTRACTOR receives final payment).

B. Defective work, equipment, materials and workmanship that develops within warranty period, which is not caused by ordinary wear, damage or abuse by others, shall be replaced or corrected without additional cost to Owner.

C. Repair or maintenance for the guarantee period is the responsibility of the CONTRACTOR and shall include all repairs and maintenance other than that which is considered as routine. (That is replacement of lamps, oiling, greasing, etc.)

7. EXCAVATING FOR ELECTRICAL WORK

A. Include whatever excavating and backfilling is necessary to install electrical work. Coordinate work with other excavating and backfilling in same area, including dewatering, flood protection provisions and other temporary facilities. Coordinate work with other work in 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.

B. Except as otherwise indicated, comply with applicable provisions of Section 02200 for electrical work excavating and backfilling. Refer instances of uncertain applicability to Engineer for resolution before proceeding.

C. Where conduit is less than 2' 6" below surface of roadway, provide encasement in Class 2500 concrete, 4" minimum coverage all around.

D. After backfilling has been completed disturbed areas shall be returned to their original condition and shall match adjoining area, or in areas to be covered under site work, area shall be finished as directed by Engineer.

E. Where it is necessary to remove and replace landscape work, pavement, flooring and similar exposed finished work, engage original installer to install replacement work; except where work existed prior to work of this Contract, engage only experienced and expert firms and tradespersons to replace work.

8. CONCRETE FOR ELECTRICAL WORK

A. Work of this article is defined to include whatever concrete work is necessary or indicated specifically to install electrical work. Except as otherwise indicated, comply with applicable provisions of Division 3 for electrical work concrete, including formwork, reinforcement, mix design, materials (use mix designs and materials accepted for Division 3 work where possible), admixtures, accessories (including waterstops), placing of wet concrete, finishing, curing, protecting, testing, submittals, and other requirements of the concrete work. Refer instances of uncertain applicability to Engineer for resolution before proceeding.

B. Except as otherwise indicated, provide strength classes as follows, with the following cement content and water/cement ratios; for the indicated applications and similar required applications.

(1) 4000 psi Class: 565 lbs. cement/yd. (6.0 sacks); 0.57 water/cement ratio.
Provide 4000 Class for vaults, beam type foundations and similar structures.

(2) 3000 psi Class: 500 lbs. cement/yd. (5.25 sacks); 0.68 water/cement ratio.
Provide 3000 Class for miscellaneous underground structural concrete, reinforced encasement, block type foundations (with smallest dimension at least 0.2 x largest dimension), curbs, pads, and similar structural support work.

(3) 2500 psi Class: 450 lbs. cement/yd. (4.75 sacks); 0.75 water/cement ratio.
Provide 2500 Class for plain encasement, filling steel framed units, and similar work.

(4) Rough Grouting Class: 565 lbs. cement/yd. (6.0 sacks); 0.75 water/cement ratio; adjust aggregate sizes to facilitate placement. Use for rough grouting, not for setting equipment bases.

(5) Backfill Class (Lean Concrete): 375 lbs. cement/yd. (4.0 sacks); 0.87 water/cement ratio. Use for backfilling where excavations are extended below point of support for electrical work.

C. Anchor Bolts-Concrete: Provide all anchor bolts required for equipment furnished under Contract. Set anchor bolts in a substantial manner so they will not be displaced. Anchor bolts shall be set in new concrete construction before pouring. Anchor bolts shall be stainless steel.

9. TESTING AND BALANCING

A. Feeders and branch circuits shall have their insulation tested after installation, and before connection to fixtures and equipment. Perform with a 500 volt megger. Conductors shall test free from short circuits and grounds. Test conductors phase to phase and phase to ground. Test readings shall be recorded and delivered to Engineer.

B. Verify rotation of all three phase motors with trade furnishing equipment. Bump or run these motors uncoupled in presence of trade furnishing equipment to insure proper rotation.

C. Circuit numbers are indicated on Drawings for reference; however Contractor shall make corrections as necessary to obtain proper phase balance under operating conditions.

D. After the wiring system is completed, and at such time as the ENGINEER may direct, the CONTRACTOR shall conduct an operating test for acceptance. The equipment shall be demonstrated to operate in accordance with the requirements of these Specifications and the Contract Drawings. The test shall be performed in the presence of the ENGINEER or his authorized representative. The CONTRACTOR shall furnish all instruments and personnel required for the tests, as well as the necessary electrical power.

E. Before energizing the system, the CONTRACTOR shall check all connections and set all relays and instruments for proper operation. He shall obtain all necessary clearances, approvals, and instructions from the serving utility company prior to placing power on the equipment.

1.10 TRAINING

A. All manufacturers supplying equipment for this division shall provide the OWNER'S operations staff with training in the operation and maintenance on the equipment being furnished. The training shall be conducted at the project site by a qualified representative of the manufacturer.

B. The cost of this training shall be included in the bid price.

C. The required training shall consist of both classroom and hands-on situation. Classroom training shall include instruction on how the equipment works, its relationship to all accessories and other related units, detailed review of shop drawings, detailed presentation of written O&M instructions, troubleshooting and record-keeping recommendations. Hands-on training shall include a review of the manufacturer's O&M instructions, check out of each operator to identifying key elements of the equipment, tear down as appropriate, calibration, adjustment, greasing and oiling points, and operating manipulations of all electrical and mechanical controls.

D. The training shall be scheduled through the CONTRACTOR with the OWNER. The timing of the training shall closely coincide with the startup of the equipment, but no training shall be conducted until the equipment is operational.

E. The minimum number of training hours to be provided by manufacturer supplying equipment on this project shall be in accordance with the following tables:

Item	Training Hours	
	Classroom	Hands-on
Motor Control/Telemetry Control Systems	3	3

F. At least 60 days prior to the training the manufacturer shall submit through the CONTRACTOR to the ENGINEER an outline of the training proposed for the ENGINEER'S review and concurrence.

G. The OWNER reserves the right to videotape all training sessions.

1.11 STORAGE AND CLEANING

A. All work, equipment, and materials shall be protected against dirt, water, or other damage during the period of construction.

B. Sensitive electrical equipment such as light fixtures, motor starters and controls, delivered to the job site, shall be protected against damage or corrosion due to atmospheric conditions or physical damage by other means. Protection is interpreted to mean that equipment shall be stored under roof, in a structure properly heated in cold weather and ventilated in hot weather. Provision shall be made to control the humidity in the storage area to 50 percent relative. The stored equipment shall be inspected periodically, and if it is found that the protection is inadequate, further protective measures shall be employed.

C. The CONTRACTOR shall not store submersible pump units in the wet well. If it is absolutely necessary to do so, the open power cable ends are to be suspended above the maximum flood elevation or maximum expected water level. If not stored in this manner, the CONTRACTOR may be called upon to replace the pump motors and cables with new units to ensure that water has not penetrated the cable and entered the motor housing.

D. At completion of work required under this Contract and just prior to acceptance by Owner, thoroughly clean all exposed equipment fittings, fixtures and accessories.

E. During construction, cover all OWNER equipment and furnishings subject to mechanical damage or contamination in any way.

1.12 SUPPORT OF ELECTRICAL ITEMS

A. Unless otherwise indicated, all electrical items or their supporting hardware, including but not limited to, conduits, raceways, cable trays, busways, cabinets, panelboards, wall mounted transformers, starters, boxes, and disconnect switches shall be securely fastened to building structures with the following methods. Fastening shall be by wood screws or screw type nails on wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws, welded threaded studs, or spring tension clamps on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts may be used instead of expansion bolts or machine or wood screws. Threaded C clamps with retainers may be used on rigid steel conduit only. Conduits or pipe straps shall not be welded to steel structures. In partitions of light steel construction, sheet metal screws shall be used.

B. Equipment supports at process structures remote from buildings shall be as detailed and/or noted on Drawings. Where a particular support type is not noted, aluminum channel (uni-strut)

shall be used. Channel type supports shall not be used in lieu of other supports noted unless approved by Engineer.

(1) All mounting brackets and strut used outside shall be aluminum. Fasteners used to mount equipment outside shall be stainless steel. The only exception to the above shall be anchor bolts for area lightpoles which shall be allowed to have galvanized threads and galvanized nuts.

- a. All mounting brackets and strut used inside shall be aluminum.
- b. All free standing equipment shall be anchored to its foundation using expansion bolts of the size and number recommended by the equipment manufacturer.
- c. The load applied to any fastener shall not exceed one of the proof test load. Fasteners attached to concrete ceilings shall be vibration and shock resistant.

C. Since this project is in Seismic Zone 1, the CONTRACTOR shall be sure that all supports are consistent with the KBC requirements in this regard.

1.13 IDENTIFICATION

A. Equipment disconnect switches, motor starters, pushbutton stations, panels, switchgear, special device plates, and similar material shall be clearly marked. Coordinate size of lettering and wording with Engineer.

B. Mark panels, giving panel designation in one half inch letters and voltage in one quarter inch letters centered above door on exterior trim. Mark equipment mounted remotely from source of power (such as roof exhaust fans) with equipment number and source of power. Where starters are remotely mounted, marking shall include equipment name and number.

C. Except as indicated, mark all equipment with engraved lamacoid plates having black foreground and white letters. Attach interior mounted plates with contact type permanent adhesive and exterior mounted plates with self tapping stainless steel screws except where screws should not penetrate substrate use waterproof contact adhesive. Align plates on equipment being marked in center near top.

(1) All control panels, disconnects, [instruments,] etc., shall be marked to indicate the circuit they control, [or variable monitored.] Marking is to be done with engraved laminated nameplates and shall bear the designation shown on the Contract Drawings where this information is given. Nameplates shall be fastened to equipment with stainless steel screws, minimum of one each side. In no way shall the installation of mounting screws void the NEMA enclosure rating of the equipment in which they are installed. If there are more than one identical unit, they shall be given consecutive numbers or other descriptions as designated by the ENGINEER. Nameplate background color shall be white, with black engraved letters, unless otherwise noted.

(2) Control panels and disconnect switches shall be labeled with vinyl self-adhesive signs that warn of "High Voltage" (state the specific voltage). Other major equipment such as transformers, transfer switches, pump control panels, etc., shall be labeled as such. The type of labels to be used shall have orange as the basic color to conform with OSHA requirements, letters shall be black. The labels shall be of proper size to fit flatly on the surface of the enclosure to make for a neat appearance and not interfere with the operating functions of the device it is attached to. These labels shall be as manufactured by the Brady Identification Systems Division, Safety Sign Company, Westline Products Company, or equal.

D. Provide warning signs where there is hazardous exposure or danger associated with access to or operation of electrical facilities, such as pad mount transformers. Provide text of sufficient clarity and lettering of sufficient size to convey adequate information at each location; mount permanently in an appropriate and effective location. Comply with recognized industry standards for color and design.

E. Bury a continuous, pre printed, bright colored plastic ribbon cable marker with each underground power or signal circuit, regardless of whether conductors are in conduit or concrete encasement. Locate each directly over cables, 6" to 8" below finished grade.

F. Provide adequate marking of conduits containing conductors operating above 600 volts, which are exposed or concealed in accessible spaces. Except as otherwise indicated use orange banding with black lettering. Provide self adhesive or snap on type plastic markers. Indicate voltage ratings of conductors. Locate markers at ends of conduit runs, near switches and other control devices, near items of equipment served by conductors, at points where conduits pass through walls or floors or enter non accessible construction, and at spacings of not more than 50' along each run of exposed conduit.

1.14 SUBMITTALS

A. Refer to the Division 1 sections for general requirements concerning work related submittals. For electrical work, the following quantities are required for each category of submittal (in lieu of quantities specified in Division 1), unless otherwise indicated in individual work sections (quantity does not include copies required by governing authorities, or by Contractor for its own purpose.)

(1) Shop Drawings: Minimum 6 sets, including 3 for maintenance manuals.

(2) Product Data: Minimum 6 sets, including 3 sets for maintenance manuals.

(3) Samples: 4 sets for final submission.

(4) Certifications: 3 copies.

(5) Test Reports: 3 copies.

(6) Warranties (Guarantees): 6 copies, including 3 for maintenance manuals.

(7) Maintenance Manuals: 3 final copies, including wiring diagrams, maintenance and operating instructions, parts listings, and copies of other submittals indicated for inclusion.

B. Each submittal shall have Engineer's Project Number, Specification Section Number, Schedule, Material and Date Submitted, indicated on its cover sheet so Engineer may readily determine particular item Contractor proposes to furnish.

C. An example of above requirements is indicated by:

(Job Number)

Division 16 ELECTRICAL

Section 16510 Building Lighting Fixtures

Date Submitted:

D. Operating and Maintenance Manual

(1) Submit to Engineer prior to substantial completion three (3) copies of complete operating and maintenance instructions for equipment provided under this Contract. Provide complete parts lists for all new major equipment items.

(2) Organize each maintenance manual with index and thumb tab marker for each section of information; bind in 2", 3 ring, vinyl covered binder with pockets to contain folded sheets, properly labeled on spine and face of binder with the following:

TITLE: (Project Name)

Electrical System Operation and Maintenance Data

Name and Address of Architect/Engineer

Name and Address of Consultants/Contractors

(3) Index of contents shall include equipment vendor's name and address.

(4) Include Brochures, data, all approved shop drawings, parts lists, warranties, wiring diagrams and manufacturers operating and maintenance instructions.

E. Contractor shall refer to each separate section of these specifications for information on electrical items requirement shop drawing submission and additional maintenance manual documentation.

1.15 MATERIALS

A. All materials used shall be new and at least meet the minimum standards as established by the NEC and/or National Electrical Manufacturers Association (NEMA). All materials shall be UL listed for the application, where a listing exists. Additional requirements are found in Division 1. All equipment shall meet applicable FCC requirements and restrictions.

B. The material and equipment described herein has been specified according to a particular trade name or make to set quality standards. However, each CONTRACTOR has the right to substitute other material and equipment in lieu of that specified, other than those specifically mentioned as matching or for standardization, providing such material and equipment meets all of the requirements of those specified and is accepted, in writing by the ENGINEER.

C. The reuse of salvaged electrical equipment and/or wiring will not be permitted unless specified herein or indicated on the Contract Drawings.

D. All salvaged or abandoned electrical materials shall become the property of the OWNER and shall be removed from the job site upon completion of the project as directed by OWNER.

1.16 TEMPORARY FACILITIES

A. Refer to Division 1 sections for general requirements for temporary facilities.

B. The CONTRACTOR is responsible for coordinating all activities onsite by the Power Company

C. The CONTRACTOR shall be responsible for providing temporary electrical power as required during the course of construction and shall remove temporary service equipment when no longer required. Temporary power is also addressed in Division 1.

D. All such equipment shall be removed when permanent connections have been completed. Where it is determined, during construction, that temporary facilities, as installed, interfere with construction operations, relocate said facilities in an approved manner at no cost to Owner. Temporary connections shall be in accordance with NEC and OSHA requirements. Repair damage or injury to equipment, materials, or personnel caused by improperly protected temporary installations. The Contractor shall be responsible for all costs for materials and installation for temporary electrical facilities and energy for their operation.

1.17 ERRORS, CORRECTIONS AND/OR OMISSIONS

A. Should a piece of utilization equipment be supplied of a different size or horsepower than shown on the Contract Drawings, the CONTRACTOR shall be responsible for installing the proper size wiring, conduit, starters, circuit breakers, etc., for proper operation of that unit and the complete electrical system at no extra cost to the OWNER.

B. It is the intent of these Specifications to provide for an electrical system installation complete in every respect, to operate in the manner and under conditions as shown in these Specifications and on the Contract Drawings. The CONTRACTOR shall notify the ENGINEER, in writing, of any omission or error at least 10 days prior to opening of bids. In the event of the CONTRACTOR'S failure to give such notice, CONTRACTOR may be required to correct work and/or furnish items omitted without additional cost. Further requirements on this subject may be found in the General Requirements, Division 1.

(1) Necessary changes or revisions in electrical work to meet any code or power company requirements shall be made by the CONTRACTOR without additional charge.

1.18 MAINTAINING CONTINUOUS ELECTRICAL SYSTEM AND SERVICE

A. Existing service(s) continuity shall be maintained at all times. In no way shall the installation and/or alteration of the electrical work interfere with or stop the normal operation of the existing facilities, except when prior arrangements have been made.

B. When additions and taps to existing service(s) require electrical outages of duration in excess of a few minutes, arrangements shall be made in advance for such outages. All outages shall be held to an acceptable minimum with none exceeding 4 hours continuous duration. If necessary, work shall be performed on premium time. If performed at night, requiring a general outage, the CONTRACTOR shall furnish an auxiliary source of light and power as required. Under no circumstances shall an electrical outage of any duration be initiated until the OWNER and ENGINEER have concurred, and as far as possible in advance.

1.19 SERVICE ENTRANCE

A. Conductors and terminations for service entrances shall be furnished and installed by the CONTRACTOR. Voltage, phase, and number of wires shall be as shown on the Drawings. Clearances for overhead entrance wires shall be per Power Company, NEC, and NESC requirements.

B. Any details not shown on the Drawings or written in the Specifications pertaining to the service entrance shall be per power company requirements. It is the CONTRACTOR'S responsibility to contact the utility prior to bidding and obtain any special requirements or costs they will be imposing. Those costs shall be included in the bid.

C. On underground service entrances from pad mounted transformers, the CONTRACTOR shall be responsible for furnishing and installing all primary, secondary, and metering conduits, as well as secondary service/metering conductors. The CONTRACTOR shall be responsible for furnishing pull wires in primary conduits for use by the power company. The CONTRACTOR shall be responsible for

fabricating the required concrete pad that the transformer will be mounted on. The CONTRACTOR shall also mount the meter base furnished by the power company.

END SECTION

SECTION 16051 - BASIC MATERIALS AND METHODS

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Electrical General Provision Sections govern this Section, where applicable.
- C. Requirements of the sections govern work specified in this section, where applicable.

2. DESCRIPTION OF WORK

- A. Provide labor, material, equipment and services necessary for complete and proper Basic Materials and Methods.
- B. Requirements of this section apply to electrical work specified elsewhere.

3. BASIC MATERIALS AND METHODS

- A. Unless otherwise indicated, install all wiring in rigid metal conduit, electric metallic tubing, or flexible metallic conduit specified below or as indicated on Drawings. Do not use surface metal raceways on floor. Do not use nonmetallic sheathed cable, or armored cable (Bx or Type AC).
- B. Provide complete wiring from point of service connection to all receptacles, lighting fixtures, devices, utilization equipment and outlets for future extensions, as indicated on Drawings. Provide ample slack wire for connections. Unless otherwise specified, provide No. 12 AWG or larger for all branch circuit conductors. In outlet boxes designated for future use, tape ends of wires and install blank covers. Do not install telephone signal wires unless otherwise specified.
- C. Do not bend cables, either permanently or temporarily during installation, to radii less than 10 times outer diameters, except where shorter radii are approved by engineer for conditions making specified radius impracticable.
- D. All conductors No. 10 and smaller located in branch circuit panelboards, signal cabinets, signal control boards, switchboards and motor control centers shall be neatly and securely bundled. For conductors larger than No. 10 located in switchboards, motor control centers and pull boxes, neatly and securely cable in individual circuits. Use nylon straps made of self extinguishing nylon having a temperature range of 65 degrees F. to + 350 degrees F. Construct each strap with a locking hub or head on one end and a taper on other.
- E. Where two or more conduits have been installed in place of a single conduit because of space conditions, use duplicate conductors in each conduit, including neutrals where required, and total capacity of duplicate conductors shall be not less than capacity of conductors replaced.
- F. Where length of a branch circuit , from panel to first outlet, exceeds 75 feet for a 120 volt, 20 amp. circuit or 175 feet for a 277 volt circuit, use No. 10 AWG conductor size.
- G. Where homerun circuit numbers are indicated on Drawings, follow such numbers in connecting circuits to panelboards. Where homerun circuit numbers are not indicated on Drawings, divide similar types of connected loads among phase buses in such a manner that, in normal usage, phase bus currents will be approximately equal. Connect each branch circuit homerun containing two or more circuits to circuit breakers or switch in a three wire or four wire branch circuit panelboard in such a manner that no two circuits will be fed from same bus. Where panelboard cabinets are recessed, conduits with sufficient

capacity to carry required number and size of future conductors for all spare branch circuit protective devices and spaces in panelboard shall be stubbed up concealed to a junction box for future connections and extensions located as follows:

(1) In an area with removable ceiling, junction box shall be accessible above suspended ceiling.

(2) In an area with nonremovable ceiling, recess junction box in ceiling directly over panelboard location.

(3) In an area without finished ceiling but with finished walls, recess junction box in wall directly above panelboard location at ceiling line.

(4) In an area without suspended ceiling but with unfinished walls, recess junction box on ceiling directly over panelboard location.

H. Provide all junction boxes in accordance with NEC as to conductor capacity for future conductors with adequate knock outs on all four sides and a blank screw cover. Plates shall match those installed in that particular area.

I. Install only one 277 volt circuit in a wall switch outlet box. Where more than one 277 volt circuit (on different phases) is indicated on drawings as being run to multi wall switch units from a ceiling branch circuit outlet box, provide individual conduit with phase and lighting fixture control wiring and separate outlet boxes with separated wall plates to segregate each phase.

END SECTION

SECTION 16110 - ELECTRICAL RACEWAYS

1.1 RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements.
- B. Requirements of Electrical General Provision Sections govern this Section, where applicable.
- C. This section shall be governed by Alternates insofar as they apply to this work.

1.2 DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and services necessary for proper and complete installation of electrical raceways.
- B. The requirements of this section apply to electrical raceway work specified elsewhere in these specifications.

1.3 QUALITY ASSURANCE

- A. Comply with applicable portions of National Electrical Manufacturers Association standards pertaining to metallic and nonmetallic conduit, duct and EMT.
- B. Comply with applicable portions of Underwriters' Laboratories safety standards pertaining to electrical raceways; and provide products which have been UL listed and labeled.
- C. Comply with National Electrical Code (NFPA No. 70) as applicable to construction and installation of electrical raceways.
- D. Raceways shall be marked with the manufacturer's name or trademark as well as type of raceway and size. This marking shall appear at least once every 10 feet and shall be of sufficient durability to withstand the environment involved. All raceways shall be furnished and installed as outlined under the following sections of this Specification.

1.4 SUBMITTALS

- A. Submit manufacturer's standard data sheets for rigid metal conduit, EMT, wireways, rigid PVC conduit, flexible metal conduit, bitumastic coatings and fittings for all types of raceways.

1.5 MATERIAL

- A. Types/acceptable manufacturers of electrical raceways:
 - Electrical metallic tubing – Allied Tube, Wheatland Tube
 - Liquid tight flexible metal conduit – Allied Tube, Eastern Wire
 - Rigid steel conduit – Allied Tube, Maverick Tube
 - Rigid aluminum conduit – Wheatland Tube, Allied tube, Indalex
 - Raintight wireways – Square "D"; Cooper B-Line

Rigid PVC conduit – Carlon, Allied Tube, Can Tex

B. For each electrical raceway system indicated, provide assembly of conduit, tubing or duct, and fittings, including, but not necessarily limited to, connectors, couplings, offsets, elbows, straps, bushings, expansion joints, hangers, and other components and accessories needed for a complete system.

(1) Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with applicable portions of National Electrical Code for electrical raceways.

a. Provide threaded steel conduit and fittings in accordance with U.L. 6 and ANSI C80.1, zinc coated or coated with and approved corrosion resistant coating on inside. Conduits not completely encased in concrete but laid directly in or in contact with ground or on a vapor barrier shall be field coated on outside with asphaltum before installation or shall have an additional outside factory coating of polyvinyl chloride or phenolic resin epoxy material or other equally flexible and chemical resistant material.

b. Provide electrical metallic tubing, EMT and fittings in accordance with U.L. 797 and ANSI C80.3, zinc coated on outside and either zinc coated or coated with an approved corrosion resistant coating on inside.

c. Liquid tight flexible metal conduit shall consist of a core of flexible galvanized steel tubing over which is extruded a liquid tight jacket of poly vinyl chloride (PVC). Liquid tight flexible conduits not larger than 1 1/4 inch size shall be provided with a continuous copper bonding conductor wound spirally between convolutions. Products shall comply with U.L. 1 and U.L. 360.

d. Flexible metal conduit (commercial Greenfield) and fittings shall be in accordance with U.L. 1 and U.L. 1479.

e. Fittings for threaded steel and thin wall (EMT type) conduit shall be either iron or steel only.

f. Compression type threadless fitting shall not be used with threaded steel conduit. Where it is impractical (due to limited working space when employing normal installation practices) to use common construction tools for installation of threaded steel conduit with standard couplings, locknuts and bushings, steel set screw connectors and couplings will be permitted provided they meet the following requirements: body of steel set screw connector and coupling shall have a wall thickness at least equal to wall thickness of conduit with which it is to be used. Set screws shall be of case hardened steel with hex head, and with cup point to firmly seat in wall of conduit for positive ground. Set screws shall be tightened to embed in conduit wall. Tightening screws with pliers will not be permitted.

1/2 through 2 inch connectors shall have one set screw each.

2 1/2 through 4 inch connectors shall have two set screws each.

1/2 through 2 inch couplings shall have two set screws each.

2 1/2 through 4 inch couplings shall have four set screws each.

Conduit nipples with running threads shall not be used.

g. Couplings and connectors for EMT shall be made of either steel or malleable iron only, shall be "Concretetight" or "Raintight" and shall be of either gland and ring compression

type, or stainless steel multiple point locking type. All connectors shall have insulated throats. Fittings using indentations as a means of attachment shall not be used.

h. Bushings for threaded steel conduit and connectors for EMT shall be insulated type, designed to prevent abrasion of wires without impairing continuity of conduit grounding system. Insulating insert shall be made of thermosetting or fiber material which conforms to flame test requirements of UL 514, molded or locked into metallic body of fitting. Conduit bushings made entirely of nonmetallic material shall not be used.

i. Fittings for liquid tight flexible conduit shall be in accordance with U.L. 1 and U.L. 360 of a type incorporating a threaded grounding cone, a steel, nylon or equal plastic compression ring, and a gland for tightening. Fitting shall be made of either steel or malleable iron only, shall have insulated throats and shall be of a type having a male thread and locknut or male bushing with or without "O" ring seal.

j. Die cast zinc alloy fittings and fittings made of inferior materials, such as "pot metal", shall not be used on any type of rigid or flexible conduit or EMT.

(2) Wireways

a. Provide wireways of sizes indicated. Constructed of galvanized steel with screw on covers and knockouts approximately 6" o.c. Provide raceway fittings indicated which match and mate with raceway. Finish wireways with gray epoxy paint over corrosion resistant primer.

b. Use wireways only where indicated on Drawings.

c. Effectively ground all wireways.

(3) PVC Conduit

a. Provide nonmetallic conduit, ducts and fittings of types, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with applicable portions of National Electrical Code for electrical raceways. Products shall be in accordance with NEMA TC-2 and U.L. 651.

b. PVC Conduit and Tubing Fittings: NEMA Standards Pub. No. TC 3 and U.L. 514B.

c. Except as otherwise indicated, provide conduit, tubing and duct accessories of types, sizes, and materials indicated, including, but not necessarily limited to, hangers, clamps, rollers, traps, fasteners, brackets, expansion and deflection fittings, complying with manufacturer's published product information, and designed and constructed by manufacturer for use in applications indicated.

(4) Provide watertight hub connections at all conduits connecting to NEMA 3R or 4 enclosures. Meyers or equal.

(5) Aluminum Conduit

a. Aluminum conduit shall be extruded from alloy 6063 and shall be the rigid type, non-toxic, corrosion resistant, and non-staining. It shall be manufactured per UL standards as well as listed/labeled by same.

b. Fittings, boxes and accessories used in conjunction with aluminum conduit shall be die cast aluminum, copper free type. They shall be resistant to both chemical and galvanic corrosion. All covers shall have neoprene gaskets.

- c. Standard threaded couplings, locknuts, bushings, and elbows made only of aluminum alloy materials. Aluminum fittings containing more than 0.4 percent copper are prohibited.
- d. Locknuts and bushings: As specified for rigid steel conduit, except of aluminum materials.
- e. Set screw fittings: Not permitted for use with aluminum conduit.

C. Conduit Supports

(1) Pipe straps and supports shall be PVC coated steel in pipe galleries and chemical feed rooms. All others shall be zinc coated steel.

(2) Provide individual pipe hangers, multiple (trapeze) pipe hangers, and riser clamps as necessary to support conduits. All parts and hardware shall be zinc coated throughout. Provide all U bolts, clamps, attachments, and other hardware necessary for hanger assembly, and for securing hanger rods and conduits. Design each multiple hanger to support a load equal to or greater than sum of weights of conduits, wires, hanger itself, and 200 pounds.

(3) Fasten pipe straps and hanger rods to surfaces as specified under "Support of Electrical Items" paragraph in the 'ELECTRICAL, GENERAL PROVISIONS' section.

(4) All EMT and conduits not embedded in concrete or masonry shall be securely and independently supported so that no strain will be transmitted to outlet box and pull box supports. Supports shall be rigid enough to prevent distortion of conduits during wire pulling.

(5) Support individual horizontal conduits by one hole pipe straps or separate pipe hangers for sizes 1 1/2 inch and smaller, and by separate pipe hangers for larger sizes. Spring steel fasteners may be used in lieu of pipe straps or hangers for sizes 1 1/2 inch and smaller in dry locations only. Hanger rods used with spring steel fasteners shall be not less than 1/4 inch diameter steel with corrosion resistant finish. Spring steel fasteners shall be specifically designed for supporting single conduits or EMT. Unless otherwise specified, do not use wire as a means of support.

(6) Where two or more horizontal conduits or EMT run parallel and at same elevation, they shall be supported on multiple (trapeze) pipe hangers. Secure each conduit or EMT to horizontal hanger member by a U bolt, one hole strap or other specially designed and approved fastener.

(7) Branch circuit conduits and raceways above suspended ceilings may be supported from floor construction above or from main ceiling support members, however, finished installation shall not interfere with removability of ceiling panels.

1.6 INSTALLATION

A. Install conduit, tubing and wireway products as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and complying with recognized industry practices to ensure that products serve intended functions. Handle conduit and tubing carefully to prevent bending and end damage, and to avoid scoring finish. Store pipe and tubing inside and protect from weather. When necessary to store outdoors, elevate well above grade and enclose with durable, watertight wrapping. Provide color coded end cap thread protectors on exposed threads of metal conduit.

B. Conduit buried in concrete shall be rigid steel unless otherwise indicated. Do not install EMT underground, in slabs on grade, in wet locations, in hazardous areas, or for circuits operating at more than 600 volts. Do not use EMT in concrete placements where vibrators will be used. Metallic conduit buried in concrete shall be threaded steel only. Outside diameter of conduit buried in concrete shall not exceed one third of the thickness of structural slab, wall or beam in which it is placed. Locate conduit

entirely within middle third of member wherever possible. Lateral spacing of conduits buried in concrete slabs shall be not less than three diameters except where drawings definitely indicate that concrete slab has been specially designed to accommodate a closer spacing of conduits entering wire closets, panelboards, or electrical boxes or arrangements is approved by Engineer.

C. Use flexible conduits for connections to motors and other electrical equipment when it is subject to movement, vibrations, misalignment, cramped quarters or where noise transmission is to be eliminated or reduced. Flexible conduit used to meet the above requirements shall in addition be liquid tight type when installed under any of the following conditions:

- (1) Exterior locations
- (2) Moisture or humidity laden atmosphere where it is possible for condensation to accumulate.
- (3) Corrosive atmosphere.
- (4) Where water or spray due to wash down operations is frequent or possible.
- (5) Wherever there is a possibility of seepage or dripping of oil, grease, or water.

D. Run concealed conduit and EMT in as direct lines as possible with a minimum number of bends of longest possible radius. Run exposed conduits and EMT parallel to or at right angles to lines of building. All bends shall be free from dents or flattening.

E. Conduit and EMT runs shall be mechanically and electrically continuous from service entrance to all outlets. Unless otherwise specified, each conduit shall enter and be securely connected to a cabinet, junction box, pull box or outlet box by means of a locknut on outside and a bushing on inside or by means of a liquid tight, threaded, self locking, cold weld type wedge adapter. Where nominal circuit voltage exceeds 250 volts, (1) in rigid conduit, an additional locknut shall be provided, one locknut being inside and one locknut outside and (2) in EMT or flexible metal conduit, the one locknut shall be made wrench tight. All locknuts shall be bonding type with sharp edges for digging into metal wall of an enclosure and shall be installed in a manner that will assure a locking installation. Locknuts and bushings or self locking adapters will not be required where conduits are screwed into tapped connections. All vertical runs of conduit or EMT terminating in bottoms of wall boxes or cabinets shall be protected from entrance of foreign material prior to installation of conductors.

F. The minimum size of threaded conduit, EMT, and flexible metallic conduit shall be 3/4" except as follows:

- (1) Unless otherwise specified or indicated on drawings.
- (2) Unless otherwise indicated on Drawings, telephone conduits shall be not less than 1 inch trade size.

G. Check size of all raceways to determine that green equipment ground conductor, specified, indicated or required can be installed in same raceway with phase and neutral conductors in accordance with percentage of fill requirements of NEC. If necessary, sizes of duct, conduit, tubing or raceway indicated or specified shall be increased to accommodate all conductors without additional cost to Owner.

H. Unless otherwise specified or indicated on Drawings, all conduit and EMT shall be installed concealed. Unless otherwise indicated on Drawings, conduit and EMT may be run exposed on unfinished walls, on unfurred basement ceilings, in penthouses, attics and roof spaces.

I. In wood construction, run conduits and EMT in rough underflooring, on top of joists or between joists. Furring strips may be notched at any point but joists may be notched only at points not more than one foot from a point of support and notches may not be deeper than 1 3/8". Conduits and EMT may be run exposed on bottoms of joists only in unfinished rooms where permitted by Engineer.

J. Horizontal cross runs of conduit or EMT may be installed in partitions only where explicitly permitted by Architect. Install exposed horizontal runs, where permitted, close to ceiling or ceiling beams and above water, steam or other piping. Run conduits and EMT connected to wall outlets in such a manner that they will not cross water, steam or waste pipes or radiator branches. Do not run conduits and EMT through beams, except where clearly indicated on Drawings or where permitted by Architect.

K. Install every conduit system complete before conductors are drawn in.

L. Expansion Fittings: Each conduit that is buried in or rigidly secured to building construction on opposite sides of a building expansion joint and each long run of exposed conduit that may be subject to excessive stresses shall be provided with an expansion fitting. Expansion fitting shall be made of hot dipped galvanized malleable iron and shall have a factory installed packing, which will prevent entrance of water, a pressure ring, and a grounding ring.

(1) In addition to grounding ring, provide a separate external copper bonding jumper secured by grounding straps on each end of fitting.

(2) Where conduits are buried in concrete, they shall cross building expansion joints at right angles, and expansion fittings shall be installed in accordance with manufacturer's instructions. Provide free ends of conduits with insulated bushings.

M. Sealing Fittings: Sealing fittings for use with threaded steel conduits shall be threaded, zinc or cadmium coated and cast or malleable iron type fittings. Fittings used to prevent passage of water vapor shall be of the continuous drain type.

(1) Install and seal sealing fittings in accordance with manufacturer's recommendations at suitable, approved, accessible locations. In concealed work, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates.

(2) Install sealing fittings at the following points, and elsewhere as indicated.

a. Where conduits enter or leave hazardous areas equipped with explosion proof lighting fixtures, switches or receptacles to prevent passage of explosive vapors.

b. Where conduits pass from warm locations to cold locations, such as refrigerated spaces and air conditioned spaces, to prevent passage of water vapor.

c. Where required by NEC.

N. Expansion and Deflection Couplings

(1) Accommodate 1.9 cm (0.75 inch) deflection, expansion, or contraction in any direction and allow 30 degree angular deflections.

(2) Include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL, and the NEC code tables for ground conductors.

(3) Watertight, seismically qualified, corrosion-resistant, threaded for and compatible with rigid metal conduit.

(4) Jacket: Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber material and stainless steel jacket clamps.

1.7 SPECIAL INSTALLATION INSTRUCTIONS

A. The following installation requirements are specific to this project and shall be strictly enforced.

(1) All exterior below grade conduits shall be Schedule 80 PVC except as noted on Drawings for telephone and power company circuits. Above grade shall be rigid aluminum. Rigid steel below grade shall be asphaltum coated with minimum two (2) coats Carbolite Bitumastic 50 or equal.

(2) All conduit installed within pump station building shall be rigid aluminum.

(3) Aluminum conduit in contact with concrete and/or where installed below grade shall have polytape applied per Section 16200.

END SECTION

SECTION 16120 - CABLE, WIRE AND CONNECTORS

1.1 RELATED DOCUMENTS

A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to work specified in this section.

B. Requirements of Electrical General Provision Sections govern this Section, where applicable.

C. This section shall be governed by Alternates insofar as they affect this work.

1.2 DESCRIPTION OF WORK

A. Provide labor, materials, equipment and services necessary for proper and complete installation of cable, wire and connectors.

B. Requirements of this section apply to cable and wire work specified elsewhere in these specifications.

1.3 QUALITY ASSURANCE

A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical cable, wire and connectors.

B. Provide electrical cable, wire and connectors which have been listed and labeled by Underwriters Laboratories.

C. Comply with National Electrical Manufacturers Association/Insulated Power Cable Engineers Association Standards publications pertaining to materials, construction and testing wire cable, where applicable.

D. Manufacturers offering products complying with requirements include:

(1) Cable and Wire:

Paige Pump Wire

Southwire Company

Triangle PWC, Inc.

Belden

Clifford of Vermont

E. Connectors:

Buchanan

Burndy Corporation

3M Company

Thomas and Betts Co.

King Innovation

1.4 SUBMITTALS

A. Submit manufacturer's product data on all 4-20MA signal cables and Telemetry System shielded cables.

B. Submit manufacturer's product data for watertight wire connectors.

1.5 MATERIALS

A. Cable and Wire

(1) Provide factory fabricated cable, wire and connectors of sizes, ratings, materials and types indicated for each service. Where not indicated, provide proper selection as determined by equipment manufacturer to comply with project's equipment installation requirements and NEC standards, including equipment control and instrumentation requirements.

(2) Use single conductor annealed copper type for all wires and cables for secondary service, feeders and branch circuits, unless specified otherwise.

(3) Use No. 12 or No. 10 solid conductor for branch circuit wiring connected to receptacles, lighting switches and snap switches.

(4) Use minimum 75 degrees C rated insulation unless specified otherwise, indicated on Drawings, or required by NEC.

(5) Wire #12 - #1 shall be applied based on a 60 degree Celsius temperature rise. Building wire larger than #1 may be applied at its 75 degree Celsius temperature rise.

(6) Use 600 volt insulation rating unless specified or indicated otherwise. Where operating voltage is less than 100 volts, wires or cables may be insulated for 300 volts provided they are isolated from higher voltage systems.

B. Use (1) 16 ga. twisted/shielded pair cable for 4-20ma signal circuits from flow, level, alarm transmitters, V.F. drives, etc. Cable shall be Belden No. 8719, or General Cable type VNTC with 100% shield coverage and stranded/tinned 18 ga. drain wire, 600V rated.

C. Valves, valve controllers, start-stop selector switches, etc. Use minimum 75 degrees C rated insulation unless specified otherwise, indicated on Drawings, or required by NEC. Use 600 volt insulation rating unless specified or indicated otherwise.

D. Connectors

(1) All circuit wire connectors for wiring #6 AWG and smaller shall be made using watertight type connectors which have been prefilled with silicone sealant. Connectors shall have lifetime guarantee and be UL 50 raintight/watertight listed. Connectors shall have a temperature rating of 105 degrees C. minimum and silicone sealant shall be rated for -45 to 400 degrees F.

(2) Watertight type wire connectors shall be King Innovation DryConn or equivalent.

E. Electrical Lugs

(1) Lugs from #6 AWG - 1000 MCM shall be compression types with barrels to provide maximum conductor contact and tensile strength. They shall be manufactured from high conductivity copper and entirely tin plated. The lugs must have a current carrying capacity equal to the conductors for which they are rated and must also meet all UL requirements. All lugs above 4/0 shall be 2 hole lugs with NEMA spacing. The lugs shall be rated for operation through 35 KV. The lugs shall be of closed end construction to exclude moisture migration into the cable conductor.

1.6 INSTALLATION

A. Install electrical cable wire and connectors as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure products serve intended functions.

B. Store cable, wire and connectors in factory installed coverings in a clean, dry indoor space which provides protection against weather.

C. Pull conductors together where more than one is being installed in a raceway.

D. Use pulling compound or lubricant, when necessary; compound must not deteriorate conductor and insulation.

E. Do not use a pulling means, including fish tape, cable or rope which can damage raceway.

F. Install exposed cable, parallel and perpendicular to surface or exposed structural members and follow surface contours, where possible.

G. Color Code: All secondary service, feeder and branch circuit conductors throughout projects as follows:

208Y/120 volts	Phase	480y/277 volts
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	White
Green	Ground	Green

H. Keep conductor splices to a minimum.

I. Install splices and taps for power wiring which has equivalent or better mechanical strength and insulation as conductor.

J. Use splice and tap connectors on power wiring which is compatible with conductor material.

K. Do not install more than three conductors in any one splice.

L. Install poly pull line in all spare/empty conduits.

M. Prior to energization, check cable and wire for continuity of circuitry and for short circuits. Correct malfunction when detected.

N. Subsequent to wire and cable hook ups, energize circuitry and demonstrate functioning in accordance with requirements.

O. Multi conductor cables shall not be spliced but shall run continuous from point of supply to equipment connection.

P. Shielded pair cable shall be grounded at one end only and as close to signal source as possible.

Q. A minimum separation of 12 inches between analog signal leads and a-c power leads should be maintained. For a-c power leads carrying 100 amps or greater, a 24 inch separation should be maintained. Parallel runs should be limited to less than 500 feet. Perpendicular runs may be as close as 6 inches.

1.7 SPECIAL INSTALLATION INSTRUCTIONS

A. Wire or cable splices for control and instrumentation circuits shall not be accepted.

B. Do not install any control or instrumentation cable or wiring in same conduit or J-box with electrical power wiring, unless otherwise noted.

C. NOTE: Electrical Contractor shall be responsible for providing and installing all power, control and instrumentation wiring and cable from all remote devices to the pump station control panel (PCP). This shall include the termination of wires/cables on both ends and installation of wire No. markers.

END SECTION

SECTION 16130 - ELECTRICAL BOXES AND FITTINGS

1. RELATED DOCUMENTS

- A. General provisions of contract General and Supplementary Conditions and General Requirements.
- B. Requirements of Electrical General Provision Sections govern this Section, where applicable.
- C. This Section shall be governed by Alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment, and services for proper and complete installation of electrical boxes and fittings.
- B. Extent of electrical box and electrical fitting work is indicated by drawings and schedules, and requirements of this section.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical boxes and fittings.
- B. Provide boxes and fittings which have been listed and labeled by Underwriters' Laboratories.
- C. Comply with National Electrical Manufacturers Association standards as applicable to nonmetallic fittings for underground installation.

4. MATERIAL

- A. Provide boxes, cabinets, and fittings as indicated on Drawings, schedules, and as required for job.
- B. Interior Outlet Boxes: Provide galvanized steel interior outlet wiring boxes, of type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices.
- C. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations. Choice of accessories is Installer's option.
- D. Weatherproof Outlet Boxes: Provide corrosion resistant cast metal weatherproof outlet wiring boxes, of type, shape and size, including depth of box, with threaded conduit ends and cast metal face plate, including face plate gasket and corrosion proof fasteners.
- E. Junction and Pull Boxes: Provide galvanized sheet steel junction and pull boxes, with screw on covers; of type, shape and size, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.
- F. Conduit Bodies: Provide galvanized or aluminum cast metal conduit bodies, of type, shape, and size, to suit each respective location and installation, constructed with threaded conduit ends, removable cover, and corrosion resistant screws.

G. Bushings, Knockout Closures and Locknuts: Provide corrosion resistant punched steel box knockout closures, conduit locknuts and malleable iron conduit bushings of type and size to suit each respective use and installation.

H. Acceptable Manufacturers

(1) Appleton, Crouse-Hinds, Hoffman or T&B or equal.

5. INSTALLATION

A. Install electrical boxes and fittings as indicated, or in compliance with NEC requirements, in accordance with manufacturer's written instructions and with recognized industry practices to ensure that boxes and fittings serve intended purposes.

B. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture exposure.

C. Provide knockout closures to cap unused knockout holes where blanks have been removed.

D. Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

E. Avoid using round boxes where conduit must enter box through side of box, which would result in a difficult and insecure connection with a locknut or bushing on rounded surface.

F. Secure boxes rigidly to substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

G. Do not use sectional (gangable) boxes.

H. Use threaded hub type outlet boxes (NEMA 4X) with gasketed weatherproof covers and stainless steel hardware where surface mounted at following locations:

- (1) Exterior locations
- (2) Where exposed to moisture laden atmosphere
- (3) Where indicated on drawings
- (4) At pump station and valve vault areas.

I. Measure mounting height from finished floor or finished grade to center line of cover plate.

J. NEMA 4 junction and pull boxes shall be stainless steel, unless otherwise noted.

K. Junction boxes for use in wet-wells and other hazardous areas shall be water tight, rust proof, corrosion resistant, and explosion proof with threaded conduit openings (5 ½ full threads - minimum) and provided with rust proof hardware.

L. Explosion proof sealing fittings shall be furnished and installed in accordance with NEC requirements.

M. Outlet or junction boxes for use with exposed aluminum conduit shall be copper free, cast aluminum type, or stainless steel.

N. Saw cut openings for boxes in exposed masonry walls.

END SECTION

SECTION 16135 - ELECTRICAL EQUIPMENT SUPPORTS

1. RELATED DOCUMENTS

- A. General provisions of contract General and Supplementary Conditions and General Requirements.
- B. Requirements of Electrical General Provision Sections govern this Section, where applicable.
- C. This Section shall be governed by Alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment, and services for proper and complete installation of electrical equipment supports.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical equipment supports.
- B. Provide fittings which have been listed and labeled by Underwriters' Laboratories.
- C. Acceptable Manufacturers: Kindorf, Unistrut, Allied or equal.

4. MATERIALS

- A. All exterior and interior mounting brackets and strut shall be aluminum. Fasteners used to mount equipment where exposed to weather or in corrosive environments shall be non-magnetic stainless steel.

5. INSTALLATION

- A. All electrical equipment shall be rigidly mounted, and installed using supporting devices as indicated on the Contract Drawings, as required by the work, and described herein.
- B. All free standing equipment shall be anchored to its foundation using expansion bolts with stainless steel fasteners of the size and number recommended by the equipment manufacturer.
- C. Where indicated, seismic restraints shall be provided for electrical equipment.

END SECTION

SECTION 16140 - WIRING DEVICES

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements.
- B. Requirements of Electrical General Provision sections govern this Section, where applicable.
- C. This section shall be governed by alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

- A. Provide labor, material, equipment and services for proper and complete installation of wiring devices.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA No. 70) as applicable to construction and installation of electrical wiring devices.
- B. Provide electrical wiring devices which have been tested, listed and labeled by Underwriters' Laboratories.
- C. Comply with National Electrical Manufacturers Association standards for wiring devices.

4. SUBMITTALS

- A. Submit manufacturer's data on wiring devices and plates.
- B. Device manufacturers other than those listed below must have ten day written prior approval.
- C. It is the responsibility of the contractor to provide data that devices are equal other than by catalog numbers.

5. MATERIAL

- A. Provide factory fabricated wiring devices, in type, color, and electrical rating for service indicated and as described below. Where type and grade are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and comply with NEC and NEMA standards for wiring devices.

- B. Devices and Plates

- (1) All receptacles, switches, and non-metallic device plates shall be gray in color unless otherwise indicated.

- C. Device Plates - Standard

- (1) All plates shall be of 302 stainless steel (non magnetic) with rounded or beveled edges. All device plate screws shall be stainless steel with countersunk heads. Plates shall be installed vertically and with an alignment tolerance of 1/16 inch. Device plates shall be of the one-piece type, of suitable shape for the devices to be covered. Plates shall have a smooth finish with no crevices to collect dirt. Oversize plates are not acceptable.

(2) All non-weatherproof metal wall plates shall be corrosion resistant 302 super stainless steel unless otherwise noted.

D. Device Plates - Weatherproof

(1) All devices in dusty and or wet locations shall use weatherproof corrosion resistant cover plates of cast aluminum, rustproof, weatherproof, with spring loaded "in use" cover for receptacle and external handle or neoprene cover for switch. Similar to Hubbell 1795 for switches and Hubbell WP8M or WP26MH for receptacles.

E. Switches

(1) All switches shall be 20 ampere for 120/277 volt AC lighting circuits.

(2) All switches shall be specification grade side wired.

(3) Switches shall be of the following mfg.

	HUBBELL	BRYANT
Single Pole	1221	1121
Double Pole	1122	1122
Three Way	C5320	1123
Four Way	1124	1124
Pilot Light	1121 PL	1121 PL

F. Receptacles – Specification Grade

(1) GFCI Receptacles

1. Ground fault shall have solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120V, 20A branch circuit. Device shall have nominal sensitivity to ground leakage current of four to six milliamperes and shall function to interrupt the current supply for any value of ground leakage current above five milliamperes on load side of the device. Device shall have a minimum nominal tripping time of 1/30th of a second.

2. Device shall be of the following mfg.

	HUBBELL	BRYANT
15A 125V 5 15R	GF5252	GF5262
20A 125V 5 20R	GF5352	GF5362

(2) Duplex Receptacles Corrosion Resistant

1. Receptacles shall be 5-20R 20A, 125V, 2 pole, 3 wire as required.

2. Receptacles shall have the following characteristics:

1) "T" type contacts for phase and neutral female connections.

- 2) Female ground connections shall be riveted to bridge.
- 3) Bridge shall be of hot dipped steel.
- 4) Face plate shall be impact resistant nylon.
- 5) Receptacle body shall be of heat resistant thermoset material.
- 6) Face plate to bridge connecting rivet shall be spun brass.
- 7) Automatic self grounding clip.
- 8) Receptacles shall be of the following mfg.

HUBBELL

20A 125V 5-20R

HBL53CM62 (Marine Grade)

- 9) Corrosion resistant GFCI receptacles shall be Hubbell GF8300A (Hospital Grade).

6. INSTALLATION

A. Install wiring devices where indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and in accordance with recognized industry practices to ensure that products serve intended function.

B. Delay installation of devices until wiring is completed.

C. Install receptacles and switches only in electrical boxes which are clean; free from excess building materials and debris.

D. Install receptacles with ground pin on top.

E. All devices and plates shall be of the same manufacturer.

F. Do not use sectional plates.

G. Upon installation of wall plates, receptacles and switches, advise Contractor regarding proper and cautious use of convenience outlets. At time of Substantial Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

H. Test wiring devices to ensure electrical continuity of grounding connections, and after energizing circuitry, to demonstrate compliance with requirements.

I. All outlet boxes shall have a cover plate.

J. Device mounting heights above finished floor (AFF) or other reference to center of device. Verify exact mounting heights with Architectural Drawings.

Receptacles above countertops.	4" above countertop backsplash. Mount long axis horizontal.
General receptacles	18" AFF
Receptacles in storage	45" AFF

and Mechanical Rooms

Toggle Switches 45" AFF

Thermostats 54" AFF

Telephones-Desk 18" AFF

Telephones-Wall 48" AFF

Switches above countertops 6" above countertop
mount long axis vertical.

END SECTION

SECTION 16150 - MOTORS

1.1 RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions, and General Requirements, apply to this Section.
- B. Requirements of Electrical General Provisions sections govern work specified in this Section.
- C. This section shall be governed by alternates insofar as they affect this work.

1.2 DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and services necessary for proper and complete installation of motors.
- B. Motors are to be furnished with driven equipment. All motors shall conform to the following Specifications and any special requirements of the driven equipment. Special requirements of the driven equipment shall take precedence over these Specifications should a discrepancy occur. Starting torque and slip ratings shall conform to the requirements of the driven equipment. [All motors 15 horsepower and larger (230 volt) or 25 horsepower and larger (480 volt) shall be started via solid state reduced voltage starters unless otherwise noted on the Contract Drawings.]
- C. Polyphase motors shall be of the squirrel cage induction type and single phase of the capacitor start-induction run type except as otherwise noted.

1.3 QUALITY ASSURANCE

- A. Manufacturers offering products complying with requirements include:

General Electric

Westinghouse

U.S. Motors

Gould Century

Lincoln

Baldor

Marathon

Reliance

Magnatek

Siemens

Or Equal

- B. Provide motors which have been listed and labeled by Underwriters Laboratories.
- C. Comply with National Electrical Code (NFPA No. 70) as applicable to installation and construction of electrical power/distribution transformers.
- D. Comply with applicable portions of National Electrical Manufacturers Association Standards ST20 pertaining to power/distribution transformers.
- E. Comply with applicable American National Standards Institute (ANSI) standards pertaining to power/distribution transformers.
- F. Comply with applicable portions of Institute of Electrical and Electronic Engineers (IEEE) standards pertaining to motors.

1.4 SUBMITTALS

- A. Shop drawings shall consist of motor dimensions, name-plate data from each motor and tests as outlined above. Also included shall be efficiency and power factor at 100, 75, and 50 percent load. Operation, maintenance, and lubrication information (including bearing catalog numbers) shall be submitted with shop drawings for review.

1.5 EQUIPMENT

- A. Motors 200 Horsepower and Under for Service Under 600 Volts
 - (1) Ratings and Electrical Characteristics
 - a. Time: All motors shall be rated for continuous duty.
 - b. Temperature: Based on NEMA standards for a maximum ambient temperature of 40 degrees Celsius and an altitude of 3,300 feet or less, according to service factor and insulation class employed.
 - c. Voltage: All single phase motors shall be rated 120/208/230 volts and all polyphase motors 230/460 volts. All motors shall be capable of normal operation at balanced voltages in the range of ± 10 percent from rated winding voltage.
 - d. Frequency: All a-c motors shall be rated for 60 Hz. operation. All motors shall be capable of normal operation at frequencies 5 percent above or below the nominal rating of 60 Hz.
 - e. Horsepower: Horsepower of the motors shall be as given in the specification division on the driven equipment or as shown on the Contract Drawings. Submersible motors shall be allowed to be furnished even though the horsepower rating may not be in accordance with standard NEMA assignments. In many cases, the horsepower specified is a minimum requirement and certain alternate manufacturers may require larger horsepower motors. The larger motor shall be furnished at no extra cost to the OWNER.
 - f. Locked Rotor Current: Locked rotor current shall be in accordance with NEMA standards.

- g. Efficiency and Power Factor: Efficiency and power factor shall be given consideration during shop drawing review. The ratings at full, 3/4, and 1/2 load shall be compared to similar motors manufactured by acceptable suppliers listed in these Specifications. Excessive variation shall be considered grounds for rejection.
- h. Speed: Synchronous speed of motors shall correspond to standard NEMA ratings. Actual speed shall be as given in the specification division on the driven equipment. Slip shall not exceed 5 percent at full load.
- i. Service Factor: The service factor shall be 1.0 unless requirements of the driven load necessitate a higher service factor.
- j. Insulation Class: Insulation class for submersible motors shall be NEMA Class F. Motors to be operated at variable speed shall also be Class F. Class F insulated motors shall operate at a Class B rise at nameplate horsepower loading.
- k. Design Level: Motors shall be NEMA design B, except as otherwise noted.
- l. Enclosure: Submersible motors shall be air [or oil filled] and of watertight construction.
- m. Frame Size: Frame designations shall be in accordance with NEMA standards.
- n. Winding Over-temperature Sensors: All submersible motors shall be provided with motor winding thermostats. The devices shall be hermetically sealed, snap-acting thermal switches, actuated by a thermally responsive bi-metallic disk. A minimum of 1 per phase is required; with switches wired into the control circuit of the starter to provide de-energization should overheating threaten.
- o. All submersible pump/motor assemblies shall be equipped to detect presence of moisture and alarm at the controller.
- p. Motors to be controlled by VFD's shall be inverter duty rated, NEMA MG-1.

(2) Mechanical Characteristics

a. Submersible Motor Construction

- 1) See Equipment Specifications.

(3) Tests, Nameplates and Shop Drawings

a. Tests

- 1) Tests shall be required on integral horsepower motors only. A factory certified test report of "electrically duplicate motors previously tested" shall be supplied on all motors under 200 horsepower. The test shall be certified by the factory and shall

contain a statement to the effect that complete tests affirm the guaranteed characteristics published in the manufacturer's catalogs or descriptive literature.

2) Tests will be in accordance with IEEE test procedures.

b. Nameplates

1) Each motor shall have a permanently affixed nameplate of brass, stainless steel, or other metal of durability and corrosion resistance. The data contained on the nameplate shall be in accordance with NEMA standards.

(4) Efficiency Requirements

a. The following motor full load efficiency requirements shall be met as a minimum for premium efficiency totally enclosed 3 phase integral horsepower motors (per NEMA test Methods):

Horsepower	Nominal	Nominal	Nominal	Nominal
	3600 RPM	1800 RPM	1200 RPM	900 RPM
	(Minimum %)	(Minimum %)	(Minimum %)	(Minimum %)
1		77.0	72.0	68.0
1.5	75.5	78.5	80.0	72.0
2	78.5	80.0	80.0	80.0
3	80.0	81.5	81.5	78.5
	82.5	82.5	82.5	81.5
7.5	82.5	85.5	85.5	82.5
10	85.5	85.5	85.5	85.5
15	85.5	86.5	87.5	86.5
20	86.5	88.5	87.5	87.5
25	87.5	89.5	88.5	87.5
30	87.5	89.5	89.5	88.5
40	88.5	90.2	90.2	88.5
50	88.5	91.0	90.2	89.5
60	90.2	91.7	90.2	90.2
75	91.0	91.7	91.7	91.7
100	91.7	92.4	91.7	91.7
125	91.7	92.4	91.7	92.4
150	91.7	93.0	93.0	92.4
200	93.0	93.6	93.0	93.0

b. Where indicated on the Contract Drawings or in the Contract Specifications motors shall be of the energy efficient line offered by the motor manufacturer, having comparable performance characteristics to their standard line as far as torque and horsepower are concerned. Efficiency and power factor however, shall be higher than the manufacturer's standard line of motors and shall be documented in the shop drawings submittal in sufficient detail to allow the ENGINEER complete review of what is offered. Motors shall be referred to simply as "premium efficiency" in Specifications and Contract Drawings.

- c. All motors to be installed for connection to V.F. drives shall be inverter duty rated, NEMA MG-1.

1.6 INSTALLATION

- A. All electric motors shall be protected against the accumulation of moisture, dust and debris and physical damage during the course of installation of the job.
- B. Handle motors carefully to avoid damage to components, enclosures and finishes. Do not install damaged equipment; replace and return damaged units to equipment manufacturer.
- C. Store motors in a clean dry place and protect from weather and construction traffic.
- D. Install motors in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that motors comply with requirements of National Electrical Code, and applicable portions of ANSI/NEMA standards pertaining to installation of electrical motors and ancillary equipment.
- E. All motors shall be manufactured and installed in accordance with applicable NEMA standards and NEC provisions, latest revisions.

END SECTION

SECTION 16152 - MOTOR CONTROL CENTERS

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Section 16000 General Provisions govern work specified in this section.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and accessories necessary for a complete and proper motor control center system.
- B. Unless otherwise specified, required for a particular application, or indicated by details or control diagrams on Drawings, provide each motor with a motor starter.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Manufacturers Association Standards.

4. SUBMITTALS

- A. Submit manufacturer's data on motor control centers.
- B. Submit dimensioned drawings of motor control centers indicating accurately scaled layout of enclosures and required individual devices, including but not necessarily limited to, circuit breakers, fusible switches, fuses, ground-fault circuit interrupters and accessories.

5. EQUIPMENT

- A. General

1. Motor Control Centers shall be Square "D" Company Model 6, Westinghouse, Allen-Bradley or equal as approved by this Engineer. The enclosures shall be NEMA 1 with door gaskets unless otherwise noted. Units shall be mounted front-of-board, or back-to-back as shown on the drawings. Wiring shall be NEMA Class I, Type B. Each motor control center shall consist of one or more vertical sections bolted together to form a rigid, free-standing assembly and shall be designed to permit future additions, changes or regrouping of units by the purchaser. Motor control centers shall meet the minimum requirements of the latest published standards of NEMA. Provide separate ground bus.

- B. Service

1. Motor Control Centers shall be suitable for operation on 480 volts, 4 wire with ground, 60 hertz service. The control voltage shall be 120 volts at 60 hertz. Horizontal and vertical bus bars shall be braced for 65,000 rms symmetrical amperes. Incoming line feeder conductors shall consist of cables. See plans.

- C. Vertical Sections

1. Vertical sections shall be formed of 13 gauge hot rolled steel with uniform blemish-free surfaces. Top and bottom structural parts shall be 10 gauge for a strong and rigid assembly. End closing plates shall be 12 gauge and unit parts and doors shall be 14 gauge. Base channels shall be provided, constructed of rugged steel to easily withstand the stress of transit and moving the control

center into position. Bolt holes in the base channels shall be provided in all sections for the purpose of bolting the control centers to the floor. Steel removable lifting angles, shall be provided on the top of the section(s) for convenience in handling the control center.

2. Each section, to comply with standards of NEMA, shall be approximately 90" high excluding lifting angles and base channels. It shall be 20" deep. Sections housing plug-in units shall be 20" wide. Wider sections will not be permitted.

3. Unit sections shall have horizontal wireways at both top and bottom and shall have 4" wide vertical wireway with separate hinged door. Structures housing a full section control unit are not required to have separate vertical wireway.

4. Where wire access ports between unit spaces and vertical wire trough are open, snap-in block-offs shall be provided to prevent items, such as a fish tape, from accidentally entering the unit space. Snap-in wire grommets shall be provided in wire access ports for Size 2 units and smaller for isolation and added protection of small wires. For larger units snap-in guards shall be provided for added protection of larger wires.

D. Bus Bars

1. Main horizontal bus bars rated not less than 600 amperes shall be provided near the top of the control center and extend its entire length when cut and supplied with splice bars to divide the control center for ease in handling. All current carrying parts of the bus shall be tin plated copper. Horizontal bus bars shall be mounted edge- to-edge to provide greater mechanical strength.

2. Vertical bus bars shall be rated not less than 300 amperes for adequate current carrying capacity in a variety of plug-in applications. Vertical bus bars shall be tin plated copper.

3. Horizontal and vertical bus bars shall be electrolytically tin plated to provide maximum protection in adverse atmospheres. Connections between horizontal and vertical busses shall be joined by bolts, conical spring washers for constant pressure joints and self-clinching nuts to allow joint maintenance using one wrench from the front only.

4. A full length tin plated copper ground bus, rated for 600 amps, shall be provided.

E. Bus Barriers

1. Insulated horizontal and vertical bus barriers shall be furnished to reduce the hazard of accidental contact. These barriers shall have a red color to indicate proximity to energized buses. Vertical bus barriers shall have interlocking front and back pieces to give added protection on all sides and shall segregate the phases from each other to reduce the chance of accidental "flash over." Small separate openings in the vertical bus barriers shall permit unit plug-in contacts to pass through and engage the vertical bus bars. Bottom bus covers shall be provided below the vertical bus to protect the ends of this bus from contact with fish tapes or other items entering the bottom of the enclosure. Unused plug-in openings shall have plastic snap-in closing plates for added safety.

F. Unit Stab Connection

1. Units with circuit breaker disconnects through 250 amp frame and fusible switch disconnects through 200 amps shall connect to the vertical bus through a spring reinforced stab-on connector. Units with larger disconnects shall be connected directly to the main horizontal bus with appropriately sized cable or riser bus.

Stabs on all plug-in units shall be solidly bussed to the unit disconnect. Cabled stab assemblies are not permitted.

2. The stab connection shall be a high quality two point connection for each phase designed to tighten during heavy current surge. For a trouble free connection, fingers shall be silver plated to yield a low resistance connection, and shall be backed by spring steel clips to provide high pressure connection points.

G. Units

1. Each unit shall have a door securely mounted with rugged hinges which allow the door to swing open a minimum of 112 degrees for ease of unit maintenance. Unit doors shall be fastened to the stationary structure so they can be closed to cover the unit space when the units have been temporarily removed. To discourage unauthorized tampering, unit doors shall be held closed under fault conditions. Removable door panels held with captive type screws shall be provided on starter unit doors for mounting selector switches and pilot lights. Blank door panels capable of accepting future pushbutton devices shall be furnished when push button devices are not originally specified for starter units. All starter units shall have an external low profile overload reset button. Additional controls, indicating devices and alarms shall be supplied as specified.

2. All plug-on units shall utilize a two stage type operating mechanism which will allow the unit to disengage from the power bus without withdrawing the unit from the motor control center.

3. A single standard padlock shall be able to lock the unit in the RETRACT position, and simultaneously lock the disconnect in the "off" position. When in this position, it shall be possible to close the unit door in order to maintain the enclosure's integrity.

4. A rugged flange mounted operator handle shall be supplied for each switch or breaker. To prevent false circuit indication, this mechanism shall be engaged with the switch or breaker at all times regardless of unit door position. The operator handle shall have a conventional up- down motion with the down position as OFF. For added safety it shall be possible to lock this handle in the OFF position with up to three 3/8" diameter shackle padlocks. For added recognition, the operator handle shall be color coded to display red in the ON position and black in the OFF position. The operator handle shall be interlocked with the unit door so that the disconnect cannot be switched to the ON position unless the unit door is closed. It shall be possible to defeat this interlock by a deliberate act of an electrician should he desire to observe the operation of the operator handle assembly. This interlock shall also prevent opening the unit door unless the disconnect is in the OFF position. A defeater for this action shall also be provided in the event an electrician must gain access to the unit without interrupting the service.

5. Provide acrylic/lamicoid nameplates to identify all units including spaces in accordance with 16000-8. White background with minimum one inch high black lettering.

H. Magnetic Starters

1. Magnetic starters as manufactured by the Control Center Manufacture shall be provided. Thermal melting alloy overloads on starters shall be provided. Three overload relays shall be furnished on each three-phase starter. Four auxiliary contacts (2NO-2NC) shall be provided on each starter. All starters shall be combination type unless otherwise noted.

2. Control circuit transformers shall include two primary fuses and one secondary fuse (in the non-grounded secondary conductor). The transformer shall be sized to accommodate the contactor(s) and all connected control circuits.

3. NEMA Size 1-4 starters shall be mounted directly adjacent to the wireway so that power wiring (motor leads) shall connect directly to the starter terminals without the use of interposting terminals. Larger starters shall be arranged so that power wiring may exit through the bottom of the starter cubical without entering the vertical wireway.

4. All starters shall be furnished with H-O-A switch.

I. Timing Relays and Interlocks

1. Timing relays and interlocks shall be provided to stagger starting times of motors so as not to exceed the AC supply system capability to deliver sufficient voltage and frequency, and to protect the main fuses/cb. Time shall be 0-90SEC min. adjustable.

J. Finish

1. All painted parts shall undergo a phosphatizing pre-painting treatment for rust resistance and good paint bond. All painting shall be with UL listed enamel which shall be baked for a durable hard finish.

6. INSTALLATION

A. Handle starters and enclosures carefully to prevent breakage, denting and scoring finish.

B. Store control centers indoors and protect from weather. When necessary to store outdoors, elevate well above grade and enclose with durable, waterproof wrapping.

C. Install in accordance with manufacturer's written instructions, applicable requirements of NECA and in accordance with recognized industry practices to ensure that products comply with requirements and serves intended purposes.

D. Coordinate installation of motor control centers and enclosures with cable and raceway installation work.

E. Construct 3" high concrete pads which extend min. 2" beyond sides and front of centers installed against walls and 2" beyond all sides of free standing centers.

7. SPECIAL INSTALLATION REQUIREMENTS

A. Service distribution center main switch cb unit shall have distribution class lightning arresters.

END SECTION

SECTION 16155 - MOTOR STARTERS

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Section 16000 General Provisions govern work specified in this section.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and accessories necessary for a complete and proper motor starter system.
- B. Unless otherwise specified, required for a particular application, or indicated by details or control diagrams on Drawings, provide each motor with a motor starter.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of motor starters.
- B. Provide motor starters which have been listed and labeled by Underwriters' Laboratories.
- C. Comply with National Electrical Manufacturers Association Standards.
- D. Acceptable manufacturers offering products complying with requirements:

Allen Bradley

Square D

GE

Cutler-Hammer

4. SUBMITTALS

- A. Submit manufacturer's data on motor starters.

5. EQUIPMENT

- A. Each starter and its component and related parts shall be properly designed and coordinated to suit characteristics of motor it controls and driven equipment. Starters provided with automatic control shall be capable of making as frequent starts as control devices may demand.

(1) Equip each starter with contacts to break each ungrounded line to motor. Provide a thermal overload device to open all contacts simultaneously, as an integral part of starter, in each ungrounded line to motor. Provide a suitable reset device for resetting overload trip. Overload devices shall be rated in amperes to correspond to motor nameplate rating but rating shall not exceed that recommended by motor manufacturer for application.

(2) Unless otherwise specified or indicated, starters shall have NEMA type 12 dust tight enclosures with doors arranged for padlocking. Each enclosure shall be so designed that entire starter can be readily removed and shall be of sufficient size to permit easy access for repair, replacement, and making of connections. Separately mounted starters shall be arranged for wall, floor or panel mounting and shall be complete with necessary frames and supports.

B. Unless otherwise indicated on Drawings, locate starters within sight of their associated motors. Where starter is not within sight of motor, provide a disconnect device within sight of motor.

(1) Unless otherwise specified or indicated on Drawings, disconnect device shall be either an unfused switch or a non automatic circuit breaker. Disconnect device for motors rated over 50 horsepower shall be a non automatic circuit breaker. Switches shall be unfused and circuit breakers shall be without overcurrent devices.

C. Provide magnetic starters for 1/2 horsepower and larger motors. Magnetic starters shall be full voltage (across the line) type with under voltage release for automatic control, and undervoltage protection for manual control. Magnetic starters shall be combination type with fused disconnect switch or circuit breaker, except where panelboard containing motor circuit protection is within sight of starter. Circuit breakers shall have interrupting capacity adequate for fault current available at particular location.

(1) All magnetic starters shall have both cover mounted Hand Off Automatic selector switch and start stop pushbutton unless otherwise noted. This applies to both starters in NEMA 12 and NEMA 4 enclosures.

(2) Do not connect selector switches in any manner which interferes with intended operation of safety devices or safety interlocks.

(3) All starters shall have four (4) auxiliary contacts (NO/NC) and (1) set of fail contacts.

D. Magnetic starters for two speed motors shall be designed for use with two speed motors having two separate windings. Starter shall have two separate sets of contacts, mechanically and electrically interlocked to prevent simultaneous closing. Provide overcurrent protection for each winding. Manual control stations shall be three button type, with "Slow", "Fast" and "Stop" positions. Provide pilot lights to indicate speed position.

E. Reduced voltage and increment starters, where specified, shall also comply with the following requirements:

(1) Maximum line current and current increments shall conform to local power company limits.

(2) Line shall not be opened at any time during starting period (closed transition).

(3) Starting torque shall be suitable for driven machine, and shall cause motor to break away from rest on first step.

(4) Starting period shall not be long enough to result in excessive heating of or damage to motor.

(5) Resistors, if used, shall be mounted within starter case in rear of contactor panel, unless otherwise indicated or specified.

(6) Adequately ventilate case.

(7) Disconnect means for starters may be separate from starter in lieu of combination type, but shall be as hereinbefore specified for magnetic starters.

F. Unless otherwise indicated on Drawings, provide manual starters for all motors under 1/2 horsepower. Equip each starter with a manually operated trip free switch. Provide a separately mounted safety disconnect switch except where panelboard containing disconnect and circuit protection for motor is within sight of disconnect switch for starters. Provide hand off automatic selector switches where starters are controlled by automatic devices. Functions, locations, and like, shall be as specified for magnetic starters.

G. Unless otherwise specified or indicated, control circuits and indicating lights shall operate at not over 120 volts, provided, where necessary, by individual dry type control transformers located within starter cases. Each transformer shall have adequate capacity to operate both starter and other connected control equipment, if any. Protect each control transformer by one fuse on secondary side. Control circuit conductors shall be connected, grounded, and protected against overcurrent in accordance with National Electrical Code, and shall be arranged so that an accidental ground will not start any motor.

H. Where interlocking or sequence starting of motors is specified or indicated on Drawings, it shall be done in such a manner that, when main switch or breaker on any starter is open, no part of starter will be left energized. Furnish all equipment, such as relays or auxiliary contacts on breakers or disconnect switches, necessary to accomplish the above.

6. INSTALLATION

A. Install motor starters in accordance with manufacturer's written instructions, applicable requirements of NEC and in accordance with recognized industry practices to ensure that products serve the intended function.

B. Motor starter installation work with electrical raceway and cable work, as necessary for proper interface.

7. SPECIAL INSTALLATION INSTRUCTIONS

A. All starters noted to have a NEMA 4 enclosure shall be stainless steel.

END SECTION

SECTION 16157 - VARIABLE SPEED DRIVES (VFD)

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Section 16000 General Provisions govern work specified in this section.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and accessories necessary for a complete and proper motor control system.
- B. This section provides specification requirements for adjustable frequency drives, variable speed drives or herein identified as AC Drives or VFD for use with NEMA® Design AC motors.
- C. The manufacturer shall furnish, field test, adjust and certify all installed AC Drives for satisfactory operation.
- D. Any exceptions or deviations to this specification shall be indicated in writing and submitted with no less than two (2) weeks prior to bid date.

3. QUALITY ASSURANCE

- A. Comply with:
 - (1) ANSI®/NFPA® 70 - National Electrical Code® (NEC®)
 - (2) CSA® C22.2 No. 14-M91 - Industrial Control Equipment
 - (3) IEC 61000 - Electromagnetic Compatibility
 - (4) NEMA 250 Enclosures for Electrical Equipment
 - (5) NEMA ICS7 - Industrial Control and Systems Adjustable Speed Drives
 - (6) NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection Installation and Operation of Adjustable Speed Drives
 - (7) UL® 50 – Enclosures for Electrical Equipment
 - (8) UL 98 – Disconnect Switches
 - (9) UL 507 – Electric Fans
 - (10) UL 508 – Industrial Control Equipment
 - (11) UL 508C – Power Conversion Equipment
 - (12) UL 991 – Safety Tests for Safety Related Controls employing Solid State Devices

- (13) OSHA® 1910.95 – AC Drive Controller Acoustical Noise
- (14) The manufacturer of the AC Drive shall be a certified ISO 9001 facility.
- (15) The AC Drive and all associated optional equipment shall be UL Listed according to UL508C Power Conversion Equipment. A UL label shall be attached inside each enclosure as verification.
- (16) The AC Drive shall be designed constructed and tested in accordance with UL, CSA, NEMA and NEC standards.
- (17) Every power converter shall be quality assurance tested with an AC induction motor under load conditions and subjected to a hi-pot test with all enclosed devices mounted and wired, prior to shipment.
- (18) Quality Assurance documentation shall be furnished to verify successful completion upon written request of the engineer.
- (19) A 12-month parts warranty shall be provided on materials and workmanship from the date of project substantial completion and acceptance of installation by manufacturer.

4. **SUBMITTALS**

- A. [6] Copies of approval drawings shall be furnished for Engineer's approval prior to factory assembly of the AC Drives. These drawings shall consist of elementary power and control wiring diagrams and enclosure outline drawings. The enclosure drawings shall include front and side views of the enclosures with overall dimensions and weights shown, conduit entrance locations and nameplate legends.
- B. Standard catalog sheets showing voltage, horsepower, maximum current ratings and recommended replacement parts with part numbers shall be furnished for each different horsepower rated AC Drive shall be provided.
- C. Submit with the delivery of the VFD an Installation and Maintenance Manual and one (1) copy of the manufacturer's drawings per shipping block.
- D. A submittal package, including drawings shall be furnished for the Engineers' approval prior to factory assembly of the AC Drives. These packages shall consist of elementary power and control wiring diagrams on one drawing and enclosure outline drawings. The enclosure drawings shall include front and side views of the enclosures with overall dimensions and weights shown, and conduit entrance locations. Standard catalog specification sheets showing voltage, horsepower and maximum current ratings shall be furnished as part of the submittal package.

5. **EQUIPMENT**

- A. Acceptable Manufacturers
 - (1) The AC Drive VFD units shall be Square "D" E-Flex 6 Pulse or prior approved equal. Substitutions must be submitted in writing three (3) weeks prior to original bid date with supporting documentation demonstrating that the alternative manufacturer meets all aspects of the specifications herein.

- (2) Alternate control techniques other than pulse width modulated technology (PWM) are not acceptable.

B. General Description

- (1) The AC Drive shall convert the input AC mains power to an adjustable frequency and voltage.
- (2) The input power section shall utilize a full wave bridge design incorporating diode rectifiers. The diode rectifiers shall convert fixed voltage and frequency, AC line power to fixed DC voltage.
- (3) The output power section shall change fixed DC voltage to adjustable frequency AC voltage.
- (4) The adjustable frequency NEMA 3R drive package shall consist of a circuit breaker disconnect, line reactor, EMI/RFI filter (if drive design requires RFI interference protection), 120V control transformer, control circuit terminal board for digital and analog field wiring. AC line fuses do not meet specification.
- (5) The drive door shall have mounted and wired, Hand-Off-Auto switch, Manual Speed Potentiometer and AFC-Off switch.
- (6) The entire drive package shall be UL508C listed and coordinated with NEMA ICS 7.1. A UL508A panel builders label does not meet specification.

C. Construction

- (1) The AC Drive power converter shall be enclosed in a NEMA Type 3R enclosure with a circuit breaker disconnect, user terminal strip connections. The enclosure shall provide dedicated user terminals for power and control device connection.
- (2) Provisions shall be included for locking the disconnect in the OFF position with a padlock.
- (3) All enclosure and heat sink fans shall be accessible from the front and shall not require the removal of the AC drive power converter for fan replacement.

D. Application Data

- (1) The AC Drive shall be sized to operate a variable torque load.
- (2) The speed range shall be from a minimum speed of 1.0 Hz to a maximum speed of 72 Hz.

E. Environmental Ratings

- (1) The AC Drive shall meet IEC 60664-1 Annex A and NEMA ICS 1, UL, and CSA standards.
- (2) The AC Drive shall be designed to operate in an ambient temperature from -10 to 40 °C (14 to 104 °F).
- (3) AC Drives in Type 3R enclosures shall be designed to operate in an ambient temperature from -10 to 50 °C (14 to 122 °F) and in full sunlight.

- (4) The storage temperature range shall be -25 to 65 °C (-13 to 149 °F).
- (5) The maximum relative humidity shall be 95%, non-condensing.
- (6) The AC Drive shall be rated to operate at altitudes less than or equal to 3300 ft (1000 m). For altitudes above 3300 ft (1000 m), the AC Drive should be de-rated per drive specifications.
- (7) The AC Drive shall meet the IEC 60721-3-3-3M3 operational vibration specification.
- (8) The AC Drive shall be Seismic Qualified to 2000 IBC Level 3 "Extreme" rating with an Importance Factor $1p=1.5$

F. Ratings

- (1) The AC Drive shall be designed to operate at the input line voltage indicated on the equipment schedule.
- (2) The AC Drive shall operate from an input frequency range of 60 Hz (\pm) 5%.
- (3) The displacement power factor shall not be less than .98 lagging under any speed or load condition.
- (4) The efficiency of the AC Drive at 100% speed and load shall not be less than 97%.
- (5) The variable torque rated AC Drive over current capacity shall be not less than 110% for 1 minute.
- (6) The output carrier frequency of the AC Drive shall be programmable at 0.5, 1, 2, 4 or 8 kHz. In addition, the output carrier frequency shall be randomly modulated about the selected frequency.

G. Protection

- (1) Upon power-up, the AC Drive shall automatically test for valid operation of memory, loss of analog reference input, loss of communication, DC-to-DC power supply, control power and pre-charge circuit.
- (2) The enclosure shall provide a fully coordinated 100,000 AIC current rating marked on the enclosure nameplate. Short circuit coordination to UL 508C Power Conversion Equipment and NEMA ICS 7.1.
- (3) The AC Drive shall be protected against short circuits, between output phases and to ground.
- (4) The AC Drive shall have a minimum AC undervoltage power loss ride-through of 200 milliseconds (12 cycles).
- (5) The AC drive shall have a programmable ride-through function, which will allow the logic to maintain control for a minimum of one-second (60 cycles) without faulting.

- (6) For a fault condition other than a ground fault, short circuit or internal fault, an auto restart function will provide up to 6 programmable restart attempts. The time delay before restart attempts will be 30 seconds.
- (7) Upon loss of the analog process follower reference signal, the AC Drive shall be programmable to display a fault.
- (8) The AC Drive shall have a solid-state UL 508C listed overload protective device and meet IEC 60947.
- (9) The output frequency shall be software enabled to fold back when the motor is overloaded.
- (10) There shall be three skip frequency ranges that can be programmed to a bandwidth of (\pm) 2.5 Hz.

H. Adjustments & Configurations

- (1) The AC Drive will be factory programmed to operate all specified optional devices.
- (2) The acceleration and deceleration ramp times shall be adjustable from 0.05 to 999.9 seconds.
- (3) The memory shall retain and record run status and fault type of the past eight faults.
- (4) The software shall have an energy economy function that, when selected, will reduce the voltage to the motor when selected for variable torque loads. A constant volts/Hz ratio will be maintained during acceleration. The output voltage will then automatically adjust to meet the torque requirement of the load. Selectable volts/Hz ratio patterns does not meet specification, the function must be automatically optimized.

I. Keypad Display Interface

- (1) A keypad display interface shall offer the modification of AC Drive adjustments through a touch keypad. All electrical values, configuration parameters, I/O assignments, application and activity function access, faults, local control, and adjustment storage, and diagnostics shall be accessible.
- (2) The AC Drive model number, torque type, software revision number, horsepower, output current, motor frequency and motor voltage shall be listed on the drive identification portion of the LCD display.
- (3) The keypad display shall have a hardware selector switch that allows the keypad to be locked out from unauthorized personnel.

J. Operator Controls

- (1) The control power for the digital inputs and outputs shall be 24 Vdc.
- (2) The internal power supply shall incorporate automatic current fold-back that protects the internal power supply if incorrectly connected or shorted. The transistor logic outputs will be current limited and will not be damaged if shorted.

- (3) Pull-apart terminal strips shall be used on all logic and analog signal connections in the power converter
- (4) Two voltage-free relay output contacts will be provided. One of the contacts will indicate AC Drive fault status. The other contact shall indicate a drive run status.
- (5) The combination enclosure shall have the following dedicated operator controls:
 - (a) Hand-Off-Auto switch
 - (b) Manual Speed Potentiometer
- (6) The combination enclosure shall include terminal point connection for fire /freeze state interlock, to prevent drive operation. The interlock must shut down the motor in the drive modes.

K. Serial Communication

- (1) The AC Drive shall have serial communications capability.

L. Harmonic Mitigation

- (1) Each drive shall include a line reactor mounted inside the drive enclosure to reduce power system harmonics and provide power quality protection for the drive. DC bus chokes do not meet specification and shall not be substituted.

6. INSTALLATION

- A. Handle VFD's and enclosures carefully to prevent breakage, denting and scoring finish.
- B. Store VFD's indoors and protect from weather.
- C. Install in accordance with manufacturer's written instructions, applicable requirements of NECA and in accordance with recognized industry practices to ensure that products comply with requirements and serves intended purposes.
- D. Coordinate installation of VFD's and enclosures with cable and raceway installation work.
- E. The AC Drive manufacturer shall provide a factory certified technical representative to supervise the contractor's installation, testing and start-up of the AC Drive(s) furnished under this specification for a maximum total of 1 day. The start-up service shall be quoted as a separate line item.
- F. An on-site training course of 1 training day shall be provided by a representative of the AC Drive manufacturer to plant and/or maintenance personnel.
- G. The AC Drive supplier shall supply a comprehensive 8-1/2 x 11-inch bound instruction and installation manual that includes wiring diagrams, layout diagrams, and outline dimensions. This manual must be 3-hole punched for insertion in a shop manual supplied by the installing contractor.

7. **SPECIAL INSTALLATION INSTRUCTIONS**

- A. **Drives shall have contacts as required for interfacing with new telemetry control and 4-20MA input/output for remote drive speed control, pressure indication and flow rate indication.**

END SECTION

SECTION 16160 - PANELBOARDS

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary conditions and General Requirements, apply to this section.
- B. Requirements of Electrical General Provision sections govern this section, where applicable.
- C. This section shall be governed by alternates insofar as they apply to this work.

2. DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and services necessary for proper and complete installation of panelboards.
- B. Refer to other Division 16 sections for cable/wire, connectors and electrical raceway work required in conjunction with panelboards and enclosures, not work of this section.

3. QUALITY ASSURANCE

- A. Special Use Markings: Provide panelboards, constructed for special use, with UL marks indicating that special usage, i.e., "suitable for use as service entrance equipment".
- B. UL Compliance: Comply with applicable UL publications pertaining to panelboards, enclosures and panelboard accessories. Provide units which have been listed and labeled by Underwriters Laboratories.
- C. NEC Compliance: Comply with National Electrical Code (NFPA 70/ANSI C1) as applicable to installation of cabinets, cutout boxes and panelboards. Comply with applicable NEC Articles pertaining to installation of wiring and equipment in hazardous locations.
- D. NEMA Compliance: Comply with National Electrical Manufacturers Association Stds. Pub. No. 250, "Enclosures for Electrical Equipment (1000 volt maximum)"; Pub. No. 250, "Enclosures for Electrical Equipment (1000 volt maximum)"; Pub. No. PB 1, "Panelboards,"; installation portion of Pub. No. PB 1.1, " Instructions for Safe Installation, Operation and Maintenance of Panelboards" and Pub. No. PB 1.2, "Application Guide for Ground Protective Devices and Equipment."

4. SUBMITTALS

- A. Submit manufacturer's data on panelboards and enclosures.
- B. Submit dimensioned drawings of panelboards and enclosures indicating accurately scaled layout of enclosures and required individual panelboard devices, including but not necessarily limited to, circuit breakers, fusible switches, fuses, ground fault circuit interrupters and accessories.

5. EQUIPMENT

- A. Except as otherwise indicated, provide panelboards, enclosures and ancillary components, of types, sizes, and ratings indicated, which comply with manufacturer's standard materials, design and construction in accordance with published product information. Equip with number of unit panelboard devices as required for a complete installation. Where types, sizes, or ratings are not otherwise indicated, comply with NEC, UL and established industry standards for applications indicated.

- (1) All terminals for wiring connections shall be suitable for copper or aluminum.
- (2) **Buses shall be tin plated copper.** Bus capacity shall be as indicated on drawings, otherwise, bus capacity shall be equal to or greater than panelboard feeder overcurrent protective device.
- (3) Provide a bare uninsulated equipment grounding bar suitably brazed or bolted to interior of each enclosure. This bar shall be equivalent in current carrying capacity to incoming feeder ground conductor and shall be suitable for brazed or approved pressure connector terminations of ground conductors for associated feeders and branch circuits.
- (4) A neutral bar, where required, shall be mounted at opposite end of each panelboard from main lugs and shall have numbered terminals for connection of neutral wires.
- (5) Bus bar connections to branch circuit overcurrent protection devices shall be of sequence phased type.
- (6) Where "provision for," "future," or "space" is indicated on drawings, space shall be equipped with bus connections to future over current device with suitable insulation and bracing to maintain proper short circuit rating and voltage clearances. All provisions shall be made for ready insertion of a future device.
- (7) All panelboards shall be dead front type.

B. Provide galvanized sheet steel cabinet type enclosures, in sizes and NEMA types as indicated, code gauge, minimum 16 gauge thickness. Construct with multiple knockouts and wiring gutters. Provide fronts with adjustable indicating trim clamps, and doors with flush locks and keys, all panelboard enclosures keyed alike, with concealed door hinges. Provide enamel finish over a rust inhibitor. Design enclosure for recessed or surface mounting as indicated. Provide enclosures fabricated by same manufacturer as panelboards, and which fit properly with panelboards to be enclosed.

- (1) Provide typewritten directories placed under a clear plastic cover on interior of doors. Directories shall identify panelboards and indicate each circuit number and description of associated branch circuit. Directories for fuse and switch panels shall also indicate switch, fuse, and branch feeder size. For panelboards without doors, provide a separate laminated phenolic identification plate on or near each device cover and provide same information that directories described above require.
- (2) Where feeders go through panelboard cabinets to serve panelboards above or beyond same, wiring gutters in panelboard cabinets shall be a minimum of 8 inches on sides and 8 inches top and bottom. Cables shall be neatly bundled, routed and supported within gutters. Do not reduce minimum bending radii as recommended by cable manufacturer.
- (3) Top and bottom feeding through panelboard buses will not be permitted. Panels served by a common feeder shall have through feeder gutter tapped or provide auxiliary gutter with a feeder tap to each panel.
- (4) Lighting and power panelboards less than 49 inches wide for surface mounting shall be equipped with a one piece sheet steel frame and shall have a hinged door. Frame shall be same size as cabinet and shall completely cover wiring gutters. Equip doors over 48 inches in height with a vault handle and a three point catch. Cabinets greater than 48 inches wide shall have sectionalized frames and multiple doors.

C. Provide panelboard accessories and devices including, but not necessarily limited to, cartridge time delay type fuses, circuit breakers and ground fault protection units, as recommended by panelboard manufacturer for ratings and applications indicated.

(1) Circuit breaker protective devices shall be rated for circuit voltage on which they are used; have trip rating and number of poles indicated on drawings; be molded case breakers of quick make, quick break, bolt on, thermal magnetic type and be trip free. Automatic tripping shall be indicated by a handle position between manual OFF and ON position.

a. All similar units of all panelboards shall be same manufacture, except where a manufacturer does not produce a frame size or type called for, and like units shall be interchangeable.

b. Adjustable magnetic trip devices shall be adjusted at factory to "low " trip setting ampere values.

c. Circuit breakers shall have a minimum interrupting rating of 10,000 amperes symmetrical, unless a greater rating is indicated on drawings. In all cases circuit breakers shall have an interrupting current rating equal or greater than available fault current at their locations in electrical system.

(2) Fusible switch branch circuit protective devices shall be as indicated on drawings, shall be interrupter switches of quick make, quick break type, and shall have sufficient load break capacity to properly coordinate with time current characteristics of current limiting fuses, where required, to provide an integrated switch and fuse device. Provide each switch pole with cartridge fuses as indicated on drawings. Interrupter switches shall have a load break capacity in excess of normal horsepower rating. Each unit shall be capable of withstanding let through current available before its fuse operates without damage or change in rating. Short circuit interrupting rating of circuit switch fuse combination shall be 100,000 RMS symmetrical amperes. Each unit shall be operable from front by means of an external operating handle and provided with an interlocking mechanism which allows access to de energized fuses and wiring only when in OFF position. Unit cover shall be so interlocked that it may not be removed or opened when switch is in ON position, except that interlock shall be tool releasable by a qualified person for inspection of contacts and mechanism. All similar switch units of all panelboards shall be of same manufacturer.

D. Manufacturers of panelboards shall be Square "D", Cutler-Hammer or equal as approved by this Engineer.

6. INSTALLATION

A. Handle panelboards and enclosures carefully to prevent breakage, denting and scoring finish.

B. Store panelboards and enclosures indoors and protect from weather. When necessary to store outdoors, elevate well above grade and enclose with durable, waterproof wrapping.

C. Install panelboards and enclosures, in accordance with manufacturer's written instructions, applicable requirements of NECA and in accordance with recognized industry practices to ensure that products comply with requirements and serves intended purposes.

(1) Install lighting and power panelboards with tops 6 feet 6 inches above floor and bottoms not less than 12 inches above floor (multi section panels shall be provided to meet these spacings) arranged for conduit or bus duct connections. Mount on metal channels. Where panelboards are equipped with remotely controlled switches or contactors, top of cabinet may be mounted above 6 feet provided height above floor of highest circuit breaker handle is not over 6 feet 6 inches.

D. Coordinate installation of panelboards and enclosures with cable and raceway installation work.

E. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure.

F. Provide electrical connections within enclosures.

G. Fill out panelboard's circuit directory card upon completion of the work.

7. SPECIAL INSTALLATION & EQUIPMENT REQUIREMENTS

A. Main service distribution panel shall have distribution class lightning arrestors.

B. Mini-powerzone type combination transformer panels shall have stainless steel enclosures.

END SECTION

SECTION 16170 - SAFETY AND DISCONNECT SWITCHES

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements, apply to this section.
- B. Requirements of electrical general provision sections govern work specified in this section.
- C. This section shall be governed by alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and services necessary for proper and complete installation of safety and disconnect switches.
- B. Types of safety and disconnect switches required for project include the following:
 - Equipment disconnects.
 - Appliance disconnects.
 - Motor circuit disconnects.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of electrical safety and disconnect switches.
- B. Provide safety and disconnect switches which have been listed and labeled by Underwriters Laboratories.
- C. Comply with National Electrical Manufacturers Association Stds. Pub. No. KS1.
- D. Manufacturers of safety and disconnect switches shall be Square "D", Allen-Bradley or Cutler-Hammer.

4. SUBMITTALS

- A. Submit manufacturer's data on electrical safety and disconnect switches.

5. EQUIPMENT

- A. Provide heavy duty type, sheet steel enclosed safety switches, of type, size and rating indicated; incorporating quick make, quick break type switches, constructed so switch blades are visible in "OFF" position with door open; equipped with operating handle which is an integral part of enclosure base and whose position is easily recognizable and is padlockable in "OFF" position.
- B. Mount switches in NEMA 12 enclosures unless otherwise indicated. Boxes exposed to wet or rain conditions shall be NEMA 4 type unless otherwise noted. Switches shall be rated at 240 or 600 minimum volts as required by voltage of circuit on which they are utilized and shall be rated in horsepower. Each shall be capable of interrupting locked rotor current of motor for which it is to be used. Current shall be assumed as ten (10) times full rated load current.

C. Mount switch parts on insulating bases to permit replacement of parts from front of switch. All current carrying parts shall be designed to carry rated load without excessive heating. Switch contacts shall be silver tungsten type or plated to prevent corrosion, pitting and oxidation and to assure suitable conductivity. Fuse clips shall be of positive pressure type and switch operating mechanism shall be designed to retain its effectiveness with continuous use at rated capacity without use of auxiliary springs in current path. Switches shall be capable of withstanding available fault current or let through current before fuse operates without damage or change in rating. Fuse clips shall be designed and coordinated to accommodate class and type of fuse specified or indicated to be used with switch.

6. INSTALLATION

- A. Deliver switches individually wrapped in factory fabricated fiber board type containers.
- B. Handle switches carefully to avoid damage to material components, enclosures and finish. Do not install damaged switches; remove from project site.
- C. Store switches in a clean dry space. Protect switches from dirt, fumes, water and physical damage.
- D. Install safety and disconnect switches where indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and in accordance with recognized industry practices.
- E. Coordinate safety and disconnect switch installation work with electrical raceway and cable work, as necessary for proper interface.
- F. Install disconnect switches used with motor driven appliances larger than 1/8 h.p. and motors and controllers within sight of controller position unless otherwise indicated.

7. SPECIAL INSTALLATION INSTRUCTIONS

- A. All disconnect switches noted to have a NEMA 4 enclosure shall be stainless steel.
- B. Main service disconnect switches shall have distribution class lightning arrestors.

END SECTION

SECTION 16181 - FUSES

1. RELATED DOCUMENTS

- A. General Provisions of Contract, General and Supplementary Conditions and General Requirements, apply to this section.
- B. Requirements of electrical general provision sections govern work specified in this section.
- C. This section shall be governed by alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and services necessary for proper and complete installation of fuses.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of fuses.
- B. Fuses shall be listed by Underwriters Laboratories.

4. SUBMITTALS

- A. Submit manufacturer's data on fuses.

5. EQUIPMENT

- A. Except as otherwise specified herein, provide complete sets of fuses for all switches requiring fuses. Fuses shall be of size indicated on drawings. Provide spare fuses in original boxes of the following quantities: one complete set for each different size, type and class.
- B. Install current limiting fuses in lieu of regular fuses where fault current exceeds 10,000 RMS amperes. Fuses rated over 600 amperes shall be NEMA Class L. Unless otherwise specified, fuses for use with switches rated 600 amperes and less shall be UL Class RK 1, and have interrupting rating of 200,000 RMS amperes. Class RK 1 fuses shall be dual element type with minimum time delay of ten seconds at 500 percent of rating.
- C. Current limiting high interrupting capacity fuses manufacturer with each unit as required for complete coordination.
- D. Provide all project fuses supplied by same manufacturer. Proper selectivity with associated protective equipment shall be substantiated by published catalog data.
- E. Switch size and fuse ratings indicated on Drawings and/or specified are based on general approximate values for each motor horsepower delineated. Since characteristics of fuses for motor short circuit protection vary with different manufacturers, coordinate fuse values with switch sizes for each motor.

6. INSTALLATION

A. Install fuses where indicated and required in accordance with manufacturer's written instructions, applicable requirements of N.E.C., and in accordance with recognized industry practice.

END SECTION

SECTION 16200 - MISCELLANEOUS ELECTRICAL EQUIPMENT

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary conditions and General Requirements, apply to this section.
- B. Requirements of Electrical General Provision sections govern this section, where applicable.
- C. This section shall be governed by alternates insofar as they apply to this work.

2. DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment and services necessary for proper and complete installation of equipment specified.
- B. Refer to other Division 16 sections for additional work required in conjunction with electrical equipment, not work of this section.

3. QUALITY ASSURANCE

- A. Special Use Markings: Provide equipment, constructed for special use, with UL marks indicating that special usage, i.e., "suitable for use in Class 1, Division 1 Environments".
- B. UL Compliance: Comply with applicable UL publications pertaining to miscellaneous equipment. Provide units which have been listed and labeled by Underwriters Laboratories.
- C. NEC Compliance: Comply with National Electrical Code (NFPA 70) as applicable to installation of miscellaneous electrical equipment. Comply with applicable NEC Articles pertaining to installation of wiring and equipment in hazardous locations.

4. SUBMITTALS

- A. Submit manufacturer's data on **all** miscellaneous electrical equipment items.
- B. Submit dimensioned drawings of equipment and enclosures indicating accurately scaled layout of enclosures and required individual devices.

5. EQUIPMENT

- A. Bitumastic Coatings
 - 1. Coatings for use on conduits and between metal and concrete contact points shall be of self priming type.
 - 2. Coatings shall be black, high build type single component coal tar mastic capable of maximum 30 mil dry film thickness.
 - 3. Coatings shall be applied in two (2) coats to achieve average of 18 mil dry film thickness over surface to be protected.
 - 4. Coatings shall be Carboline Bitumastic 50 or equal.

B. Corrosion Control Tape

1. **Corrosion control tape shall be applied to all rigid aluminum conduit where in contact with concrete (passing thru slabs, etc.) and where installed below concrete or in contact with earth.**

2. Corrosion control tape shall be Polyken No. 826 yellow in color, 12 mil thickness, 2" or 4" wide as required. Use Polyken No. 1027 primer prior to tape installation per manufacturer requirements.

C. Exothermic Ground Connections

1. Exothermic welding systems shall be approved by Underwriters Laboratories to ANSI UL 467 "Grounding and Bonding Equipment."

2. Exothermic welding shall be used for making electrical connections of copper to copper, copper to steel or copper to cast iron for grounding and cathodic applications.

3. Exterior connections shall be suitable for exposure to the elements of direct burial in earth or concrete without degradation over the lifetime of the grounding system.

4. Interior connections in occupied building shall be made using a low smoke producing process.

5. Products for exothermic connections shall be Cadweld, Thermoweld, Permaweld or equal.

6. INSTALLATION

A. Handle miscellaneous equipment carefully to prevent breakage, denting and scoring finish.

B. Store miscellaneous electrical equipment indoors and protect from weather. When necessary to store outdoors, elevate well above grade and enclose with durable, waterproof wrapping.

C. Install miscellaneous electrical equipment, in accordance with manufacturer's written instructions, applicable requirements of NECA and in accordance with recognized industry practices to ensure that products comply with requirements and serves intended purposes.

D. Coordinate installation of miscellaneous electrical equipment with cable and raceway installation work and work of other trades.

E. Anchor equipment firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure.

END SECTION

SECTION 16450 - ELECTRICAL GROUNDING

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements, apply to this section.
- B. Electrical general provision sections govern this section, where applicable.
- C. This section shall be governed by Alternates insofar as they apply to this work.

2. DESCRIPTION OF WORK

- A. Provide labor, material, equipment and services for proper and complete electrical grounding system.
- B. Grounding of electrical installations comprises both system and equipment grounding, and includes, but is not necessarily limited to, metal raceways, transformer frames, switchgear enclosures, metal enclosures of electrical devices, and circuit conductors.
- C. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.
- D. Electrical cable, wire, connectors, clamps, and raceway work are specified in applicable Division 16 basic material sections.
- E. Method
 - (1) Supplement grounded neutral of secondary distribution system by and equipment grounding systems to properly safeguard equipment and personnel. Design equipment grounding system so all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment, and other conductive items in close proximity with electrical circuits operate continuously at ground potential and provide a low impedance path for possible ground fault currents.
 - (2) The AC secondary system ground shall be connected using exothermic welds to at least three ground rods minimum 3/4 inch by 10 feet. Where required to meet requirements of herein specified tests, install extra rods at no additional cost to Owner. Locate rods a minimum of 10 feet from each other or any other electrode and loop interconnect with each other by a minimum No. 6 AWG bare copper conductor brazed to each rod below grade. Do not splice grounding electrode conductor.
 - (3) In addition, provide in conduit a minimum 3/0 or as required green insulated copper ground conductor to main metallic water service entrance and connect to same by means of adequate ground clamps. Where a dielectric main water fitting is installed, connect this ground conductor to street side of dielectric water fitting. Do not install a jumper around this fitting. Bond to ground conductor at each end. Provide with ground clamps a 3/0 jumper around water meter.
 - (4) Connect system neutral ground and equipment ground system to common ground bus as indicated on Drawings, or if not indicated, as required by NEC.
 - (5) Ground secondary services at supply side of secondary disconnecting means and at related transformers in accordance with NEC. Provide each service disconnect enclosure with a neutral disconnecting means and an insulated neutral stud which interconnects with insulated neutral and uninsulated equipment ground buses to establish system common ground point. Locate neutral

disconnecting link or links so that low voltage neutral bar with all interior secondary neutrals can be isolated from common ground bus and service entrance conductors.

(6) Size required equipment grounding conductors and straps in compliance with NEC. Provide equipment grounding conductors with green insulation equivalent to insulation on associated phase conductors. Braze related feeder and branch circuit grounding conductors to grounding bar or connect with approved pressure connectors. A feeder serving several panelboards shall have a continuous grounding conductor which shall be connected to each related cabinet bar. Aluminum, straps or bars may be substituted for proposed copper items if this is consistent with materials proposed for low voltage distribution system. Aluminum materials shall be comparable in current carrying capacity, temperature, rise, and mechanical strength, and installation shall include all necessary precautions regarding electrical connections with dissimilar metals.

(7) Provide low voltage distribution systems with a separate green insulated equipment grounding conductor for each single or three phase feeder and each branch circuit. Install required grounding conductor in common conduit with related phase and/or neutral conductors. Where there are parallel feeders installed in more than one raceway, each raceway shall have a green insulated equipment ground conductor. Single phase branch circuits required for 120 and 277 volt lighting, receptacles, and motors shall consist of phase, neutral and grounding conductors installed in common metallic conduit. Provide flexible metallic conduit equipment connections utilized in conjunction with the above single phase branch circuits with suitable green insulated grounding conductors connected to approved grounding terminals at each end of flexible conduit. Provide single phase branch circuits required for special equipment and all branch circuits installed in nonmetallic or flexible conduits with a separate grounding conductor.

(8) Determine number and size of pressure connectors to be provided on all equipment grounding bars required in panelboards and other electrical equipment for termination of equipment grounding conductors. In addition to active circuits, provide pressure connectors for all three phase spares and spaces.

(9) Provide a green colored equipment ground conductor and connected as described below. Provide each ground conductor with spade tongue terminals or solderless pressure connectors to suit conditions.

a. From green ground terminal of all receptacles to green 10 32 "washer in head" outlet box machine screw. Note: Receptacles with special cast boxes and factory designed and approved ground path will not require a separate ground jumper.

b. From green 10 32 "washer in head" machine screw in ceiling outlet box or junction box through flexible metallic conduit to ground terminal in fixture.

c. From green 10 32 "washer in head" machine screw in ceiling outlet box or junction box through flexible metallic conduit to green 10 32 "washer in head" machine screw in switch outlet box in movable partitions.

d. From green 10 32 "washer in head" machine screw in junction box or disconnect switch through flexible metallic conduit to ground terminal in connection box mounted on single phase fractional horsepower motor.

e. From equipment ground bus in motor control center through conduit and flexible metallic conduit to ground terminal in connection box mounted on three phase motor. Note: where motor has separate starter and disconnect device, ground conductor shall originate at ground bar in panelboard supplying these motors and be bonded to each starter and disconnect device enclosure also.

f. From equipment ground bar to equipment grounding bar on a busway, install and connect by an approved method a ground conductor.

g. From a computer area power panel ground bar, provide each branch circuit with a green insulated equipment ground conductor. Minimum size of this conductor shall be per NEC but no ground conductor circuit shall exceed 3 ohms resistance to building ground system.

(10) Nonmetallic conduits or ducts shall contain a green insulated grounding conductor unless otherwise specified.

a. Equipment grounding conductors are not required for telephone ducts.

(11) Where electric devices such as electric air cleaners or heaters are installed in air ducts, provide a green insulated equipment ground conductor. Bond conductor to each unit, air duct, and to ground in panelboard.

(12) Where electric immersion type water heater or surface anti frost heating cables are installed, provide a green insulated equipment ground conductor. Bond this conductor to water piping at unit and to ground bar in panelboard.

(13) Subject completed equipment grounding system to a megger test at each service disconnect enclosure ground bar to insure that ground resistance, without chemical treatment or other artificial means, does not exceed twenty five (25) ohms. Certified test reports of ground resistance shall be submitted to Engineer for approval. Necessary modifications for compliance with the twenty five (25) ohm value shall be performed without additional expense to Owner.

(14) Where steel conduit(s) terminate without mechanical connection to a metallic housing of electrical equipment by means of locknut and bushings or adapters such as switchboards, switchgear, motor control centers, the following procedure shall be followed: Provide each conduit with a ground bushing and each bushing connecting with a bare copper conductor to ground bus in electrical equipment. Ground conductor shall be in accordance with article on Grounding of NEC. Bond electrically non continuous metallic conduits containing ground wiring only to ground wire at both conduit entrance and exit in a manner similar to that described above.

3. QUALITY ASSURANCE

A. Comply with NFPA No. 70, National Electrical Code, as applicable to materials and installation of electrical grounding systems and associated equipment and wiring.

B. Comply with UL standards and IEEE Greenbook pertaining to electrical grounding and bonding.

C. Manufacturers offering products complying with requirements include: Cadweld, ITT Blackburn, ITT Weaver, Copperweld Bimetallics Group, Cathodic Engineering Equipment Co., or equal.

4. SUBMITTALS

A. Submit manufacturer's information on exothermic type connection system. Submit written results of grounding system megger test.

5. EQUIPMENT

A. Except as otherwise indicated, provide for each electrical grounding indicated, a complete assembly of materials including but not necessarily limited to cable, wire, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, and other items

and accessories needed for a complete installation. Where more than one type meets indicated requirements, selection is Installer's option. Where material or component is not otherwise indicated, provide products complying with NEC, and established industry standards.

B. Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC.

C. Provide electrical connectors, terminals and clamps as recommended by connector, terminal and clamp manufacturer for intended applications.

D. Steel ground rods with copper welded exterior, 3/4" dia. x 10'.

E. Acceptable Manufacturers:

(1) Grounding equipment shall be Cadweld, ITT Blackburn, ITT Weaver, Copperweld Bimetallics Group, Cathodic Engineering Equipment Co., or equal.

6. INSTALLATION

A. Testing

(1) The CONTRACTOR shall be required to provide all labor, tools, instruments, and materials as necessary to perform testing of the grounding electrode system. Results shall be submitted in writing to the ENGINEER. The testing shall be done to determine the effectiveness of the selected grounding scheme and to see that it conforms with resistance specified (2.5 ohms maximum).

(2) The testing should be done using a fall-of-potential method test at the point of grounding electrode conductor connection to main power distribution equipment and at each separately derived system or MCC. The test shall be performed no sooner than 48 hours after a rainfall event.

(3) The written report should contain the following information:

a. Type of ground scheme used, i.e., building steel, driven rod, mat, etc.

b. Type of instrument used.

1) Mfr.

2) Model number

3) Confirm fall-of-potential test

4) *Serial number

5) *Where instrument was obtained

* These 2 items are required so that the same instrument may be utilized should reproduction of the test be necessary due to unsatisfactory readings/instrument miscalibration.

c. Ground resistance readings obtained at various test distances.

d. Ground resistance/distance curve.

e. Value of Grounding Electrode Resistance at knee of curve.

f. Sketch showing setup of instrumentation and location electrode and test probes.

g. Proposed method to achieve the specified resistance, should an unacceptable reading be obtained.

h. Ground resistance readings obtained (if applicable) after modification incorporated.

B. Ground Enhancement Material

(1) Where indicated on the Drawings or as deemed necessary by the CONTRACTOR to achieve design grounding electrode system resistance, a ground enhancement material shall be utilized, in accordance with manufacturer's recommendations.

(2) The ground enhancement material must be permanent and maintenance free (no recharging with salts or chemicals which may be corrosive) and maintain its earth resistance for the life of the system. It must set up firmly and not dissolve or decompose, or otherwise pollute the soil or local water table. The material shall be capable of being applied dry or in a slurry form, and shall reduce resistance by at least 40 percent.

(3) Basic components of this material shall be carbon, hydraulic cements, and hydrous aluminum silicates. Minimum 4-inch diameter holes shall be used with ground rod installations, with depth 6" shorter than length of rod, completely filled with the material. Trenches for grounding electrode conductor shall also utilize this material the full length from electrode to building, in accordance with manufacturer installation recommendations, except trench depth shall allow buried conductor to be at least 2'-6" deep.

(4) Ground enhancement material shall be GEM by Erico Products, Powerfill by Cathodic Engineering Equipment Company, or equal.

(5) Should ground rods be impractical for use due to rocky conditions, then grounding electrode plates may be used after acceptance by the ENGINEER or a case by case basis.

(6) Install electrical grounding systems where indicated, in accordance with manufacturer's instructions and NEC as necessary to interface installation of electrical grounding system with other work.

C. Special Installation Instructions

(1) Contractor shall coordinate with General Contractor and connect main AC system ground to exposed rebar stub at main service disconnect per 2011 N.E.C. requirements.

(2) All connections to ground rods shall be made using exothermic (Cadweld) type connections.

END SECTION

SECTION 16510 - BUILDING LIGHTING FIXTURES

1. RELATED DOCUMENTS

A. General provisions of Contract, General and Supplementary Conditions and General Requirements, apply to this section.

B. Requirements of electrical general provision sections govern the work specified in this section, where applicable.

C. This Section shall be governed by alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

A. Provide material, equipment, labor and services necessary for proper and complete installation of interior lighting fixtures.

3. QUALITY ASSURANCE

A. Comply with National Electrical Code (NFPA No. 70) as applicable to installation and construction of interior lighting fixtures.

B. Comply with applicable portions of National Electrical Manufacturers Association standards pertaining to lighting equipment.

C. Comply with applicable American National Standards Institute standards pertaining to lamp materials, and lamp ballasts and transformers, and interior lighting fixtures.

D. Provide interior lighting fixtures which have been listed and labeled by Underwriters Laboratories.

E. Provide fluorescent-lamp ballasts which comply with Certified Ballast Manufacturers Association standards and carry CBM label.

F. Comply with additional fixture requirements contained in Interior Lighting Fixture Schedule at end of this section or indicated on Drawings.

4. SUBSTITUTIONS

A. Lighting fixtures detailed on drawings and specified in schedules are intended to indicate general fixture type. Fixture products of other manufacturers may be proposed, provided these are of similar design, equally efficient, have aesthetically acceptable appearance, and are approved by Architect or Engineer.

B. In addition to requirements of Section 16000 Products, proposal shall consist of three (3) bound copies of cuts on lighting fixtures and shall include the following information:

- (1) Name of Manufacturer
- (2) Catalog Number
- (3) Fixture drawings, showing metal gauges and finish.
- (4) Photometric distribution curves.
- (5) Coefficient of utilization as determined by an independent testing laboratory.

5. SUBMITTALS

A. Submit fixture shop drawings and manufacturer's data in booklet form with a separate sheet for each fixture, assembled in luminaire "type" numerical/alphabetical order, with proposed fixture and accessories clearly indicated on each sheet.

6. LIGHT FIXTURES

A. Light fixtures shall consist of, but not be limited to lamps, lampholders, reflectors, ballasts, starters, and wiring.

B. Provide all recessed fixtures installed in plaster or drywall ceilings with plaster frames supplied by fixture manufacturer.

C. All ferrous metal surfaces of fixtures and plaster frames shall be treated and given rust inhibiting and finish coat adherence properties before finish coats are applied. Finish coats shall be enamel baked on at approximately 320 degrees F or dry powder electrostatically applied.

D. Unless otherwise specified, metal baffles and plastic or glass diffuser panels and low-brightness lens panels shall be contained in rigid, hinged or safety chained metal frames. Diffusers and lens panel shall be replaceable without the use of tools other than screwdriver or pliers. Frames and lens shall provide proper tolerance for normal expansion and contraction without damage to panels.

E. Plastic members shall be uncolored 100 percent virgin acrylic.

F. Fixtures shall allow replacement of ballasts without removal of fixture.

G. It shall be possible to remove and install lamps in fixtures without tools.

7. LAMPS

A. Provide new and unused lamps for all fixtures.

B. Provide mercury vapor and metal Halide lamps with extinguishing mechanisms to prevent operation of lamps when outer globe is broken.

C. Incandescent lamps shall be rated 130 volts.

8. BALLASTS

A. Each ballast shall meet requirements of "Certified Ballast Manufacturer's Association". Securely fasten ballasts in place with mounting surface of ballast making as complete contact with surface of ballast mounting area of fixture as practical. Attach ballasts to mounting surface of fixture by one bolt and nut or sheet metal screw for each ballast mounting hole or as recommended by ballast manufacturer for optimum heat transfer. Ballasts shall have an "A" sound rating.

B. Equip all fixtures with ballasts with external GLR line fuses in HLR holders. Fuse size shall be determined by fixture manufacturer.

C. Provide low temperature fluorescent ballasts in fixtures mounted in cold rooms, outdoors, and as indicated.

D. H.I.D. ballasts shall be constant wattage autotransformer, high power factor type, unless otherwise indicated.

E. Fluorescent ballast to be high performance electronic to operate at a frequency of 25KHz or

higher with less than 2% lamp flicker, at an input voltage of 108 to 132 VAC (120 volt line) or 249 to 305 VAC (277 volt line) at an input frequency of 60 Hz minimum of .99 power factor. Light output to remain constant for line voltage of $\pm 5\%$. Ballast to comply with EMI and RFI limits set by FCC (CFR 47 part 18) for normal electrical equipment and have less than 1.5 lamp current crest factor (LCCF). Units shall be full rapid start except slimline and maintain full cathode heat during operation. Ballast to meet ANSI standard (82.41) and UL listed Class P Type 1 outdoor. Ballast shall be non-PCB. Ballast to have less than 10% total harmonic distortion less than 6% third harmonic distortion. Ballast to have A sound rating with a power factor greater than .99 and have a twenty year rated lamp life. Ballast to operate 1, 2, 3 or 4 T8 or T12 or T5 lamps as specified in fixture specification. Number of ballasts in multi-lamped fixture to be determined by switching or multiple fed luminaires. Responsibility for correct number of ballasts in luminaires and correct voltage to be responsibility of fixture suppliers. Motorola, Advance or Universal are acceptable manufacturers.

9. INSTALLATION

- A. Deliver lighting fixtures individually wrapped in factory-fabricated fiberboard type containers.
- B. Handle fixtures carefully to prevent breakage, denting and scoring of fixture finishes. Do not install damaged lighting fixtures; replace and return damaged units to equipment manufacturer.
- C. Store lighting fixtures in a clean, dry space. Store in original cartons and protect from dirt and debris, physical damage, weather and construction traffic.
- D. Install lighting fixtures of types indicated, where indicated, and at indicated heights; in accordance with lighting fixture manufacturer's written instructions and with recognized industry practices; to ensure that fixtures comply with requirements and serve intended purposes. Comply with NEMA standards, and requirements of National Electrical Code pertaining to installation of lighting fixtures.
- E. Set lighting fixtures and equipment plumb, square, and level and secure to structural support members of building. Provide all steel supports necessary for lighting fixtures in addition to those specified under general building construction. Recessed and semi-recessed fixtures may be supported from suspended ceilings and ceiling tees if ceiling system support rods or wires are provided not more than 6 inches from each edge of each fixture. Secure fixtures in suspended ceilings to framing members in accordance with NEC 410-16 by using standard clips made for the purpose. Sheet metal screws are not acceptable.
- F. Mounting heights specified or indicated shall be to bottom of fixture. Coordinate exact mounting of lighting fixtures with type, style and pattern of ceiling being installed.
- G. Clean interior lighting fixtures of dirt and debris upon completion of installation. Protect installed fixtures from damage during remainder of construction period.
- H. Upon completion of installation of lighting fixtures, and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.
- I. At date of substantial completion, replace lamps in lighting fixtures which are observed to be noticeably dimmed after Contractor's use and testing, as judged by Engineer.

BUILDING LIGHTING FIXTURE SCHEDULE

- LF-1 4'-0" surface mounted industrial with aluminum housing, UL listing for wet location, acrylic diffuser secured to fully gasketed housing by cast aluminum hangers latches, electronic ballast with less than 10% THD, and two (2) 54W-T5 HO lamps.
Holophane PrismaLite 7300-4-AL-K42-YP-GLR
- LF-2 Surface mounted self-contained emergency light with thermoplastic housing, dual voltage input capability, solid state charger, short-circuit protection, thermal protection, AC/LVD reset, 36 watt capacity sealed maintenance free lead calcium battery, brownout protection, low voltage disconnect, UL label, and three (3) year total customer satisfaction warranty. Unit to be supplied with (2) H2012 lamp heads.
Lithonia IND 1254-H2012
Chloride equal
Holophane equal
- OLF-1 Exterior wall pack type light fixture, 120V with photocell. Fused. Die cast aluminum housing, 140 poly-carbonate lens. One (1) 42W TRT lamp.
Luminaire Lighting YWP-610-HO-PC-GLR

END SECTION

SECTION 16800 - SURGE PROTECTIVE DEVICES

1. RELATED DOCUMENTS

- A. General Provisions of Contract, General and Supplementary Conditions and General Requirements, apply to this section.
- B. Requirements of electrical general provision sections govern this section, where applicable.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. This Section includes Surge Protection Devices for low-voltage power, control and communication equipment.
- B. Provide labor, material, equipment and services necessary for proper and complete installation of secondary surge (lightning) arresters and surge protective devices.
- C. In addition to this section, the Contractor shall refer to other specification sections and drawings to ascertain the extent of work included.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code Article 285 as applicable to construction and installation of surge arresters.
- B. Provide surge arresters which have been listed and labeled by Underwriters Laboratories.
 - (1) UL1449 3rd Edition: Surge Protective Devices (SPD)
 - (2) UL1283 5th Edition: Electromagnetic Interference Filters
- C. Comply with applicable portions of ANSI/IEEE:
 - (1) C62.41.1: 2002 IEEE Guide on the Surge Environment in Low-Voltage (1000V and less) AC Power Circuits
 - (2) C62.41.2: 2002 IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits
 - (3) C62.45: 2002 IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and Less) AC Power Circuits
 - (4) C62.62: 2000 IEEE Standard Test Specifications for Surge Protective Devices for Low Voltage (1000V and Less) AC Power Circuits
 - (5) C62.72: 2007 IEEE Guide for the Application of Surge Protective Devices for Low Voltage (1000V and Less) AC Power Circuits
- D. Surge protective devices selected for project shall comply with short circuit current ratings per N.E.C. 285.6.

E. Surge protective devices selected for project shall comply with NFPA 780 – Standard for the Installation of Lightning Protection Systems.

F. Source Limitations: All secondary service suppression devices and accessories shall be from a single manufacturer.

4. SUBMITTALS

A. Submit manufacturer's data on secondary lightning arresters.

B. Submit manufacturer's data on surge protective devices.

5. PRODUCTS

A. The types of surge protective devices required for project shall include the following as noted within plans and specifications:

(1) Surge protective devices (modular-replaceable module solid state type).

(2) Surge protective devices (non-modular encapsulated non-replaceable component- solid state type).

(3) Telephone, data, signal and instrumentation surge protective devices.

B. Surge Protective Devices (SPDs)

(1) Description

(a) This section describes the materials and installation requirements for transient voltage surge suppressors (TVSS) for the protection of all AC electrical circuits from the effects of lightning induced currents, substation switching surges and internally generated surges resulting from inductive and/or capacitive load switching.

(2) Modular Surge Protection (Type 1)

(a) Configured as shown on the riser diagram and/or panel schedules.

(b) The SPD surge current ratings shall be based on the electrical system ampacity listed in the table below.

Electrical System Ampacity @ SPD Install Point	Surge Protection (kA)	
	Per Mode	Per Phase
2500 – 6000A	300	600
1200 – 2000A	250	500
600 – 1000A	200	400
225 – 400A	150	300
125 – 225A	100	200

(c) The SPD shall be rated for voltage, phase and wye or Delta configuration as indicated on Drawings or noted in specifications.

(d) Modes of Protection: The SPD system shall provide surge protection in all possible modes (L-N, L-G, L-L, and N-G) for the circuit or service to be protected. Each replaceable module must provide the uncompromising ability to deliver full surge current rating per mode.

(e) SPD modules shall be configured to isolate individual suppression component failures without causing total loss of surge protection in that mode.

(f) Opening of supplementary protective devices, internal or external, is not permissible during UL1449 3rd Edition Nominal Discharge testing.

(g) Optional Connection Methods: [Fused Disconnect, 60A, #6AWG] [Surge Rated Disconnect, 100A, #2AWG] [Distribution Block, 100A, #2AWG] [Terminal Block, 60A #6AWG].

(h) Each individual module shall feature an LED indicating the individual module has all surge protection devices active. If any module is taken off-line, the LED will turn off and/or a "fail" LED will illuminate, providing individual module status.

(i) Monitoring: Units shall have Status Indication Lights, Surge Counter with Audible Alarm and Form "C" Contacts.

(j) The modular SPD shall be provided in a NEMA 4 enclosure for exterior use and NEMA 12 enclosure for interior use unless otherwise noted.

(k) The SPD shall provide EMI/RFI electrical noise attenuation of 36 to 44dB in the range of 50kHz to 100MHz as defined by MIL-STD-220A test procedures.

(l) Voltage Protection Ratings: The UL1449 3rd Edition Voltage Protection Ratings "VPR" (6kV, 3000 Amps, 8/20µs waveform) must not exceed the UL assigned values listed below.

	208/120V	480/277V
Line to Neutral	900V	1200V
Line to Ground	800V	1200V
Neutral to Ground	700V	1200V
Line to Line	1200V	2000V

(m) The SPD shall have a minimum UL 1449 3rd Edition Nominal Discharge Current Rating (In) of 10,000 Amps. When used in conjunction with a UL 96A certified Lightning Protection System the (In) rating shall be 20,000 Amps.

(n) Approved Manufacturers: The following SPD manufacturers and respective models are acceptable, subject to conformance with indicated requirements:

Current Technologies TSr Product Series

THOR SYSTEMS SL2 Product Series

Liebert Interceptor II Series

(3) NON-MODULAR SURGE PROTECTION (Type 2)

(a) Configured as shown on the riser diagram and/or panel schedules.

(b) The SPD surge current ratings shall be based on the electrical system ampacity listed in the table below.

Electrical System Ampacity @ SPD Install Point	Surge Protection (kA)	
	Per Mode	Per Phase
400 – 800A	150	300
125 – 225A	100	200
15-100A	50	100

(c) The SPD shall be rated for voltage, phase and wye or Delta configuration as indicated on Drawings or noted in specifications.

(d) Modes of Protection: The SPD system shall provide surge protection in all possible modes (L-N, L-G, L-L, and N-G) for the circuit or service to be protected. Each replaceable module must provide the uncompromising ability to deliver full surge current rating per mode.

(e) All non-modular units shall be factory wired for each phase conductor and for Neutral and Ground conductors.

(f) Continuous LED indication of the system integrity (including N-G mode for a Wye system) utilizing LEDs. Monitoring: Units shall have Solid State Status Indication Lights, Surge Counter with Audible Alarm and Form "C" Contacts.

(g) The non-modular SPD shall be provided in a NEMA 4 enclosure for exterior locations or NEMA 12 enclosure for interior locations unless otherwise noted.

(h) The SPD shall provide EMI/RFI electrical noise attenuation of 32 to 37dB in the range of 50kHz to 100MHz as defined by MIL-STD-220A test procedures.

(i) Voltage Protection Ratings: The let-through voltage test results used to obtain the UL1449 3rd Edition Voltage Performance Ratings "VPR" (6kV, 3000 Amps, 8/20µs waveform) must not exceed the UL assigned values listed below.

	208/120V	480/277V
Line to Neutral	700V	1200V
Line to Ground	700V	1200V
Neutral to Ground	800V	1200V
Line to Line	1000V	2000V

(j) The SPD shall have a minimum UL 1449 3rd Edition Nominal Discharge Current Rating (In) of 10,000 Amps. When used in conjunction with a UL 96A certified Lightning Protection System the (In) rating shall be 20,000 Amps.

(k) Approved Manufacturers: The following NON-MODULAR SPD manufacturers and respective models are acceptable, subject to conformance with indicated requirements:

Current Technologies	TSn Product Series
THOR SYSTEMS	TG Product Series
Liebert	Accuvar All Product Series

(4) Transient Voltage Surge Suppressors - Telephone, Data, Signal and Instrumentation.

- (a) TVSS shall be listed in accordance with UL 497A where applicable.
 - (b) TVSS shall be of compact in-line design and have low shunt capacitance for minimum signal loss.
 - (c) TVSS shall utilize high speed avalanche diodes for protection.
 - (d) TVSS units shall meet or exceed the following criteria:
 - 1) Response time < 10ns
 - 2) Maximum shunt capacitance < 40pf except coaxial. Devices which shall be < 30AR.
 - 3) Coaxial cable devices shall have -0.5db insertion loss and no series resistance.
 - 4) Telephone/Data units shall exceed Category 5.
 - 5) Standard clamp voltages/peak pulse currents shall meet or exceed the following as applicable to respective system requirements:

Ethernet 10-base T	7.5V/750A
Telephone Dial-up	240V/250A
CSU/DSU	60V/200A
T-1	60V/200A
DDS	60V/200A
Cable TV	7.5V/750A
Satellite TV	18V/340A
4-20MA Instrumentation (Analog)	30V/370A
 - (e) TVSS shall have a warranty for a period of five years.
 - (f) Manufacturers
 - 1) Surge protectors shall be as manufactured by Current Technologies, TSC, DDC, MTC and CCC Series or equal. EDCO Series SS65 (4-20ma instrumentation) or equal.
- (5) Transient Voltage Surge Suppressors - 120VAC Hardwired Equipment
- (a) TVSS shall be listed in accordance with UL 1449 Third Edition and UL 1283.
 - (b) TVSS shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G.

fused. (c) TVSS shall have operational status indicators and each MOV shall be

(d) Unit shall be housed in NEMA 4 enclosure, have terminal screw connections and each MOV shall be fused.

(e) TVSS shall meet or exceed the following criteria:

1) Maximum surge current capability (single pulse rated) PER PHASE (2 x per mode) shall be:

a) Hardwired equipment (40) kA per phase or as noted on drawings.

(f) Manufacturers

Surge protectors shall be as manufactured by EDCO, HSP Series or equivalent.

6. INSTALLATION

A. Deliver each piece of equipment in durable shipping cartons. Maintain cartons through shipping, storage and handling as required to prevent damage and eliminate dirt and moisture. Store cartons inside and protect from weather.

B. Install system and materials in accordance with manufacturer's instructions and roughing in drawings, and details on drawings. Install electrical work and use electrical products complying with requirements of applicable Division 16 sections of these specifications.

C. Term "wiring" is defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting devices.

D. Install a complete wiring system as required for system(s) surge protection.

E. Number Code or Color Code conductors, appropriately and permanently for identification and servicing of systems.

F. Contractor shall install surge protective devices and lightning arresters.

G. Surge Protective Devices shall be provided in quantities such that all modes of protection of the secondary service is protected. This protection shall be provided at the main service panel.

H. Surge Protective Devices shall be installed such that both line and ground lead lengths are as short as possible. Splicing of additional conductor to increase lead length as provided by manufacturer will not be accepted.

I. Existing Utilities: Do not interrupt utilities serving facilities occupied by the Owner or others except when permitted and then only after arranging to provide temporary utility services according to requirements indicated. Notify and coordinate with the engineer when an interrupt is required and prior to interrupting.

J. Coordinate location of field-mounted surge protective devices to allow adequate clearances for maintenance.

K. All devices must be installed on the load side of the facility after the first overcurrent protection or disconnect unless otherwise noted.

L. Products shall be installed external to service, distribution, and branch panel equipment. All SPDs must have the same or greater AIC, Interrupting or Fault rating of the equipment the SPD is protecting.

M. Continuity measurements shall be made between the Neutral and Ground connections to verify the Neutral-to-Ground bond.

7. WARRANTY

A. All Surge Protective Devices (SPDs), associated hardware, and supporting components shall be warranted to be free from defects in materials and workmanship, under normal use and in accordance with the instructions provided, for a period of five (5) years.

B. Any component or subassembly contained within the surge protection system that shows evidence of failure or incorrect operation during the five (5) year warranty period, shall be replaced by the manufacturer.

8. SPECIAL INSTALLATION INSTRUCTIONS

A. Contractor shall furnish and install (1) Type "2" SPD on all new and existing services fed from utility company transformers.

END SECTION

SECTION 16920 - CONTROLS

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Section 16000 General Provisions govern work specified in this section.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and accessories necessary for complete and proper control systems.
- B. Unless otherwise specified, required for a particular application, or indicated by details or control diagrams on Drawings, provide each motor with a motor starter of type specified.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of control panels.
- B. Provide control panels which have been listed and labeled by Underwriters' Laboratories.
- C. Comply with National Electrical Manufacturers Association Standards.

4. SUBMITTALS

- A. Submit manufacturer's data complete with wiring diagrams and individual manufacturer cutsheets for all items contained within control panels.

5. EQUIPMENT

- A. General
 - (1) Equipment controls shall be as specified herein and shown on the Contract Drawings.
 - (2) All equipment starters shall contain nonresettable elapsed time meters as shown in the Contract Drawings.
 - (3) All starters shall contain "run" lights, control transformers, and minimum (2) sets spare auxiliary contacts. Reset pushbuttons shall also be provided for overloads built into the starters.
- B. Custom Control Panels
 - (1) All control panels furnished under this Contract shall be manufactured in accordance with industry standards and as herein specified. Control panels are specified to be furnished with the equipment controlled.
 - (2) Control panel construction shall comply with OSHA and other code requirements as applicable, and shall be attested to by UL listing the panels as an assembly. Otherwise,

panel modifications as required by the Electrical Inspector shall be performed by the supplier at no extra cost to the Owner.

(3) Control panels to be furnished on this project shall be wired to function according to schematics shown on the Contract Drawings. In addition to the requirements shown on the Contract Drawings, the panels shall adhere to additional requirements as written herein, and in the utilization equipment specifications.

(4) Enclosures shall be dead front with all operators devices accessible in a lockable switch compartment on the enclosure door. All relays, timers, terminal strips, etc., shall be mounted to a subpanel inside the enclosure. All control wiring must be stranded and sized to be protected by circuit breakers. Supplemental overcurrent protection may be used in lieu of oversized wiring.

(5) All terminal strips and lugs shall be of a type UL listed to terminate the size and quantity of wires encountered. Where conduits enter the boxes, if they are NEMA 4X, sealing locknuts or hubs must be used to maintain the box rating.

(6) Wet location or outdoor mounted enclosures shall comply with Article C. below.

(7) Elementary control schematics and connection diagrams showing the spatial relationship of components and wiring shall be submitted for review. Also, a bill of materials, drawing of device arrangement on front, and enclosure fabrication drawings shall be submitted. Further, descriptive literature is required on all components. A copy of the shop drawings shall be furnished and stored in a pocket inside the enclosure.

(8) Sleeve type wire markers or other "permanent" type marker shall be installed on all wires, keynoted back to the elementary schematic or the connection diagram, and all terminals identified.

C. Control Panel Enclosures For Outdoor/Wet Locations

(1) The purpose of this Specification is to provide details of an enclosure that protects internal equipment from rain, dust, vandalism, and other conditions found in an outdoor environment or otherwise harsh environment.

(2) The manufacturer shall provide part numbers on all components for repair purposes. Enclosure shall be single or double door as required.

(3) Control panel enclosure sizing shall be by supplier in accordance with appropriate standards and codes.

a. Minimum size of pad mount enclosures not including floor stands shall be 48"W x 60" high.

(4) The enclosure(s) will meet or exceed the requirements of a NEMA 4X rating and shall be UL listed.

D. Cabinet Construction

(1) The cabinet and door or doors shall be constructed from 5052-H32 sheet aluminum alloy which has thickness of 0.125 inch. External welds shall be made by using the Heliarc welding method, whereas internal welds will be made by the wire welding method. All welds shall be neatly formed and free of cracks, blow holes and other irregularities.

- (2) All inside and outside edges of the cabinet shall be free of burrs.

E. Door Hardware

- (1) The cabinet door or doors shall be a minimum of 80 percent of the front surface area and shall be hinged on the right side when facing the cabinet (right and left outside edges for double door enclosures).

- (2) Each door shall be furnished with a gasket that satisfies the physical properties as found in UL508 table 21.1 and shall form a weathertight seal between the cabinet and door.

- (3) The hinges shall be continuous and bolted to the cabinet and door utilizing ¼-20 stainless steel carriage bolts and ny-lock nuts.

- (4) The hinges shall be made of 0.093 inch thick aluminum and shall have a 3" open width with a 0.250 inch diameter stainless steel hinge pin.

- (5) The hinge pin shall be capped top and bottom by weld to render it tamperproof.

- (6) All bolt holes shall be gasketed.

- (7) The latching mechanism shall be a 3-point draw roller type.

- (8) The center catch and pushrods shall be cadmium plated, Type II, Class 1 or equal.

- (9) An operating handle shall be furnished.

- (10) The handle shall be stainless steel with ¾ inch diameter shank.

- (11) The latching handle shall have a provision for padlocking in the closed position.

F. Switch Compartment

- (1) A switch compartment, with removable back panel, is to be supplied on the enclosure main door. It shall be large enough to include all operating devices.

- (2) The switch compartment door opening shall be double flanged on all four sides for strength and to prevent liquids or dirt from dropping into the compartment when the door is open.

- (3) The door shall be furnished with a gasket that satisfies the physical properties as found in UL508 Table 21.1 and will form a weathertight seal between cabinet and door.

- (4) The switch compartment door shall have a tight key lock. Two keys shall be furnished with each lock.

- (5) The switch compartment door hinge shall be 0.063 inch stainless steel with a 0.120 diameter stainless steel hinge pin.

G. Equipment Mounting

- (1) The enclosure shall be equipped with two adjustable "C" mounting channels on both side walls and back wall of the enclosure, allowing versatile positioning of shelves or panels.

(2) The mounting channels shall provide infinite vertical and horizontal adjustment and not limit the positioning of shelves or panels. All mounting hardware will be furnished.

(3) If equipment is to be shelf mounted, the enclosure shall be provided with shelves fabricated from 5052-H32 aluminum having a thickness of 0.125 inch.

(4) The shelf depth shall be a minimum of 10.5 inches. The enclosure will have provision for positioning shelves or panels to within 4 inches of the bottom and to within 8 inches of the top of the enclosure.

(5) If the equipment is to be panel mounted, the enclosure shall be provided with a 5052-H32 aluminum back panel having a thickness of 0.125.

(6) The panel shall be natural finish. All mounting hardware will be furnished.

(7) A control panel shop drawing storage pocket shall be provided inside the enclosure at a convenient location.

H. Cabinet Finish & Mounting

(1) Unless otherwise specified, the outside surface of the cabinet shall have a smooth, uniform, natural aluminum finish.

(2) Pad Mounted Enclosure (Where Applicable)

a. Enclosure shall have 12" high floor stands to support entire enclosure bottom from contact with concrete pad.

I. Acceptable Manufactures

(1) Cabinets shall be as manufactured by Hoffman or a UL listed equivalent.

6. GENERAL SYSTEM DESCRIPTIONS

A. The systems description section of these Specifications is supplementary to the descriptions in other Divisions of the Specifications and to the Contract Drawings. Refer also to the equipment specifications and controls shown on the Contract Drawings.

7. PUMP STATION CONTROL

A. Refer to Sections in Division 11000 of Specifications for additional control requirements.

B. Panel controls shall include, but not be limited to the following:

- Elapsed Time Meter-One For Each Pump
- Pump Alternator Control (with Pump1-Pump2-Alt. Sel. Switch)
- Time Delay (Adjustable)
- H-O-A Switch – One For Each Pump
- Pump "Test" with Reset Pushbutton – One For Each Pump

- Pump Run Pilot Light
- High Discharge Pressure Relay & Pilot Light
- Low Suction Pressure – Pump Lockout Control – Auto Reset
 - When the suction pressure switch senses a drop in suction pressure below the setting of the switch, the normally open contacts of the switch will close energizing a time delay relay – T1. After this time delay completes its timing sequence, a normally closed control contact of time delay relay –T1 will open, interrupting the pump control circuit, shutting the pumps off and energizing the Low Suction Alarm light. Low suction alarm will then be locked in for the minimum amount of time as set by a second time delay relay – T2. When the pressure recovers to the point that pressure switch opens, contact will be made energizing time delay relay T2. If T2 finishes timing the low suction alarm light shall turn off and the pump control circuitry shall no longer be interrupted. Contacts shall be provided to indicate suction pressure status (normal/alarm) to telemetry system for remote indication at MTU.
 - Coordinate pressure switch PSI range with civil engineer.
 - Time delay relay range:
 - T1 Low suction 'ON' time – 0-60 secs. Adjustable – initial setting 30 seconds
 - T2 Low suction 'OFF' time – 0-60 secs. Adjustable – initial setting 15 seconds

C. Remote panel controls shall include, but not be limited to the following:

- I/O Control From Telemetry System

D. Panel power and internal equipment features shall include, but not be limited to the following:

- 120VAC Control Voltage Disconnect
- Fuses – as required
- 24VAC power supply for control panel control voltage as applicable

E. Control panel input/output shall include, but not be limited to the following:

Input (From Telemetry RTU)

- Pump Start
- Pump Stop

Output (To RTU)

- Power Fail

- Pump 1 Run
- Pump 2 Run
- Pump 1 Fail (From VFD)
- Pump 2 Fail (From VFD)
- Pump 1 Stop
- Pump 2 Stop

8. INSTALLATION

A. Deliver custom control panels with factory-installed shipping skids and shims; package accessories in factory-fabricated fiber-board type containers. Do not deliver damaged, dented or cracked equipment; replace and return damaged units to equipment manufacturers.

B. Install control panels where indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices to ensure that sets comply with requirements and serve intended purposes. Comply with NEMA standards, requirements of National Electric Code pertaining to construction of fabricated control panels.

C. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pick-up, cross talk and other impairments.

D. Wiring within Enclosures: Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced or interrupted in any enclosure associated with the control system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Upon completion of installation, start-up and testing shall be performed by a manufacturer trained service representative. When possible, field correct malfunctioning units, then retest to demonstrate compliance. Operating and maintenance instruction books shall be supplied upon delivery of unit and procedures explained to operating personnel.

9. SPECIAL INSTALLATION INSTRUCTIONS

A. Where control panel fabricators/suppliers opt to include all pump station service voltage electrical equipment within a single main control panel. The main breaker and installation of such breaker shall be service entrance (S.E.) rated or an S.E. rated main fusible disconnect switch or circuit breaker shall be provided for installation external to the main control panel.

END SECTION

SECTION 16940 - TELEMETRY

1. RELATED DOCUMENTS

- A. General provisions of Contract, General and Supplementary Conditions and General Requirements apply to this Section.
- B. Requirements of Section 16000 General Provisions govern work specified in this section.
- C. This section shall be governed by alternates insofar as they apply to this section.

2. DESCRIPTION OF WORK

- A. Provide labor, materials, equipment and accessories necessary for a complete and proper telemetry system.

3. QUALITY ASSURANCE

- A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of telemetry systems.
- B. Provide telemetry systems which have been listed and labeled by Underwriters' Laboratories.
- C. Comply with National Electrical Manufacturers Association Standards.
- D. Acceptable manufacturers offering products complying with requirements:

Eagle Research Corporation

4. SUBMITTALS

- A. Submit manufacturer's data on telemetry system as applicable including but not limited to antenna coaxial cable, antennas and new MTU/RTU equipment added to existing system.

5. BASIC EQUIPMENT

- A. MTU (Main Telemetry Unit)
 - (1) MTU is existing at water plant and all new RTU equipment shall be compatible with MTU system in every aspect of operation.
 - (2) Existing MTU system is High Tide Technologies – Nashville, TN; PH. 615-256-6678 as furnished by Wascon, Inc. – Livingston, TN; PH. 931-823-1388.
 - (3) All new telemetry equipment shall be High Tide Technologies to match owner system – no exceptions.
- B. RTU (Pump Station Radio Telemetry Unit)
 - (1) Furnish and install new RTU1 at pump station. RTU1 shall accept the following inputs and accept outputs from the main pump control panel "MCP" as described in Section 16920 Controls.

a. RTU1 shall be High Tide Technologies HTT2100.

(2) Furnish and install new RTU2 at storage tank. RTU2 shall be High Tide Technologies HTT2100 and provide the following outputs to the MTU.

a. Tank Level

b. Tank Hi-level Alarm

c. Tank Lo-Level Alarm

(3) Additional equipment and reprogramming of system shall be furnished as required.

6. DEFINED TELEMETRY SITES

A. Water Tanks

(1) A/C Power Provided by OWNER

a. List Site Names and Geometry

RTU) (2) A/C Power Not Provided by OWNER or not available (Provide solar powered

a. List Site Names and Geometry

B. Pump Stations

(1) List Site Names, Number of Pumps

7. SITE MINIMUM INPUT/OUTPUT STRUCTURE

A. Each existing site is unique and currently does not contain a standard input and output structure.

B. Tanks

(1) Each unique tank site shall contain a minimum of Four analog inputs, Eight digital inputs, and Four digital outputs for monitoring and control of various tank functions. The inputs and outputs shall be determined by OWNER.

C. Booster Pump Station

(1) Each unique pump station site shall contain a minimum of four analog inputs, eight digital inputs, and four digital outputs for monitoring and control of various pump station functions. The inputs and outputs shall be determined by OWNER.

8. SITE INSPECTIONS

A. Site Inspections

(1) All defined sites may be inspected prior to proposal submittal. The OWNER shall provide one (1) person to provide access to all sites.

9. QUALIFICATIONS

A. Manufacturers Qualifications: Only manufacturers who have been regularly engaged in the supply of Supervisory Control and Data Acquisition (satellite telemetry system) equipment for at least 3 years and capable of meeting the following criteria need respond.

B. Installers Qualifications: Only firms who have been regularly engaged in the installation of Supervisory Control and Data Acquisition (satellite telemetry system) equipment for at least 3 years need respond.

C. Each responsible manufacturer shall meet the following minimum qualifications and shall:

(1) Have completed a minimum of three (3) satellite telemetry system applications throughout the regions – no exceptions.

(2) Provide the OWNER with references and phone numbers of each of the three satellite telemetry systems. A minimum of two names per each SATELLITE TELEMETRY SYSTEM reference shall be provided. References will be contacted and completed work verified by the ENGINEER and OWNER.

(3) Acknowledge that shipment of the SATELLITE TELEMETRY SYSTEM RTU nodes and related equipment shall be authorized only by the ENGINEER and OWNER group – no exceptions.

(4) Utilize only UL listed and rated components in enclosure manufacture.

(5) Provide 100 percent of all hardware and software technical manuals to the ENGINEER and OWNER in digital format. The manuals shall be in Adobe pdf format.

(6) Provide all system concept, layout, design, and telemetry setup notes in Microsoft Word or Excel formats to the ENGINEER and OWNER.

(7) Provide a warranty and emergency support for a period of not less than one (1) year after the ENGINEER and OWNER accept each satellite telemetry system node.

(8) Provide primary technical support to the OWNER by full-time qualified staff members only. Temporary or part-time staff members do not qualify as full time employees. Technical support provided by manufactures representatives, salespersons or local distributors is not acceptable - no exceptions.

10. REFERENCES

A. Publications listed below form part of specification to extent referenced. Publications are referenced in text by basic designation only.

(1) NATIONAL FIRE PROTECTION AGENCY (NFPA)

a. ANSI/NFPA 70 (1999) National Electric Code

11. PRODUCTS

A. Definition

(1) Remote Terminal Units

B. Remote Terminal Unit Description

(1) The satellite telemetry system design shall use High Tide Technologies' Model HTT2100 satellite monitoring/control unit, or equal.

a. RTUs shall be installed at the locations specified.

b. General: The OWNER's existing system shall remain in-place and operational until all components of the system are eventually replaced by the new SATELLITE TELEMETRY SYSTEM system.

(2) Manufacturer's products, including design, materials fabrication, assembly, examination, inspection, and testing shall be in accordance with ANSI/NFPA 70, except as modified herein or indicated otherwise.

(3) Contractor's Responsibility: Provide a complete satellite telemetry system, including RTUs, and satellite telemetry equipment; indicating devices; controls; power supplies; enclosures; conduit, wire, and installation. Provide interconnecting wiring for the system to be based upon general requirements of specified components with spare capacity. Coordinate the interconnecting wiring requirements with OWNER provided instruments and provide necessary wiring for the system. Coordinate the loop impedance requirements of the equipment provided and provide additional loop isolation, noise suppression, surge protection, drivers, and other devices necessary to provide a complete and operating system properly installed and protected in accordance with the device manufacturer's recommendations.

(4) Electrical wiring diagrams including Cable Interface drawings for each RTU shall be included.

C. Basis Of Design

(1) The satellite telemetry system is based on Stellar satellite modems, ANSI C protocol Software – no exceptions.

D. Satellite Modem System Requirements

(1) Modems

a. The modems shall use the mobile frequency designated by the Orbcomm Satellite System.

b. The modems shall be able to be programmed.

c. The communication protocol shall be Orbcomm Satellite Communication standard.

d. The modems shall be model DS101 by Stellar Communications, LTD or approved equal.

e. One modem shall be installed at each of the sites.

(2) Antennas

a. Omni-directional antennas tuned specifically for the Orbcomm Satellite frequency bands.

b. Proper grounding shall be provided as part of price proposed at each site, including wiring, conduit, clamps, and any other item for state-of-the-art grounding.

c. One antenna shall be installed at each of the specified sites.

(3) Antenna Cable Lengths

a. The following minimum standard cable lengths shall be used during the bidding process:

1) Water Treatment Plant – Not Applicable

2) Tank sites – at the locations specified

3) Booster Pump – at the locations specified.

4) The actual as-installed cable lengths may be more or less per site.

(4) Antenna Mounting

a. All antennas shall be mounted with galvanized clamps or other non-corroding attachment devices.

b. The mounting of the antennas shall be in such a manner to prevent welding, drilling or other corrosion and stress inducing modifications, or damage to paint systems.

c. All antennas shall utilize existing non-load bearing structures such as safety rails for mounting points.

d. Antennas shall be mounted in a manner so that cables and antennas do not interfere with safety equipment or harnesses while climbing up or on the structures.

e. Cutting into a wall or structural member is not acceptable.

f. All antennas shall be mounted to insure the most direct view of the horizon in all directions whenever possible at the remote sites. When some blockage cannot be avoided the view of the Northeast horizon is preferred

g. Antenna masts shall be provided where necessary to elevate the antenna high enough to insure direct view of the horizon in all directions, and shall include the mast and all attachment hardware. At tank sites if the antenna is not mounted on top of the tank the antenna mounting must be at least one tank diameter away from the tank. In this case the view of the Northeast sky is preferred.

h. Antenna lightning arrestors shall be used at all tank sites.

(5) Antenna Connection Sealing

a. All antenna connections shall be wrapped in self-vulcanizing tape to keep all moisture away from the connections.

E. Site Communications

(1) Methods

a. Each RTU shall be capable of communicating via the ORBCOMM Satellite System with the High Tide Technologies central server.

F. Site Control

(1) Control Methods

a. The control of the typical remote booster pump shall be based upon the comparison of adjustable setpoints and dynamic tank levels. The pump shall be able to be controlled by the tank of interest. Provide override pump control from the web based software.

b. Each booster pump location shall have an operator interface on the web based software for display of local alarm messages, pump status, relevant remote tank levels, and setpoints.

c. Provide the booster pump site with the ability to operate pumps manually by providing Hand-Off-Auto (H-O-A) switches. The OWNER may specify that the software reflect the status of the H-O-A switch.

d. When the switch is in the "Hand" position, the pump shall be manually controlled by the switch and without the aid of a functioning RTU controller.

e. When the switch is in the "Auto" position, the RTU or controller shall automatically control the pump.

G. Submittals

(1) General

a. Within 7 days after receiving the contract, the Manufacturer shall submit all component data sheets in an orderly manner for review and approval.

- 1) All data sheets shall be printed out from PDF format files. Legible copies from catalogs will also be accepted. All copies shall be clear and legible.
- 2) The specified product in the data sheet shall be highlighted with a pointed stamp to clearly identify the submitted item.
- 3) The sheets shall list all pertinent product data such as name, catalog number, model number, nameplate data, dimensions etc.
- 4) The submitted data shall be organized into separate loose-leaf three-ring binders according to the type of site such as master, tanks, and booster pump station, etc.
- 5) A detailed description and/or list of functions, including spares for future items, for each SATELLITE TELEMETRY SYSTEM site shall be submitted to the ENGINEER. The Manufacturer shall meet with OWNER and ENGINEER, as requested, to fully explain functionality submittal.

b. Five (5) duplicate copies of the submittals shall be required.

(2) Submittals

a. Manufacturer's Catalog Data

- 1) Software.
- 2) DC power supplies.
- 3) Control relays.
- 4) Hardware.
- 5) Enclosures.
- 6) Modems
- 7) Surge Protection

(3) Operation and Maintenance Manuals

- a. "Quick Start" Software Guide
- b. Operations and Maintenance Manual

H. Programmable RTU Processor

(1) Provide a High Tide Technologies system, or equal. The control system shall consist of individual RTUs located at each monitoring location. The capability shall exist to allow for expansion of the system by the addition of hardware and/or software. Program development is the responsibility of the Manufacturer of the satellite telemetry system.

a. All hardware of the RTU shall operate at an ambient temperature of minus 20 to 60 degrees C (-4 to 140 degrees F), with an ambient temperature rating for storage of minus 40 to plus 60 degrees C.

b. All RTU hardware shall function continuously in the relative humidity range of 5 to 95 percent with no condensation.

c. Each RTU shall have at least one dedicated serial port.

(2) Processor Hardware

a. The processor shall be an integral piece of the modem, and will provide control program execution and support remote or local programming.

b. The user program, data, and operating system shall include EEPROM or equivalent for backed memory storage.

c. Each processor shall contain enough base memory for at least 30% growth room after the program has been completed and tested.

d. The front enclosure of the processor shall include an RS232 serial port.

e. All system modules, local and remote chassis shall be designed to provide for free airflow convection cooling. No internal fans or other means of cooling, except heat sinks,

shall be permitted.

(3) RTU Power Supplies

a. The RTU power supplies shall operate in compliance with an electrical service of 85-265 VAC, single phase, in the frequency range from 47 to 63 Hz, or 17-32 VDC.

b. The manufacturer shall, if electrical power is unavailable, provide a solar powered RTU.

c. The RTU shall have an integral AC to DC power converter.

d. The power supply shall monitor the incoming line voltage for proper levels. When the power supply is wired to utilize AC input, the system shall function properly within the range of 85 to 265 VAC. When the power supply is wired to utilize DC input, the system shall function properly within the range of 17 to 32 VDC. In addition, the power supply shall provide surge protection and isolation.

e. In addition to the electronic protection described above the power supply shall offer a failsafe fuse that is not accessible by the customer.

(4) RTU Networking and Communications

a. RTUs in the satellite telemetry system shall have standard communications that support ASCII or Modbus protocols.

b. The RTU shall have a standard programming instruction that allows bi-directional satellite messaging with the central server.

c. The RTUs shall support both scheduled and unscheduled communications between the central server.

(5) Digital Inputs

a. Number of Inputs: Minimum of 8

b. Minimum 8 optically isolated digital inputs

c. Ambient Operating Temperature Rating: Minus 20 degrees C to 60 degrees C.

(6) Digital Outputs

a. Number of Outputs: 4 Minimum.

b. 4 minimum of sync only digital outputs.

c. Ambient Operating Temperature Rating: Zero degrees C to 60 degrees C.

d. External SSR's shall be provided by the Contractor

(7) Analog Inputs

a. Input Type: voltage or current

- b. Number of Inputs: 4 minimum
- c. Input Power: Loop Powered or Sensor Powered.
- d. Current/Voltage Ranges: 0-5 dcv or 4-20 mA
- e. Resolution: 10 bits.
- f. Ambient Operating Temperature Rating: Minus 20 degrees C to 60 degrees C.

I. RTU System Technical Support

(1) The manufacturer of the RTU shall provide multiple-channels of technical support to the OWNER. These channels include toll free telephone, fax, and web-based support.

(2) The satellite telemetry system manufacturer shall maintain technical assistance toll free telephone "hotline.

J. RTU System Enclosures

(1) The system enclosure shall contain the RTU, complete with inputs/outputs, power supplies, surge protection, terminals and all associated wiring. The enclosures shall come pre-assembled with all associated components din rail mounted and wired.

(2) Remote Terminal Enclosures: Provide pre-built and wired NEMA 4 or equivalent remote terminal enclosures. Each remote terminal enclosure shall consist of:

- a. One (1) molded NEMA 4 rated enclosure. Enclosures shall be lockable, hinged fiberglass.

K. DC Power Supplies

- (1) Regulated: Solid-State
- (2) Input: 85-230 volts ac, single phase, 60 hertz.
- (3) 20-24 volts dc.
- (4) Output Current: 2.0A.
- (5) Ambient Temperature Range: Minus 20 to 50 degrees C.
- (6) Mounting: Enclosure-mount acceptable.
- (7) Primary Protection: Short circuit protected
- (8) Additional Protection: Over-current protection for secondary

L. Terminals

(1) Provide single-circuit feed-through terminal blocks for all control system enclosures. Provide the following:

- a. Voltage Rating: 30 volts AC/DC maximum.

b. Screw Type

M. Conductors

(1) Shielded twisted pairs for signal wiring such as instrument signals. General wiring for enclosures. Group and neatly route conductors within enclosures.

(2) Wire Color Codes: General internal wiring color code specifications for all supplied enclosures/enclosures. There shall be no exceptions.

a. All 120V single-phase AC LINE wiring shall be black.

b. All single-phase AC NEUTRAL wiring shall be white.

c. All wiring originating outside the enclosure/enclosure that is not controlled by the local disconnect or main breaker shall be yellow.

d. All 24V DC positive wiring shall be red.

e. All 24V DC common wiring shall be black.

f. All ground wiring shall be green or green with yellow tracer.

(3) Shielded Twisted Pair

a. Tinned soft copper and insulated with nylon-jacked polyvinyl chloride.

b. Color code each conductor pair.

c. Twist conductors into pairs with a 1-1/2-to 2-1/2-inch lay.

d. Code each pair with a unique pair number.

e. 100 percent shielded coverage, aluminum-polyester.

f. No. 22 AWG.

g. No. 22 AWG stranded copper drain wire.

h. Rated 300 volts, 60 degrees C.

(4) Conductors: General internal wiring of specified electrical enclosures. Group and neatly route conductors within enclosures.

a. All wiring internal to the supplied enclosures/enclosures shall be machine tool wiring rated MTW/AWM/TFF with an insulation rating of at 300-volts and UL approved - no exceptions.

b. All non-input/output module point-to-point wiring shall be 16 AWG.

c. All discrete input module to terminal wiring shall be 20 AWG or larger.

d. All discrete output module to terminal wiring shall be 20 AWG or larger.

e. Provide nylon wrapping around wire bundles crossing door hinges for

protection.

N. Solid State Relays – Pump Station

- (1) Mounting: Din Rail mounted
- (2) Relay Rating: 24VAC-240VAC, 8 amperes.
- (3) Contacts: SPST.
- (4) Coil Voltage: 3.5-30 Volt.

O. Analog Surge Protection

the following:

- (1) Provide surge protector on 4-20mA inputs and outputs to each RTU. Provide

- a. Rated Maximum Voltage: 28-30 volts DC.
- b. Operating Current: 80 - 300 mA maximum.
- c. Terminals: Screws or terminal mount only.
- d. Impulse Discharge Current: 5 kA (minimum).

P. Wiring Diagrams

- (1) Electrical “as-built” CAD-based wiring diagrams shall be provided for the previously defined sites using the specified standards:

- a. Detailed I/O point assignments will be provided for each enclosure by the Manufacturer of the SATELLITE TELEMETRY SYSTEM system to the CONTRACTOR.

- 1) All drawings shall be generated using Adobe pdf software.

Q. Field Instruments

- (1) All of the OWNER’s existing field instrumentation shall be integrated into the manufacturer’s satellite telemetry system, if possible. CONTRACTOR shall notify the ENGINEER should existing instrumentation not be reusable.

12. EXECUTION

A. Installation, General

- (1) Install all equipment in accordance with ANSI C2, ANSI/NFPA 70 and the requirements specified herein.

- (2) Handle equipment and enclosures carefully to prevent breakage, denting and scoring finish.

- (3) Store equipment indoors and protect from weather.

- (4) Install in accordance with manufacturer’s written instructions, applicable requirements of NECA and in accordance with recognized industry practices to ensure that products

comply with requirements and serves intended purposes.

(5) Coordinate installation of equipment and enclosures with cable and raceway installation work.

(6) The Telemetry System manufacturer shall provide a factory certified technical representative to supervise the Contractor's installation, testing and start-up of the relocated system furnished under this specification for a maximum total of 1 day. The start-up service shall be quoted as separate line item.

(7) An on-site training course of 1 training day shall be provided by a representative of the Telemetry System manufacturer to plant and/or maintenance personnel.

B. Wiring

(1) Install conductors and cables in conduit, unless indicated otherwise.

(2) Complete raceway systems and remove obstructions before pulling conductors into place. Avoid damaging insulation during conductor installation. Use an approved lubricating compound as required to facilitate pulling wires.

C. Splices And Terminations

(1) Make up both mechanically and electrically tight.

(2) Provide with a flashover or insulation value at least 100 percent in excess of wire insulation.

(3) Make splices and terminations in junction boxes.

(4) Make connections in No. 10 AWG and smaller conductors with insulated pressure connectors or wire nut connections.

(5) Use terminal blocks of the proper voltage for interconnecting or splicing control cables, communication cables, and other conductors. Mount terminal blocks in a cabinet and label terminals properly.

D. Testing

(1) Performance Verification Test: Conduct performance verification tests to demonstrate that control system maintains set-points, and that system is programmed for the correct sequence of operation. Conduct performance verification test one day after work is installed of continuous RTU systems operation and before final acceptance of work. Performance verification test shall demonstrate the following:

a. Field Testing: Calibrate field equipment and verify equipment and system operation before placing the system on-line. Field-testing shall include the following tests.

b. Calibration Accuracy and Operation of Inputs Test: Check for proper calibration and operation of each input instrument. Document each reading for the test report.

c. Operation of Outputs Test: Check the operation of each output to verify correct operation. Command digital outputs on and off. Document each command and result for the test report.

d. RTU Startup and Memory Test: Demonstrate that programming is not lost after a power failure, and RTU controllers automatically resume proper control after a power failure.

e. Surge Protection: Show that surge protection, meeting the requirements of this specification, has been installed on incoming power to the digital controllers and on communications lines.

E. Field Tests

(1) Demonstrate compliance of the control system with the contract documents. Furnish personnel, equipment, instrumentation, and supplies necessary to perform calibration and site testing. Ensure that tests are performed by competent employees regularly employed in the testing and calibration of instrumentation systems.

(2) Notify the OWNER of any defective products and workmanship disclosed by the tests.

(3) Testing will include the field and the performance verification tests. Field tests shall demonstrate proper calibration of input and output devices, and the operation of specific equipment. Performance verification test shall ensure proper execution of the sequence of operation and proper tuning of control loops.

(4) Test each device such that each item will function not less than five times.

(5) Tests are subject to oversight and approval by the OWNER.

F. Test Reporting For Field Testing And Performance Verification Tests

(1) Document tests with detailed test results. Explain in detail the nature of each failure and corrective action taken.

(2) During and after completion of field tests, and again after the performance verification tests, identify, determine causes, replace, repair or calibrate equipment that fails to meet the specification, and deliver a written report to the OWNER.

(3) Provide a written report containing test documentation after the field tests and again after the performance verification tests. Convene a test review meeting at the job site to present the results to the OWNER. As part of this test review meeting, demonstrate by performing all portions of the field tests or performance verification test that each failure has been corrected. Based on the report and test review meeting, the OWNER will determine either the restart point or successful completion of testing. Do not commence retesting until after receipt of written notification to retest by the OWNER. At the conclusion of retesting, assessment will be repeated.

END SECTION

SECTION 16941 - CONTROL AND INSTRUMENTATION CABLE AND WIRE

1. RELATED DOCUMENTS

A. General Provisions of Contract, General and Supplementary Conditions and General Requirements apply to work specified in this section.

B. Requirements of Electrical General Provision Sections govern this Section, where applicable.

C. This section shall be governed by Alternates insofar as they affect this work.

2. DESCRIPTION OF WORK

A. Provide labor, materials, equipment and services necessary for proper and complete installation of control and instrumentation cable and wire.

B. Requirements of this section apply to cable and wire work specified elsewhere in these specifications.

C. Unless specified otherwise in this Section or indicated on Drawings, control and instrumentation device/equipment power wiring is specified under Section 16120.

3. QUALITY ASSURANCE

A. Comply with National Electrical Code (NFPA 70) as applicable to construction and installation of control cable and wire.

B. Provide cable and wire which has been listed and labeled by Underwriters Laboratories.

C. Comply with National Electrical Manufacturers Association/Insulated Power Cable Engineers Association Standards publications pertaining to materials, construction and testing wire cable, where applicable.

D. Manufacturers offering products complying with requirements include:

(1) Wire:
Southwire Company
Triangle PWC, Inc.
Or equal

(2) Cable:
Belden
Or equal

4. SUBMITTALS

A. Submit manufacturers' product data on all 4-20MA signal cables and power cables.

5. MATERIALS

A. Provide factory-fabricated cable and wire of sizes, ratings, materials and types indicated. Where not indicated, provide proper selection as determined by main control and instrumentation panel supplier to comply with project's installation requirements and NEC standards.

B. Use (1) 16 ga. twisted/shielded pair cable for 4-20ma signal circuits from transmitters etc. Cable shall be Belden No. 8719, or General Cable type VNTC with 100% shield coverage and stranded/tinned 18 ga. drain wire.

C. Use No. 12 stranded conductor for control circuit wiring connected to lighting switches and snap switches.

D. Valves, valve controllers, start-stop selector switches etc. Use minimum 75 degrees C rated insulation unless specified otherwise, indicated on Drawings, or required by NEC. Use 600 volt insulation rating unless specified or indicated otherwise.

6. INSTALLATION

A. Install cable and wire as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to ensure products serve intended functions.

B. Store cable, wire and connectors in factory-installed coverings in a clean, dry indoor space which provides protection against weather.

C. Pull conductors together where more than one is being installed in a raceway.

D. Use pulling compound or lubricant, when necessary; compound must not deteriorate conductor and insulation.

E. Do not use a pulling means, including fish tape, cable or rope which can damage raceway.

F. Install exposed cable, parallel and perpendicular to surface or exposed structural members and follow surface contours, where possible.

G. Wire or cable splices for control and instrumentation circuits shall not be accepted.

H. Install poly pull line in all spare control and instrumentation circuit conduits.

I. Prior to energization, check cable and wire for continuity of circuitry and for short circuits. Correct malfunction when detected.

J. Do not install any control or instrumentation cable or wiring in same conduit or J-box with electrical power wiring.

K. **NOTE:** Electrical Contractor shall be responsible for providing and installing all control and instrumentation wiring and cable from all remote devices to the main control panel (MCP). This shall include the termination of wires/cables on both ends and installation of wire No. markers.

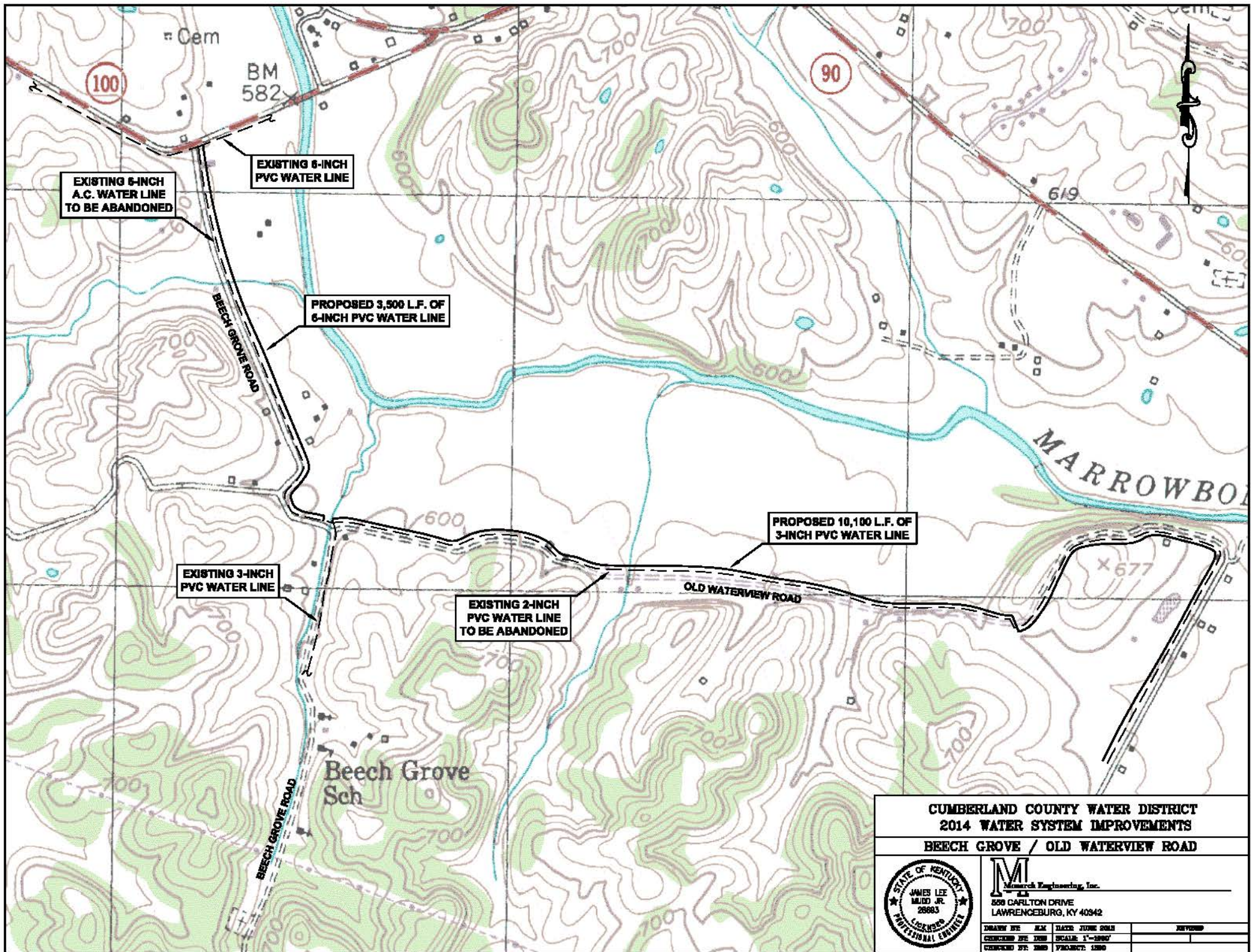
7. SPECIAL INSTALLATION INSTRUCTIONS

A. Wire or cable splices for control and instrumentation circuits shall not be accepted.

B. Do not install any control or instrumentation cable or wiring in same conduit or J-box with electrical power wiring, unless otherwise noted.

C. All 4-20MA signal cables shall be run complete without splice in minimum 3/4" conduit. These cables shall not be run in same conduit or through exterior pull boxes which contain power wiring.

END SECTION

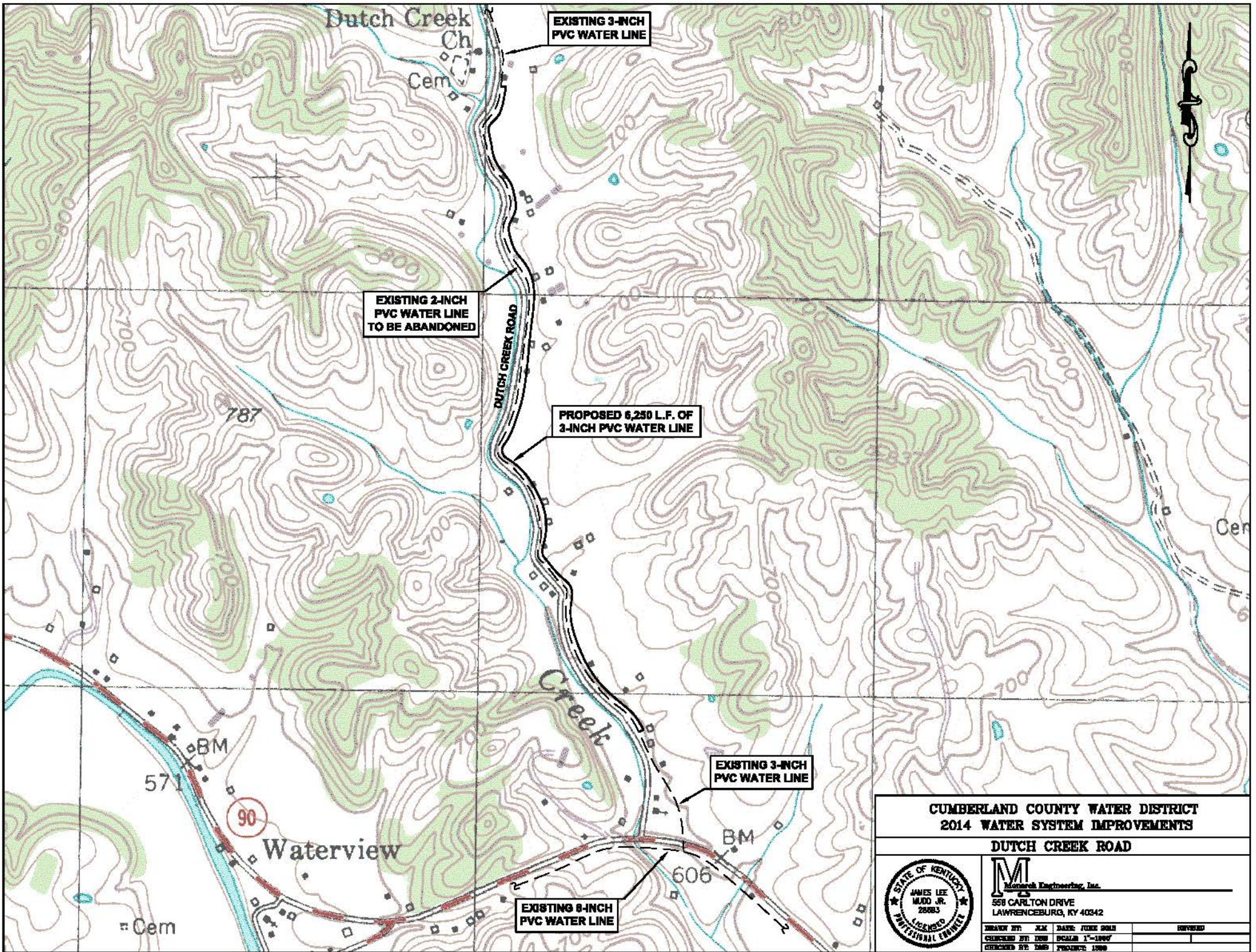


**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS
BEECH GROVE / OLD WATERVIEW ROAD**



M
Murch Engineering, Inc.
500 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DRAWN BY: JEM	DATE: JUNE 2014	REVISION:
CHECKED BY: JEM	SCALE: 1"=300'	
CONTR. BY: 2010	PROJECT: 1280	



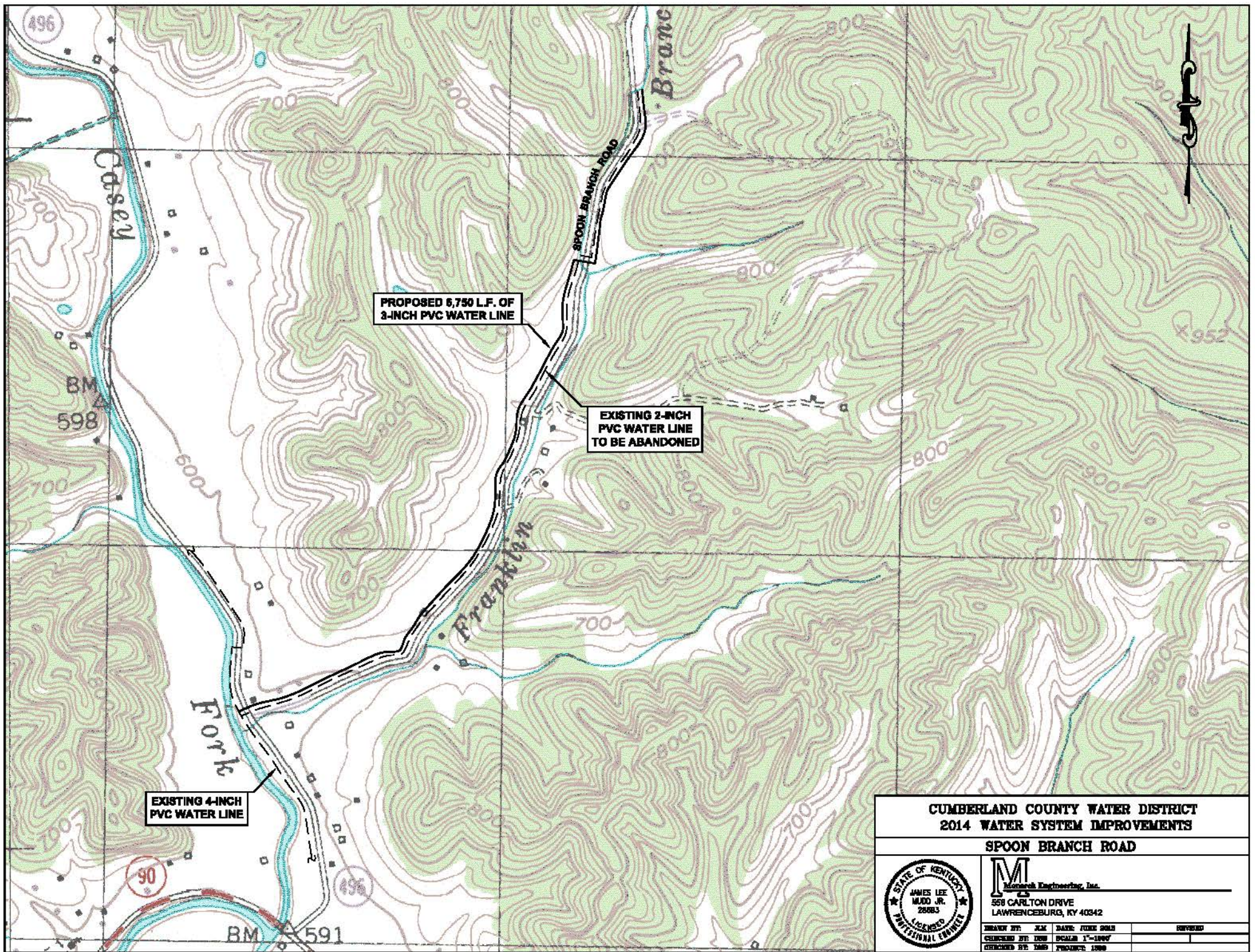
**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS**

DUTCH CREEK ROAD



M
Mudd Engineering, Inc.
558 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DATE	BY	REVISION
DESIGNED BY: JLM	DRAWN: JOHN SMITH	REVIEWED:
CHECKED BY: JLM	SCALE: 1"=100'	
DATE: 10/10/14	PROJECT: 1408	



**PROPOSED 6,750 L.F. OF
3-INCH PVC WATER LINE**

**EXISTING 2-INCH
PVC WATER LINE
TO BE ABANDONED**

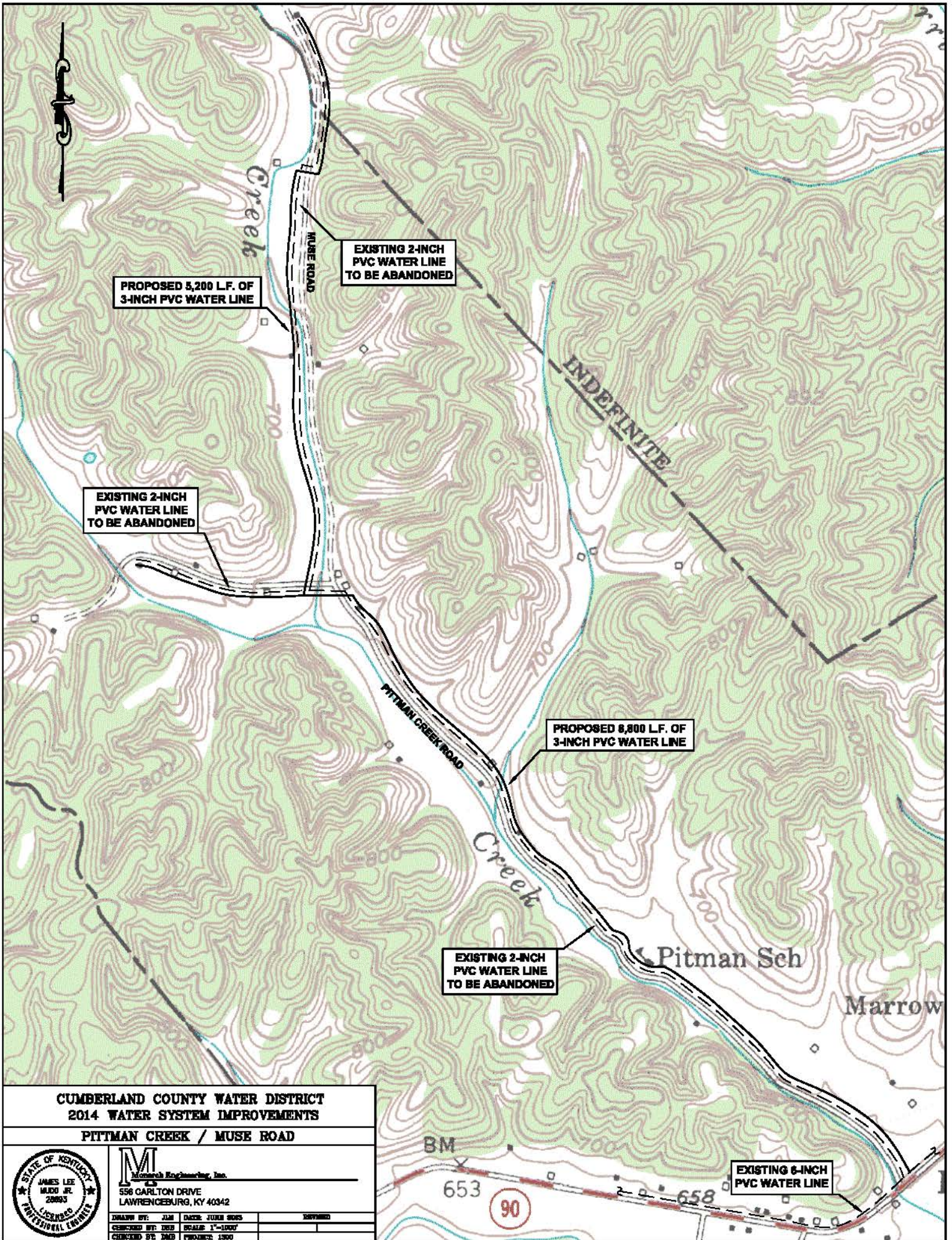
**EXISTING 4-INCH
PVC WATER LINE**

**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS
SPOON BRANCH ROAD**



M
Mudd Engineering, Inc.
568 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DATE	BY	REVISION
DESIGNED BY: JLM	DATE: JUNE 2013	REVISED
CHECKED BY: JLM	SCALE: 1"=100'	
DATE: 2013	PROJECT: 1000	



PROPOSED 5,200 LF. OF 3-INCH PVC WATER LINE

EXISTING 2-INCH PVC WATER LINE TO BE ABANDONED

EXISTING 2-INCH PVC WATER LINE TO BE ABANDONED

INDEFINITE

PROPOSED 8,800 LF. OF 3-INCH PVC WATER LINE

EXISTING 2-INCH PVC WATER LINE TO BE ABANDONED

EXISTING 6-INCH PVC WATER LINE

**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS**

PITMAN CREEK / MUSE ROAD



M
Monarch Engineering, Inc.
556 GARLTON DRIVE
LAWRENCEBURG, KY 40342

DESIGNED BY: JLM	DATE: JUNE 2014	REVISED:
CHECKED BY: JED	SCALE: 1"=100'	
CHECKED BY: JED	PROJECT: 1500	

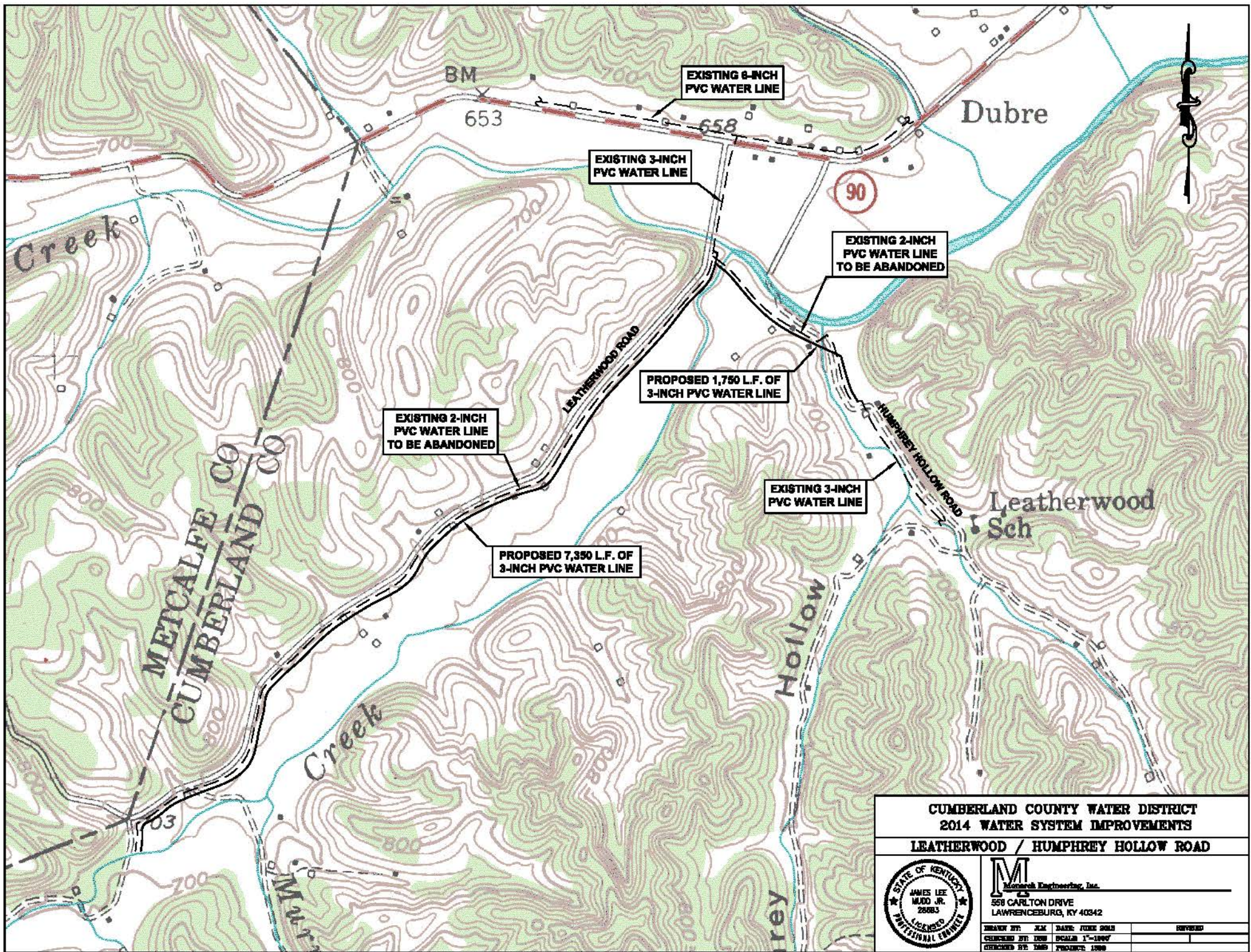
BM

653

90

658

Pitman Sch
Marrow



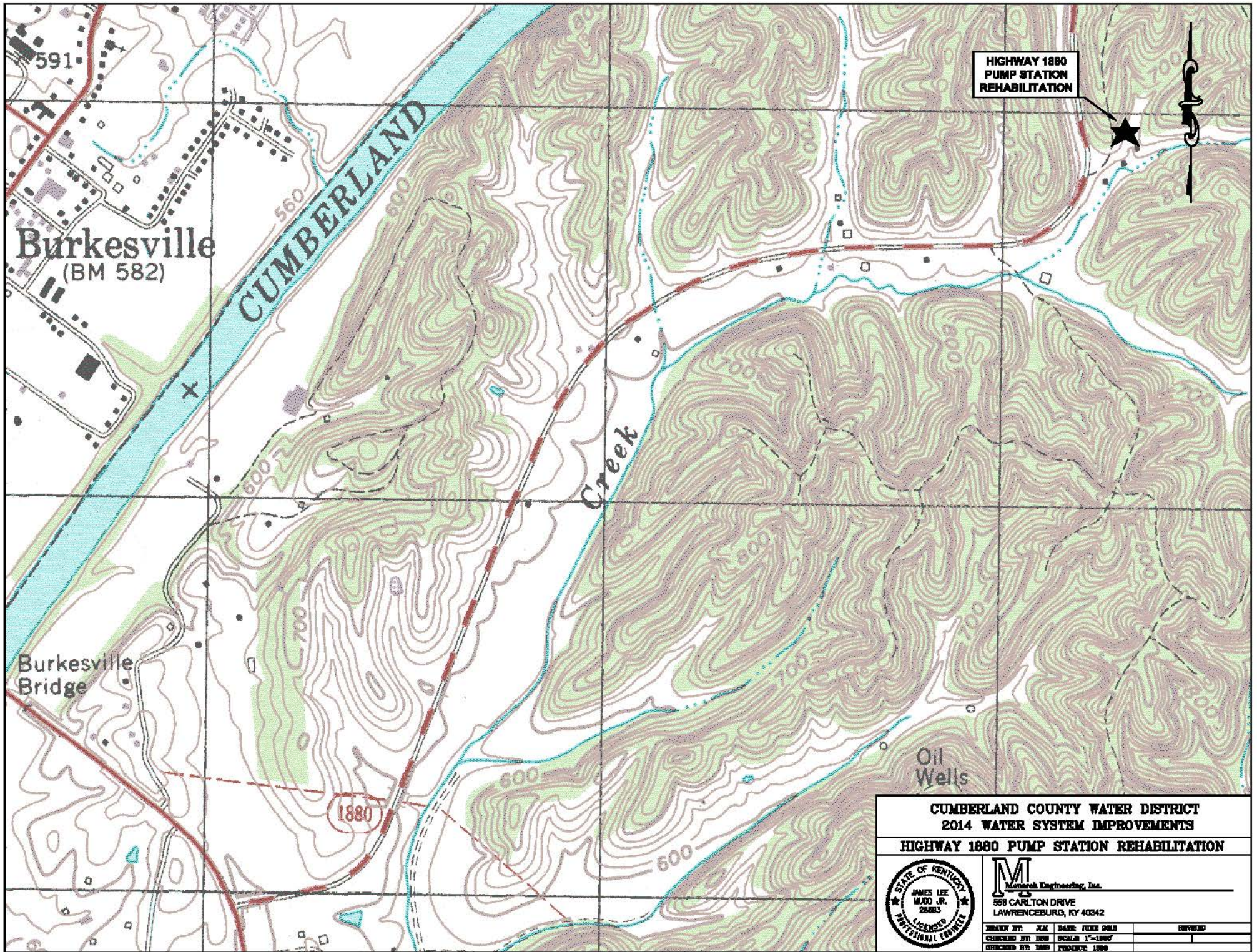
**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS**

LEATHERWOOD / HUMPHREY HOLLOW ROAD



M
Mudd Engineering, Inc.
558 CARLTON DRIVE
LAWRENCEBURG, KY 40342

ISSUED BY:	DATE:	SCALE:	REVISION:
DESIGNED BY: JLM	DATE: JUNE 2013		
CHECKED BY: JLM	SCALE: 1"=100'		
DATE: 2013	PROJECT: 1000		



**HIGHWAY 1880
PUMP STATION
REHABILITATION**

Burkesville
(BM 582)

Burkesville
Bridge

CUMBERLAND
River

Creek

Oil
Wells

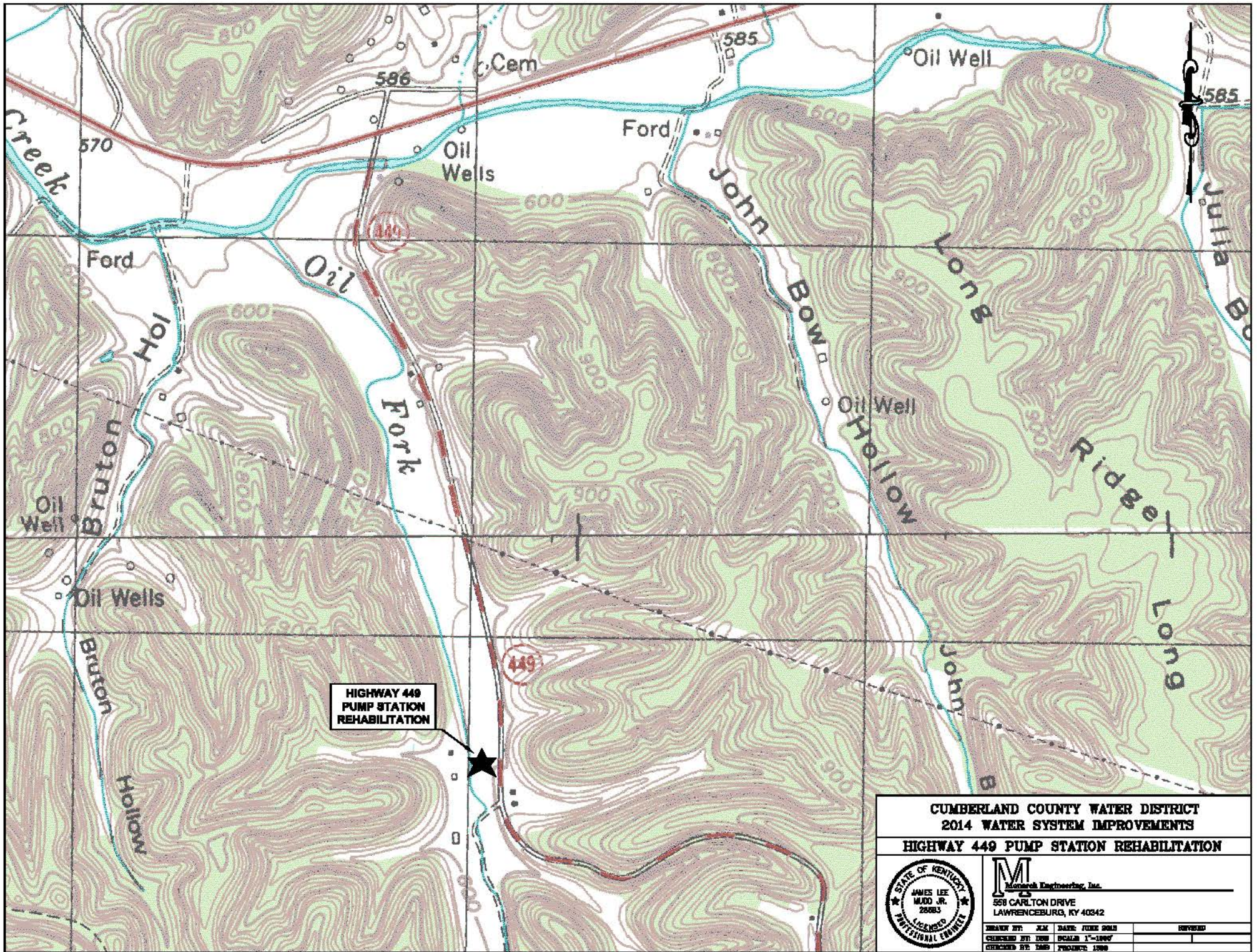
1880

**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS
HIGHWAY 1880 PUMP STATION REHABILITATION**

M
Merritt Engineering, Inc.
568 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DESIGNED BY: JLM	DRAWN BY: JOHN SMITH	REVIEWED:
CHECKED BY: JMS	SCALE: 1"=100'	
DATE: 10/10/14	PROJECT NO: 14000	

STATE OF KENTUCKY
JAMES LEE MUDD JR.
28083
LICENSED PROFESSIONAL ENGINEER



**HIGHWAY 449
PUMP STATION
REHABILITATION**

**CUMBERLAND COUNTY WATER DISTRICT
2014 WATER SYSTEM IMPROVEMENTS
HIGHWAY 449 PUMP STATION REHABILITATION**



M
Mansueti Engineering, Inc.
568 CARLTON DRIVE
LAWRENCEBURG, KY 40342

DESIGNED BY:	DATE:	SCALE:	PROJECT:
JLM	JUNE 2013	1"=100'	
CHECKED BY:	DATE:	SCALE:	PROJECT:
LM	JUNE 2013	1"=100'	